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A review on considerations required to educate new doctors

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Abstract

The long process of medical education is one of the most crucial parts related to public health. This study was conducted to review the educational alternatives in teaching new physicians.

The necessity for a revolution in the medical education is due to the increased number of medical students, constant number of patients, and their expectations, increased workload of professors and increased regulatory agent oversight, fewer clinical experiences occurring for medical students, interns and residents. Newer techniques have become available in improving education. Stimulation has been used before as an educational technique in military training, space programs, aviation industry, sports stimulation, nuclear power industry, teaching anatomy, anesthesiology, and resuscitation training. Physical models (in a skills lab or workshop), computer programs including (over the internet), standard patients, etc., can be used for this technique. By reviewing the literature, we can conclude that several questions are required to be answered before education. Thus, in order to conduct an accurate program, these questions must be answered, appropriately.

Keywords: medical education, public health, educational alternatives, physicians

Introduction

Medical training is a long procedure that takes four to 12 years of education. It is a collection of lectures, tutorials, clinical experiences and night shifts and contains socialization experience, acquiring knowledge, attitudes, skills, values and sense of ethics [1-3].

The scope, type, and timing of medical schools vary worldwide. Recently, health services of many countries have felt the need to change their educational system to better prepare future doctors for their role and provide the highest quality of care to patients and modify current methods which are known to be dehumanizing, depressing, rigid and abusive [1,4-9].

Due to the increased number of medical students, the constant number of patients and their expectations, and increased regulatory agent oversight, fewer clinical experiences are occurring for medical students, interns and residents [1,10]. Also, the increased workload of professors reduces the opportunity to improve education. Thus, the current model of "learning by doing" has to change, especially because it involves real patients [1,11].

Education focused on specific skills or procedures can increase self-confidence and competence of the students [11]. On the other hand, studies have shown that specific skills such as an appropriate communication between patients and their physician increases health outcomes (such as patient understanding and recall, symptom resolution, treatment adherence, and patient satisfaction) and decreases malpractice and medical errors [4,12-14] 1B. Also, fewer malpractice claims occur after a good communication [15-17]. These skills are important parts of practice and are carefully evaluated before granting practice license in many countries. Relying on few experiences that may or may not occur during rotations does not seem to be efficient and may lead to the unpreparedness of the future physicians [18].

There are many tasks required to master a procedure; developing cognitive skills to know indications and contraindications, expanding technical expertise, learning to interpret the results, developing communicational skills and bedside manners, and how to obtain an informed consent [19]. Studies have shown that students have high anxiety and low levels of confidence performing various skills [11,20,21].

These core skills can be taught to students. However, there are many challenges that are needed to be defeated. The most important problem is the process of teaching a large number of students in a limited period. Due to the crowded curriculum of medical schools, several medical skills have not received their requiring dedicated timing and the relying on current resources has not efficiently solved this problem. Time shortages on both ends (students and educators) are a challenging part of the medical skill education [11,20]. Even among these skills, the personality development (including
communicational skills, development of ethics sense, etc.) 
has been undermined. Performing these skills and mastering them during clinical experiences and patients' exposures are the most often implemented teaching methods. However, due to variable and sometimes, lack of supervision [19,22].

A study conducted by Wickstrom et al. showed that residents had performed only 15.4 percent of the required procedures frequently enough to be confident during the procedures [23]. Wigton et al. also showed that less than half of the residency program directors believed that their residences had mastered basic procedural skills [24]. Other studies have shown that new residents should learn the procedural skills exactly as medical students. However, many institutions use their residents to teach these skills to medical students [19].

The time of the student teaching has never been this brief. However, studies have shown that a short course, even a one day course, can significantly increase the students’ skills leading to a better health outcome and a significant increase in the physicians’ job satisfaction [11,19-21,25].

Previous studies have reported a reduced clinical experience for medical students and fewer case encounters [1], which led to a lower proficiency on implementing the required skills [26-28]. Another reason for fewer procedural experiences is that nurses, IV teams, phlebotomists and other hospital staff, routinely conduct basic skills [6,19]. Other than fewer clinical experiments for students, this leads to fewer opportunities for faculty members and many of them perform each procedure fewer than ten times per year. Thus, they feel uncomfortable to teach them to the students [29]. In turn, it results in fewer educational positions for the medical students since residents might lack the confidence or rather keep the experience for themselves. The unpreparedness of students creates two other obstacles; it is unethical to learn the procedures on real and actual patients, and that patients are not willing to let trainees perform procedures on them. Another obstacle can be that students might not be comfortable to perform these tasks on patients [28,30,31].

Studies have shown that logging the number of procedures can improve proficiency and provide further opportunities for students to perform procedures [32]. Students should be assessed to have a level of competence before performing procedures on patients. This assessment can be conducted by evaluating their ability to interpret the results of similar practice, ask the indications and contraindications to assess their knowledge, and finally, conduct the experiment on animal models or stimulated patients [25,33].

Stimulation as an educational technique

Stimulation has been used to teach various skills before. The first place that used stimulation for education was the military. Also, space programs, aviation industry, sports stimulation (such as chess, etc.), and nuclear power industry are other samples of stimulation implementation. In medical education, teaching anatomy, anesthesiology and resuscitation training have used stimulation for some time and their experience has proven to be successful [34-36].

Simulation can be conducted by using physical models (in a skills lab or workshop), computer programs inclusion (over the internet), standard patients, etc. This method offers many benefits. It provides a planned exposure to clinical situations and realistic learning environments. Students can repeat their experiences many times in a safe and controllable environment [11,18]. The use of this technique has previously been proven in military training and for curing psychological disorders [36-39]. Learners can practice infrequent clinical conditions in a protected environment [40,41].

However, the limitation of information regarding this method might prevent many organizations from implementing this technique.

Stevens et al. conducted a study to investigate the usage of virtual patients in teaching clinical and communicational skills to medical students. They reported many problems in understanding the students’ queries which can lead to the student becoming exhausted and can result in education failure [18]. They concluded that using virtual patients can decrease the expenses compared to standardized patients and an endless repository of clinical scenarios can be made. They added that this method could comply with different educational needs and provide a safe educational environment for students. Participants of that study recognized the implementation of virtual instructor as a powerful educational tool [18].

Meyers et al. conducted a study to investigate the effects of teaching technical skills to medical students during their surgery clerkship. They assigned third year students to a three-week program and taught knot tying, foley catheter and nasogastrical tube placement, sutureing, I.V. placement and arterial puncture. They also used a self-reported checklist to report their skill before and after the intervention. They showed that all skills were better performed after the intervention, however, the increase in NG tube insertion and removal were not significant. They concluded that introducing specific technical skills during clerkship could improve the skills of the students [11].

Stewart et al. conducted a study to determine the outcomes of pre clinical skills course on the proficiency, anxiety, and confidence of medical students while performing these tasks. The skills included reading electrocardiograph, abdominal and chest x-rays, obtaining bedside chart data and interpretation of them, knot tying, nasogastrical tube insertion and removing, sutureting, sterile technique, obtaining an informed consent, intravenous catheterization and Foley catheter placement and removal. A self-reporting checklist was distributed between the participants, before and after intervention. They showed...
that proficiency and self-confidence of students significantly increased in all taught areas after the four hour course [20].

Use of workshops to teach procedural skills
Many medical schools have developed workshops that provide experiments [21]. These workshops are occasionally carried out for pre-clinical students who are at their third or fourth year of medical school [42,43]. These centers can provide opportunities in an organized way and the teachers are not necessarily physicians [44]. However, non-physician trainers are carefully assessed and their competency is certified. Before conducting the procedure on patients, students must pass a relative quiz and perform the experiments on plastic models. After passing these steps, the student must execute the procedure on actual patients while being supervised and after successful attempts, students get authorized to perform those tasks [19].

Use of standardized patients
Some universities and medical education organizations use standardized patients to teach their students and increase their clinical experience. This method has its own advantages compared to real patients. However, the use of this method is limited due to its high expense [18].

Use of computer and internet to teach the required skills
Due to the rapid advancement of computer technology, computer and internet technology are considered for entering the main stream of health care education. After the introduction and development of internet, it has been considered as a powerful source of information for many fields, including physicians [11,45]. Providing an interactive and multimedia experience that simulates a real patient, lets the learner act as the physician and submit his experience, can be useful to students, residents and even graduated and licensed doctors [46]. However, the use of internet to teach skills is limited and is mostly used for CME learning and the efficacy of teaching medical students and inexperienced learners should be examined [47,48].

A challenge in using this technology is that they eliminate the non-verbal skills and the student might fail to recognize it as a crucial part of the communication [49].

We reviewed few additional techniques that can help students and residents achieve competence in required skills. However, it must be kept in mind that none of them is enough and they can only replace very early stages of clinical education. Further studies are needed to evaluate the effects of teaching aids on patient care and health care costs [44].

Discussion

Based on the reviewed literature, a number of questions should be answered prior to clinical education:

1. Which skills and procedures should be mastered by medical students or residents?
2. When should they start to learn the procedures and skills?
3. Who should teach the procedures and required skills to medical students?
4. Which method should be used to teach these skills?
5. How many performances are needed for competency?
6. What items should be evaluated to see whether they have mastered the skills or not?
7. How should this evaluation be performed?

The type of skills that are necessary to learn should be reassessed in different environments [50].

Even though anybody who can teach these skills should be welcomed (such as fellow medical students, interns, residents, professors, etc.), it is best to train the students using hospital personnel who are actually involved with those specific procedures in a daily base; nasogastric tube and urethral catheter insertion and removal can be taught by nurses, placing intravenous catheters can be educated by IV teams, arterial punctures can be taught by respiratory therapists, laboratory staff can teach preparing specimens, and residents and attending can teach more specialized procedures [4,11,19,51,52]. However, as mentioned earlier, hospital staff involved in the medical training must be carefully assessed and certified.

McLeod et al. have suggested standards for teaching educational skills [10,51]: 1. Assessing the needs and preparing the student, 2. Clearly performing the techniques and providing educational commentaries, 3. Asking the student to perform the procedure and carefully observing the learner and encouraging repetition, 4. Providing appropriate feedback, 5. Pointing out the strengths and weaknesses while encouraging the students, 6. Developing various situations and scenarios for the students to repeat the practice, 7. Understanding that each learner’s abilities and characteristics are different and are prepared to modify the approach.

Using an appropriate evaluation method is crucial to assess student skills. Some studies have suggested self-assessment as a tool for the evaluation of the proficiency of students and it is recognized as an essential part of skill building. Especially since students can review and analyze their own skills [4]. However, various studies have shown that it is inefficient and students are prone to overestimate their abilities [52-56]. Overall, since it allows faculty members to see what the students observe and value and thus, provide invaluable feedback, self-assessment is an important tool and must not be forgotten [4].

Some studies suggest videotaped encounters with simulated or standard patients along with self-reporting tools to increase the precision and accuracy of the assessment [57-62].

The early introduction of additional methods to medical students can increase the chances of mastering the required skills. However, it is needed to carefully evaluate the concepts learned by these learning aids and
assess whether they are applied on actual clinical experiences or not [20,52,63]. The final thing to remember is that despite the development of all these methods and techniques, none of them are able to replace the actual clinical experience and all these methods are only preparing students to achieve the maximum possible experience possible [44].

Conflicts of interest
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References


Preventing medication errors in pediatric and neonatal patients

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Abstract
Medication errors are the most common that occur in hospital settings. Various factors make the pediatric population more susceptible to medication errors and potential complications resulting from medication administration. These include the availability of different dosage forms of the same medication, incorrect dosing, lack of standardized dosing regimen, and organ system maturity. Electronic databases such as MEDLINE, EMBASE, International Pharmaceutical Abstracts, ASSIA, PsycINFO, British Nursing Index, CINAHL, were searched between 1985 and December 2014. Study Selection Inclusion and exclusion criteria were applied to identify the eligible publications through title analysis followed by abstract and then full text examination. Medication errors were most often reported in pediatric and neonatal patients. This was in consensus with literature data regarding the occurrences in other specialties. Fatal or life-threatening harm due to medication errors was not often reported. However, most studies reported that the potential for the patient’s impairment as a result of an error was a significant problem. Investigation of types and level of medication errors may lead to steps towards the prevention of these errors and the improvement in the quality of neonatal care and safety.

Keywords: Medication errors, pediatric and neonatal patients, fatal

Introduction
Medication errors are defined as any avoidable event that may harm the patient as a result of professionals or patients and potentially more dangerous in the pediatric population than in the mature population [1]. These errors may be related to professional practice or to health care procedures or systems, including prescription failures, drug naming, preparation, dispensing, distribution, delivery, education, follow-up, and use. Medication errors may or may not result in an adverse effect; many errors do not cause damage or injury, but indicate a low level of safety in health assistance [2]. Deliberation of different literature sources extended to which medication errors contribute to patient morbidity and mortality in the pediatric population, as much of the research has examined the adult population [3]. According to the National Coordinating Council for Medication Errors Reporting and Prevention no incidence rate for medication errors are acceptable, and for the prevention of medication errors in health care systems it should be to constantly improve [4]. Therefore, to decrease medication errors and progress in patient welfare through safe medication practices, interventions are necessary. It is a vital part of innocuous patient care, especially in the neonatal population avoiding medication errors. The medication stages process include ordering/prescribing, transcribing/verifying, dispensing/delivering and administering; pediatric medication errors could occur at each stage of the process [5]. Nursing Interventions Classification (NIC) define Medication administration as preparing, giving and evaluating effectiveness of prescription and nonprescription medications [6]. A medication error is any preventable event that may lead to patient impairment while the medication is in control of the health care professional or patients [4]. An adverse drug event is a harm that appears as a consequence of a medication or of the lack of an intended medication [3]. It should be noted that not all medication errors cause an adverse drug event. As previously mentioned, medication errors happen more commonly in the pediatric inpatient and neonate population than in the mature population. Studies indicated that medication errors in pediatrics were three times higher than in mature populations [7]. According to the findings of Antonow, out of 200 consecutive prescribing errors in a medical care hospital, 69.5% were pediatric patients [5]. A different range of factors that could lead pediatric population more sensitive to medication errors, and possible difficulties resulting from medication administration were also highlighted. Different dosage forms of the same medication are one of the main reasons for potential error. Many medications for
children are produced in different liquid concentrations, and multiple medication formulations may lead to dosing errors [8]. Improper dosing is the most commonly reported medication error in pediatrics [9]. One reason for the mentioned problem is limited standardized dosing regimens for children as compared to adults. Furthermore, most pediatric medication dosing is based upon body weight, which requires a dosage calculation, and can lead to an error. This is believed to be the reason why children are at a greater risk for adverse drug events. Children vary in weight, body surface area, and organ system maturity; all of which affect their ability to metabolize and excrete medications [9]. Moreover, children are often unable to adequately communicate when they are experiencing an adverse effect and have a limited internal physiologic capacity to buffer medication errors in comparison with adults [8]. Because literature suggests that medication errors occur more frequently and are more concerning in the pediatric population, a systematic review of medication administration errors and the pediatric population is warranted. The goal of the systematic review is to search for practice-based articles, systematic reviews, and/or research articles on medication errors in children in the inpatient pediatric population, including frequency of occurrence, types of administration errors that occur and possible causes of medication errors in this age group. The purpose of the current review is the assessment of medication and nursing literature related to medication administration errors in the pediatric and neonatal patients.

Methods for Review

Electronic databases; MEDLINE, EMBASE, International Pharmaceutical Abstracts, ASSIA, PsycINFO, British Nursing Index, CINAHL data bases were reviewed for articles published between 1985 to December 2014. MeSH terms used initially for the systematic review were “medication errors” and the search was limited to English-language publications in nursing journals that were specific to the pediatric population. The rationale behind limiting the search to nursing journals was that nurses are often the ones who administer medications, so it was believed that this would capture all articles related to medication errors that occurred during administration. The titles and abstracts were reviewed for every article, and articles were omitted if they did not relate to medication safety, including medication administration or medication errors, or if they did not pertain to administration of medication.

Results

Medical errors have become a major issue among healthcare consumers in recent years. The 1999 Institute of Medicine report “To Error is Human: Building a safer health system” states that 44,000 to 98,000 hospitalized Americans die each year from medical errors [10]. This landmark report galvanized professional, political and social forces into action. For adults, the reported incidence of errors in treatment with medication ranges from 1-30% of all hospitalized admissions [10] or 5% of orders written. In pediatrics however, this number has been reported as high as 1 in 6.4 orders [10]. Also there is a significantly increased rate of medication error resulting in harm or death in pediatric patients [11]. Drug errors associated with morbidity and mortality increased inpatient healthcare cost by an estimated $4700 per hospital admission or approximately $2.8 million annually for a 700-bedded teaching hospital [12]. The economic burden for all areas of healthcare from drug misadventures exceeds $100 billion annually in the United States. The data regarding the incidence and economic impact of medication errors is lacking in the developing world [13].

Classification of medication errors:

Medication errors based on many classifications according to different categories:

A) Based on stage: ordering (unambiguous prescription: omission of drug name; drug formulation; route; dose; dosing regimen; date; signature; time), Transcription (an identical copy of the prescription in the medical record: discrepancy in drug name; drug formulation; route; dose; dosing regimen; omission of drug; unordered drug), dispensing medication is concordant with prescribed drug in nurse medication chart (Unordered drug (wrong drug); unordered dose; omission of dose; wrong dose; wrong drug formulation) administering the right medication to the right patient in the right way and at the right time, discharge summaries, Eligible prescriptions in medical record are identical to prescriptions in discharge summaries (Discrepancy in: drug name; drug formulation; route; dose; regime; omission of drug; unordered drug).

B) Based on the onset: active which have an immediate effect like what happens if you give the patient adrenaline instead of furosemide for blood transfusion and he develops hypertension, tachycardia, latent error has a delayed effect and can be prevented before it recurs. For example, if the pharmacist misread the prescription because it was poorly written, the prevention of the recurrence of this type of error is to analyze future prescriptions more carefully and verify the medication.

C) Based on severity: Potentially serious errors that can cause permanent harm to patients and may increase hospitalization or the need for additional treatment like an overdose of potassium chloride in total parenteral nutrition; clinically significant errors can increase the need for patient monitoring e.g. Tazobactam 4 gm twice daily to a septic obese patient; clinically non-significant error that
does not harm the patient, Pantoprazole IV in a patient who can swallow.

D) Based on medication error index: Circumstances or events that have the capacity to cause error, an error occurred but the medication did not reach the patient, an error occurred that reached the patient but did not cause harm to the patient, an error occurred that resulted in the need for increased patient monitoring, but no patient harm, an error occurred that resulted in the need for treatment or intervention and caused temporary harm to the patient, an error occurred that resulted in initial or prolonged hospitalization and caused temporary harm to the patient, an error occurred that resulted in permanent harm to the patient, an error occurred that resulted in near-death event, and an error occurred that resulted in patient death [14,15].

Predisposing factors for medication errors

Related statistics show that of the 25000 medication error reports received by the FDA, 12.5% of the errors are related to names [11]. Furthermore, a recent FDA study of 400 deaths caused by medication errors found that 5% of deaths were attributed to proprietary name confusion and 4% to generic name confusion [14]. It is reasonable to extrapolate these statistics to predict that the incidence of medication errors in Canada are similar to those of the U.S., especially since many sponsors strive for global consistency in the branding of their products. Errors may also occur due to improper selection of administration devices [improper selection of insulin syringes]. In general, the Institute of Safe Medicine Practices (ISMP) identifies the following areas as potential causes of medication errors: failure in communication [hand writing and oral communication], drugs with similar names, missing or misplaced zero and decimal points, use of non-standard abbreviations, poor drug distribution practices, complex or poorly designed technology, access to drugs by non-pharmacy personnel, work place environmental problem that leads to an increased job stress, dose miscalculations, lack of patient information, and lack of patient understanding of their therapy [14].

Methods to detect medication errors

Several methods are employed to detect the occurrence of medication errors: Anonymous self-reports which were reported by the person himself or a witness, they have low cost but need realization; Incident reports - a legal report documented by the hospital staff, critical incident technique that involves an in-depth analysis of a large number of individual errors to identify common causal factors, and direct observation of subjects or interviewing people who have committed the error, disguised-observation technique when the observer accompanies the person giving the medications and witnesses the administration of each dose, dispensing error detection techniques detect the preparation before administration. The dispensing of prescription medications at the pharmacy can have various errors. The wrong medication can be given, particularly when medications are named or packaged similarly. There are particular drugs that are known to have problems because their names are very similar. The pharmacy can also give out the wrong dosage of the drug in some cases. Most studies of medication errors only analyzed hospital medication usage, and there is a large volume of medications prescribed in the doctor’s offices and dispensed by pharmacies [10]. There were nearly 2.5 billion prescriptions dispensed by pharmacies in 1998 in the USA compared to an estimated 3.75 billion drug administrations in hospitals. Errors in prescription and dispensing are known but difficult to quantify. For example, the IOM report cites an Australian study for 1988-1996, which found that 2.4 to 3.6 percent of hospital admissions were due to medication events, of which 32 to 69% were preventable. The medications causing most problems were cytotoxics, cardiovascular drugs, antihypertensives, anticoagulants, and NSAIDs. [Huntley’s]. Children are not merely small adults; they have different pharmacokinetics and pharmacodynamics, even among their population they vary according to their age groups which are classified as: preterm newborn infants < 37 weeks’ gestation, term newborn infants 0–27 days infants and toddlers 28 days to 23 months; children 2–11 years, adolescents 12–16 or 18 years, vary according to the region [3]. Children have an unpredictable oral absorption, week painful muscular absorption, large surface area for skin absorption increasing risk of toxicity, relatively impaired renal excretion, minimum liver capacity for drug metabolism; all these lead to making drug handling most serious. Dosage adjustment according to age is a quick and safe method for a drug with a wide therapeutic range like artesunate and some antibiotic to be given, however, not all children have the optimum weight for age, so weight based calculation is more perfect, some drugs being adjusted by a different weight for each age groups, surface area based dose is preserved for serious drugs (cytotoxic drugs) taking into consideration the cardiac output, renal function, body fluid status, and child health. The majority of pediatrics medications do not result in harm. Blum et al. [16] reported that only 0.2% of the errors could be classified as potentially lethal, whereas Folli et al. [17] reported 5.6% as potentially lethal. Interestingly, no actual harm was reported to children in most of the epidemiological studies. This might be because the errors were identified and rectified before any harm resulted, but it could be due to the publication bias; some healthcare providers may be reluctant to publishing studies that report patients with serious harm. Cousins et al. [18] conducted an analysis of press reports highlighting the outcomes of 24 cases of pediatric medication errors. Most of the cases reported resulted in fatal consequences, hence making the news headlines.
Types of error

The most common type of pediatric medication errors is dosing errors, especially the tenfold error. The other pediatric medication errors that have been reported in the literature, include the following: wrong drug, wrong route of administration, wrong transcription or documentation, incorrect or missing date, wrong frequency of administration, missed dose, wrong patient, drugs given to patients with known allergies, drug interaction, intravenous incompatibility, omission errors, wrong rate of intravenous drug administration [19,20].

Incidence Rate of Medication Errors

Many differences were found with regard to the way the articles were obtained and reported the incidence rate of medication errors. Holdsworth and colleagues designed a study to determine the incidence and causes of ADEs and potential ADEs in hospitalized children, and examined the consequences of those events. The reported ADE frequency was 6 per 100 admissions, and 7.5 per 1000 patient-days; the reported potential ADE frequency was 8 per every 100 admissions, and 9.3 per 1000 patient-days. Of the ADEs that occurred in this study, 24% were judged to be serious or life threatening [3]. Stratton and colleagues surveyed a convenience sample of pediatric and adult hospital nurses regarding their perceptions of the proportion of medication errors reported on their units [21]. The medication errors rates they found per 1000 patient-days were 14.8 on the pediatric unit as compared to 5.66 on the adult unit. This is higher than the results found by Holdsworth et al., and may be explained by the differences in their study design including their sampling method [3]. Ghaleb and colleagues [10] conducted a systematic review that examined the incidence rate of medication errors and categorized their results according to whether the incidence rate was obtained from chart review studies, spontaneous reporting studies or observation studies. Of the three studies included that were obtained via chart review that were specific to medication administration errors, the incidence rates were 0.15% doses administered were errant and 23.5% administration error rate [10]. The third study reviewed found that 3.9% of the 10% of patients subjected to errors were subjected to medication administration errors [10]. Differences in study designs and reporting method makes it difficult to interpret and compare the information obtained by Ghaleb et al., which they also found to be true and discussed in their review [10]. Of the two medication administration error studies included by that were obtained via spontaneous reporting, the incidence rates were 14.7 incidents per 100 admissions and 13.4 incidents per 1000 patient days [10]. Eight studies that used observation to detect drug administration errors were also included. The observation studies found that reported drug administration error rates varied between 0.6% and 27% of administrations. This included studies in which the observation was disguised and undisguised, which may explain the vast differences in observed medication administration error rates [10]. Another study surveyed nurses and found that 40.3% of the respondents indicated they had observed a medication error in at least one stage of the process during the previous week [5]. While it would be ideal to give an exact incidence rate for medication administration errors in the inpatient pediatric population, that is difficult due to differences in reporting. It was shown that some incidence rates are reported per 100 admissions, per 1000 patient days, and even as percentages of total admissions.

Medication Error Reporting

One study found that pediatric nurses estimated that only 67% of medication errors on their patient care units are actually reported [21]. This study asked for reasons as to why medication errors were underreported, and both individual/ personal and management-related reasons were selected by the participants, suggesting the need to develop a unit/ hospital culture supportive of error reporting [21]. Another study compared survey results with written incident reports and found that of the 89 medication errors observed by the nurses, the respondents indicated that only 17 of the medication errors resulted in completion of an incident report [5]. It was also found that the likelihood of preventing a medication error from reaching the patient declined in the later stages of the medication process as previously mentioned, the likelihood of a formal written incident report increased in the later stages of the medication process [5]. It was found that out of the medication errors that were not prevented and actually reached the patient, just 38% of the medication errors that occurred during the ordering/ prescribing phase were reported, 36% of the medication errors that occurred during the transcription/ verification phase were reported, 47% of the medication errors that occurred during the dispensing/ delivery phase were reported, and 65% of the medication errors that occurred during the administration phase were reported [5]. A study by Ferranti and colleagues compared a voluntary safety reporting system and a computerized ADE surveillance system with regards to frequency of rates of ADEs [22]. It was found that the incidence of ADEs was comparable with an overall rate of 1.8 ADEs per 1000 patient days with the voluntary reporting and 1.6 ADEs per 1000 patient days with the computerized system. While the incidence of ADEs was not statistically significant between the two systems, the researchers found that the voluntary system provided greater insight into system failures, such as drug omission, administration errors, and lapses in clinical monitoring. These types of errors are not easily detected by automated techniques, emphasizing the need for an approach that incorporates the strengths of each method so that the detection of ADEs in the pediatric population can be maximized. A review of the literature suggested
that attention should be placed on “near miss” medication errors [23]. A near miss is an event that did not cause harm to a patient, but had the potential to cause harm. Near misses have a high likelihood of happening again if they are not reported, and if the cause of the near miss is not corrected. It is suggested that near miss medication errors are reported in the same manner as medication errors [23]. A culture of change is needed with regard to reporting systems for medication errors [24]. Reporting systems need to be non-punitive so that individuals feel comfortable reporting medication errors. Additionally, an analysis of each reported error and potential errors needs to occur so that the underlying cause of the error within the context of the entire system can be altered [24].

To summarize, this theme found that medication errors tend to be under-reported, often due to fear of punishment. It was also found that voluntary reporting provided greater insight into system failures that lead to the error. Additionally, it is recommended that near misses are reported [24].

Interventions to prevent medication errors in children

During the last few years, professional organizations, government, and researchers have published many different guidelines and recommendations on prevention of medication errors. The following is a Summary of some important suggestions produced by the American Academy of Pediatrics Committee on Drugs and Committee on Hospital Care, Institute for Safe Medication Practices and the Pediatric Pharmacy Advocacy Group [25-27]. Prescribers should be familiar with the pediatric patients and their medications, checking drug allergies, interactions and contraindications and note these on the drug chart, confirming that the patient’s weight is correct and write the weight on each drug chart; write legible prescriptions, not exceeding the recommended adult dose, calculation double checking by other staff is recommended, checking the drug, dose and patient identity before administration, unusual volumes or dosages verification, communication with patient and caregiver. An adequate number of qualified staff and a suitable work environment for safe and effective use of medicines should be provided. Equipment [e.g. infusion pump] and measurement systems should be standardized to remove much of the risks of calculation errors as well as reduce the time required for dose calculation. Barriers to medication error reporting should be eliminated; hospitals should develop and maintain a process to inform families of errors and send feedback information to staff. Children are more vulnerable to medication errors than adults, but up to date, there have been a few studies in this area. One of the earliest studies was to determine the prevalence of errors in the medication system of a pediatric teaching hospital, and to provide direction to efforts to error-proof the system as a long-term goal, but the sample size was too small to allow a further parceling; the methods used in this study to examine the steps in the process required leaving a paper trail. The next year, Khaushal found that medication errors are common in pediatric inpatient settings, and further efforts are needed to reduce them, the rate of potential ADEs was significantly higher in neonates in the neonatal intensive care unit. Most potential ADEs occurred at the stage of drug ordering (79%) and involved incorrect dosing (34%), anti-infective drugs (28%), and intravenous medications (54%). Physician reviewers judged that computerized physician order entry could potentially have prevented 93% and ward-based clinical pharmacists 94% of potential ADEs. The study was a prospective one done on a cohort, as mentioned by Kaushal et al., in 2001. The emergency rooms present a high risk for errors and need a quick and right decision. At the same time, this may need expert opinion. Keron et al., found this in 2002; and stated that in the pediatric ED, trainees are more likely to commit prescribing errors, and the most seriously ill patients are more likely to be subjected to prescribing errors. He found that prescribing errors were identified in 10.1% of the charts. The following variables were associated in unvaried analyses with an increased proportion of errors: patients seen between 4 AM and 8 AM (odds ratio (OR): 2.45; 95% confidence interval (CI): 1.10 –5.50), patients with “severe disease” (OR: 2.53; 95% CI: 1.18 –5.41), medication ordered by a trainee [OR: 1.48; 95% CI: 1.03 –2.11], and patients seen during weekends [OR: 1.48; 95% CI: 1.04 –2.11]. There was a higher rate of errors at the beginning of the academic year among trainees [OR: 1.67; 95% CI: 1.06 –2.64]. The logistic regression revealed an increased risk for errors when a medication was ordered by a trainee [OR: 1.64; 95% CI: 1.06 –2.52] and in seriously ill patients [OR: 1.55; 95% CI: 1.06 –2.26] it was a retrospective cohort study, which might have preserved time, but it was only in summer, and this might have underestimated the errors because of the small proportion of hospital admission, adding to the fact that the retrospective design could not detect many errors in drug administration. The other factors that could influence the medication error rate, such as the interaction between parents, patients, nurses, aides, noise, and concurrent events in the ED, were not analyzed because they were not documented on the chart and could not be measured accurately. Therefore, it only focused on prescribing errors and reducing prescribing errors; hospitals should train junior doctors regarding the principles of drug dosing before they start prescribing, and enforce good practice in documentation. They should also create a culture in which prescription writing is seen as important, and formally review interventions made by pharmacists, locum arrangements, and the workload of junior doctors, and make doctors aware of situations in which they are likely to commit errors [28]. The problem of prescribing drugs to a child is represented by the need of an accurate dosage adjustment, the younger the child, the most difficult the adjustment; that was evidenced by
Chappell and Newman. They found that one third of the intravenous drug prescriptions on a neonatal unit were for doses of less than one tenth of a single drug vial [29]. Tenfold drug errors in prescribing are well documented and with the continued use of vials containing adult size doses, great potential exists for serious administration errors. Another one was in the outpatient, finding that potential medication dosing errors frequently occur in outpatient pediatrics. Studies on the clinical impact of these potential errors and effective error prevention strategies are needed. From 3 health maintenance organizations, he found that approximately 15% of the children were dispensed a medication with a potential dosing error: 8% were potential overdoses and 7% were potential under doses. Among children weighing <35 kg, only 67% of the doses were dispensed within the recommended dosing ranges, and more than 1% were dispensed at more than twice the recommended maximum dose. Analgesics were most likely to be potentially overdosed (15%), antiepileptic were most likely potentially under dosed (20%). Potential error rates were not lower at the site with an electronic prescription writer. However, prescribing errors can be preventable; the Common prescribing problems documented during chart review including the areas of allergy documentation, unsafe discontinuing, and alteration of prescriptions, unclear writing, and signing of prescriptions. Drug administration was observed. The risk areas identified included failure to follow double-checking and patient identity checking procedures, poor administration technique in the areas of inhaled/ nebulised therapy, IV drugs and oral/ gastrostomy drugs and poor documentation. The study was undergone in summer, on one hospital with a small sample size and the use of undisguised observational technique of drug administration. This may have potential effects on the behavior of the staff [30]. The physician may have a good plan and calculate his dose accurately, but nobody can read that, so using the computerized order, might help in preventing errors covered by Khowaj et al. In Pakistan they found an error rate of 5.5 with 100% compliance of computerized physician order entry, however, there was a delay in medicine delivery, they categorized the errors according to the medical job, but there was no comparison between COPE an hand writing [31]. A near study, more interested in the ICU in a London teaching hospital’s introduction of COPE, was associated with a reduction in the proportion of MEs and an improvement in the overall patient outcome score (if intercepted errors were included). Moderate and major errors, however, remained a significant concern with COPE. It was the first to compare COPE and HWP in the ICU. It was recommended that COPE was associated with a reduced proportion of MEs compared with HWP and this lowered over time. When intercepted and non-intercepted errors were combined, COPE was associated with an improvement in the error outcome scoring compared to HWP; however, the three intercepted errors that could have caused permanent harm or death, all occurred with COPE. The introduction of COPE without a decision support eliminated many minor types of error but introduced new types of errors that might be more serious. The safe prescription of medications to hospitalized children requires additional specific safeguards that are above and beyond those for adult patients.

Conclusion

Medication administration errors are a serious concern for the pediatric population. This paper presented an overview of medication errors and safe medication administration practices. Additional information regarding the pediatric population and specific factors that make this population susceptible to medication errors, were presented. Errors in dosage were found as a common reason to why medication errors occur. There was a discrepancy with regard to medication error reporting, as it was found that medication errors are underreported but the extent of them varied. Systems used to report medication errors also varied. It was found that the more the information reported on the medication error was detailed, the more it had a potential impact on leading to a system change to prevent such errors from occurring again. It was recommended that reporting systems were non-punitive so that nurses were not afraid to report errors. Additionally, more emphasis should be placed on “near miss” medication errors, as these occur frequently but are rarely reported and may provide a greater insight into system flaws. Lastly, interventions were found to reduce medication administration errors, and were congruent with current recommendations for safe medication administration.

References

Assessment of the relationship between the output of the educational systems and the assumed effective factors in Medical Education written in Data Banks and Ranking of Iran Medical Faculties book

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Abstract
Developing and expanding the universities and increasing the admission of medical students did resolve the physician shortage, but it brought down the educational quality in return. To face this problem, the administrates needed to promote the quality of education which in turn needed accurate up to date information of conditions in different universities. Information of these issues was collected by the Medical Education Council Secretariat and finally published as the Data Bank and Ranking of the Medical Faculties.

Method: Although nowadays ranking is more qualitative rather than quantitative, the above ranking was done by a statistical method. In this study, the intended statistic population consisted of the information contained in the database and the ranking of all 38 medical faculties. To perform this study, the ranking of faculties in the comprehensive entrance exam which indicated the input of educational system was considered the index at first, and then, the ranking of the faculties in the effective factors in education, was arranged according to the regulation of the input system; then outputs of the educational system were arranged according to the input system and finally a comprehensive table from all the educational information was provided. Then, the correlation of various factors in education with outputs of educational system were discussed.

Result: The correlations of each and all factors, which have an effective part on education were considered separately, collectively, and together, according to the information of the above book. No relation was found between the factors, which affected the process of education and the output in different universities. The only relation notable was the admission degree and the results of the national basic science exams. Since no meaningful relation was found between the present parameters, it seemed to be wrong to follow the path that the other parts of the world has taken in choosing the ranking factors.

Keywords: educational systems, medical education, assumed effective factors

Introduction

With the increasing acceptance of medical students, from 1323 people in 1978 to 5335 people in 1986 (and after that) and an increase in the medical faculties from 13 to 38, the problem of the shortage of physicians was fortunately resolved in Iran. Following that, the authorities at various levels including the Ministry of Health and Medical Education thought about improving the quality of education and even considered the improvement of the quality of education as one of the higher education goals, because improving the quality of education and research is one of the main concerns of the education systems in most of the countries of the world [1].

However, various studies indicated that the quality and improvement of education was a complex, dynamic process, had several dimensions and its dynamism caused the consistent striving to improvement from the educational planners in each country. Since it had various dimensions, there was not any agreement about the unification of the definition of the educational quality and its measurement methods [2] and it was necessary for each society to consider its own criteria and try to improve it, but generally it could be said that the purpose of the educational quality was to have the educational situation matched with the pre-determined standards or to have the available situation matched with the mission, goals and expectations of the beneficiaries [3,4]. A quick look was taken at the studies that have been performed in that area.

Nili Ahmadabadi [5] knew several effective factors of improving the quality of education including the following: welfare and peace of mind of students and professors, emphasis on the teaching and research, change of rules and educational structures, the establishment of the evaluation system and encouragement of the students and professors to provide the facilities.

In a research performed by Soleimani Motlagh [6] with the subject of effective factors on the quality of academic education from the view point of the faculty
members and students of Lorestan University, there was a significant relationship between the quality of education and the factors such as the content of the curriculum, the assessment methods of academic progress, teaching methods, knowledge and application of educational technology.

Following a research regarding the improvement in the quality of education, Hoveida and Mulavi [7] indicated that it was essential to have educational plans appropriated with the needs of the target population and learners and pay more attention to the indicators of improving the quality instead of the emphasis on the quantitative aspects.

In another research with the subject of the comparison of effective factors on the quality of education in the MA level of Shahid Beheshti University and Sharif University of Technology, Yomni Douzi Sorkhabi [8] said that using the criteria which are applied in the selection of faculty members and students, teaching method, organizing the educational content, organizing the educational environment and the evaluation of classroom, had an effect on the quality of education.

The result of Khorshidi et al. [9] indicated that 13 factors were effective in the efficiency and improvement of the quality of higher education as it follows: cost, graduates, recruitment rate, total quality management, performance of the Board, counseling of faculty members, space, research, benefits of faculty members, student distribution rate, professional growth, proportion of students with the society and participation of students in the university governance.

Ferasatk hah [10] said that needs such as the development of necessary infrastructure for distance learning, diversity of funding sources, development of the quality of assessment and acceptance systems, quality of the funding resources and faculty members, the institutionalization of evaluation and validation, becoming competitive of higher education, a three-way interaction of the university, different enterprises and government, are the factors which affect the qualitative and quantitative improving of education in universities.

In the study of Tabarsa et al. [11], which was conducted while being based on the analytic hierarchy process, the provision of educational programs were weighing 0.338, which was known as having the greatest impact on the improvement of the educational quality, and, after that, faculty members were weighing 0.246, and the support of students and professors were weighing 0.122, in the next positions being infrastructures and facilities, library services and administrative services being the priority.

In the study of Kells [12] regarding the development and application of performance indicators and improvement in the quality of higher education performed in 11 countries, the creation and development of programing in the area of performance indicators, which led to an improvement in the quality of higher education, were considered.

Also from UNESCO viewpoint, the quality in higher education is a multidimensional concept and it cannot be said that it follows or is obtained from a public theory or a general pattern, but the quality of education system is a special case, which meets particular needs of society at a particular time and place [13].

In a research which was performed by Lagensen et al. [14], 11 aspects of effective factors in the quality of education were identified, as it follows: team cooperation, information and accountability, proposed academic subjects, university facilities, the activities related to teaching, internal assessments, computer facilities, cooperation and comparison of factors after the study and library resources. The Research Association of America [15] mentioned that the relationship of graduates, cost, total quality management and performance of the faculty members were the most important factors in the improvement of the quality and efficiency of higher education.

In another research by Lomas [16], it was shown that the quality culture, importance of education, high quality of new teachers, their ongoing professional development, careful review of the professors’ teaching, should be stressed in order to improve the quality of education.

Borden and Bottrill [17] mentioned the graduates’ relationship, cost, and performance of faculty members, research, and participation of students in the university governance as the effective factors in the improvement of the quality and efficiency of universities.

In their researches, Care and Hanney [18] found that the following 14 factors were effective in improving the quality and efficiency of higher education centers: input, process, output, research, evaluation, space, costs, extracurricular services, discipline, hygiene, communications, informing, press, and physical education.

Moreover, in a study, Harbour [19] found the following 20 factors which were effective in improving the quality and efficiency of higher education centers: student participation, recruitment rate, scientific resources, graduates, performance of the faculty members, research cost, benefits of the faculty members, space, libraries, student distribution rate, management, communication with graduates, graduates’ welfare, career growth, the proportion of students with the society.

In another study, Cabal [20] mentioned 14 indicators as the ones to improve the quality and efficiency in universities: teaching characteristics, the results of scores, the cost per student, value-added return rate, academic failure rate, employment of graduates, evaluation by students, number of researcher students, number of publications, inventions and official documents, the quality of research, research income, degree of
popularity and acceptance, evaluation by homogeneous groups.

Also, in another study, Raharjo et al. [21] indicated that the factors such as place, facilities, educational programs, administrative services and communication with the outside world are the important factors in improving the quality of education, these being considered effective factors on the quality of higher education.

In a study with the subject of evaluation of the effective factors on the quality of education in universities, which was conducted by Tsinidou et al. [22], with the use of analytic hierarchy process, it was indicated that educational programs and faculty members have the greatest impact on improving the quality of education.

In a study with use of analytic hierarchy process, Li et al. [23] evaluated the effective factors on the quality of higher education and found that financial support, appropriate allocation of financial resources and up-dated resources were the effective factors on improving the quality of education.

The above-mentioned studies indicated that different and various factors were effective on the education and its quality, and there was not any clearer way and shortcut for the improvement of the quality of education. To achieve this goal rapidly by its performance and also to improve the quality of education at the beginning, a detailed and accurate knowledge of the current state of education and in general knowledge and identification of the strengths and weaknesses of the current education system was essential and then its improvement, information which were not available in the educational system of Iran. So, in 1998, the authorities of the Ministry of Health made the Secretariat of the Council of Graduate Medical Education responsible for collecting the data from all the medical faculties across the country and finally, after two years, in 2000, led to the release of a very good and rich collected data database of the medical universities ranking of Iran (information bank and ranking) [24]. The criteria for the ranking of faculties were divided into three main educational, research and facilities groups, weighing 51%, 23% and 26%, respectively, and according to these weights in Table 1-1 of the database and ranking, a total ranking of different faculties in the education criteria it was stated that only the educational and ranking, a total ranking of different faculties in the educational system were discussed. Although nowadays, ranking is qualitative rather than quantitative, the above ranking was performed by a statistical method. In this method, different standards and their values were defined and at the end of the rank, each university was calculated by a linear formula. These factors consisted of education (51%), research (23%) and equipment (26%). In the present research, 51 percent of the educational institutes were investigated.

In order to evaluate the relationship between the above factors with outputs of the system, correlation coefficient and multiple regression were used. However, these concepts needed to be explained at first: the correlation between variables indicated the way changes in one variable cause changes in other variables, the statistical indicator showed the extent and scope of that correlation, being called Correlation coefficient and determined the magnitude and direction of the correlation between two variables, although these two were independent. To calculate the correlation coefficient, Pearson’s correlation coefficient was used, which was available in different statistic software. In the multiple regression analysis, the correlation and relationship of a dependent variable with various independent variables were considered at first. For this purpose, the simple correlations of the dependent variable were calculated with every single independent variable and then the factors that had the highest simple correlations were entered into the multiple regression models to regression F being less than the F table. At that time, the multiple regression was stopped and the last acceptable step of
the multiple regression determined how many percentages of the dependent variable’s changes were influenced by the changes of independent variables entered to the model.

Results

According to the Table 1-1 database and ranking of the universities that mentioned the ranks of different universities in the education criteria, the University of Baghiyatallah, which was a newly established one, and the University of Tehran, which was the oldest one were ranked as third and eighth respectively. In addition, it was decided that different educational outputs of both universities should be evaluated to identify their effective factors, so, for this purpose, related factors to the system inputs including ranks of universities in the comprehensive entrance exam from the Table 1-2 database and ranking and outputs of educational system including basic science and pre-internship comprehensive board exams, assistant reception and graduating rate were extracted from Tables 1-22, 1-23, 1-24 and 1-25 of the database and ranking book for universities of Baghiyatallah and Tehran (Table 1).

Table 1. The comparison of the outputs with ranking in the entrance exam of two universities of Tehran and Baghiyatallah

<table>
<thead>
<tr>
<th>university</th>
<th>Ranking in the entrance exam</th>
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<th>Residency</th>
<th>Basic science comprehensive test</th>
<th>Pre-internship comprehensive test</th>
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The results indicated that the University of Tehran had an appropriate rank in all outputs to its inputs, except for the pre-internship comprehensive board exam, which became the eleventh, and the University of Baghiyatallah had an appropriate rank in all outputs to its inputs and the rank in the entrance exam except for the pre-internship comprehensive board exam which became the third. In addition, it was observed that the rank of the pre-internship comprehensive board exam of both universities was not appropriate for their inputs of the educational system. Therefore, to evaluate more, we referred to Tables 1-2 and 1-25 of the database and ranking and evaluated the ranks of 1-10 universities of the entrance exam and 1-10 ranks of the pre-internship comprehensive exam. It was observed that the rank of the pre-internship comprehensive board exam of the first to the tenth university in the comprehensive entrance exam were the one shown below (In parentheses): University of Tehran (11), Shahid Beheshti (16), Shiraz (14), Mashhad (18), Iran (28), Isfahan (9), Tabriz (32), Gilan (20), Qazvin (19) and the first to tenth ranked universities of pre-internship comprehensive exam in the entrance exam had the ranks as the ones below (In parentheses): Universities of Yasouj (35), Baghiyatallah (38), Shahed (14), Semnan (27), Lorestan (32), Yazd (16), Kordestan (36), Isfahan (7) and Bushehr (33).

As the second step and in order to evaluate the effect of every single assumed factor in the process of education, the correlation of the effective factors of the education criteria mentioned in the database and the ranking with different outputs of the educational system were assessed. For this purpose, Table 2, which was a complete table of the information related to the system inputs, effective factors in the process of education and outputs of the system, was used and a correlation coefficient of different assumed effective factors in education was calculated with the system outputs and the results were presented in Table 3. The correlation coefficient presented in Table 3 indicated that there was a significant and negative relationship between the graduating rate (Table 1-22) with different factors, including density of basic science and pathology classes with the correlation coefficients of (-0.61) with P<0.001 and (-0.65) with P<0.001, respectively, and it also had a significant relationship with the factors of absolute and per capita of faculty members and per capita of basic science and pathophysiology and clinical faculty members with the correlation coefficients of (0.4) with P<0.001 and (0.34) with P<0.001 and (0.32) with P<0.001 and (0.44) with at least P<0.05 and the graduating rate had no relationship and correlation with the other assumed effective factors such as the educational beds and training courses per capita, density of clinical class, educational facilities per capita, the way the curriculum presented, internal tests, clinical educational activities, inter-section training, clinical education, informing and the supervisor.

Residency for specialized courses (Table 1-23), as one of the outputs of the education system had a negative relationship with factors such as density of basic science, pathophysiology and clinical classes with the correlation coefficients (-0.75) P<0.001 and (-0.66) with P<0.001 and (-0.47) with at least P<0.04 and 0.67 with P<0.001 and had a relationship with the factors of absolute per capita of faculty members and per capita of basic science and pathophysiology and clinical faculty members, the way the curriculum presented and the inter-section training with the coefficients of (0.74) with P<0.001 and (0.67) with P<0.001 and (0.64) with P<0.001 and (0.76) with P<0.001 and (0.50) with P<0.001 and (0.51) with P<0.001, respectively and did not have a significant relationship with the other factors.

The correlation coefficients of the basic science comprehensive exam (Table 1-24) with different factors showed that the results of that exam with the factors of density of basic science and pathophysiology classes and
informing and supervisor had a negative relationship with the correlation coefficients of (-0.75) with P<0.001 and (-0.51) with P<0.001 and (-0.49) with P<0.001 and (-0.41) with P<0.001, respectively, and had a significant relationship with the factors of absolute per capita of faculty members and per capita of clinical faculty members with the coefficients of (0.33) and (0.45) with P<0.05 respectively and did not have any relationship with the other factors.

The pre-internship comprehensive test (Table 1-25) with the educational facilities per capita had the correlation coefficient of (-0.62) with P<0.001 and had a negative relationship with the educational bed per capita, with (-0.85) with P<0.001 and did not show any significant correlation with the other assumed factors.

The presented correlation coefficients in Table 3 indicated that the factors for educational facilities, educational bed per capita, the way the curriculum presented, inter-section education, informing, and supervisor had a significant relationship with maximum one of the outputs of the educational system.

Also, these results indicated factors such as training courses, internal tests, clinical educational activities, clinical education and educational rules did not have a significant relationship with any of the outputs of the educational system.

To determine the simple correlation coefficients between different factors and system outputs, multiple regression of different factors with the outputs of educational system were calculated. Moreover, only the density of basic science class from the effective factors on graduating rate was entered to the model and also pathophysiology faculty members and educational bed per capita from the effective factors in residency were entered to the model. Also, the educational bed per capita and the clinical faculty member per capita and supervisor were entered to the model of basic science comprehensive test and the only effective factor which was entered to the model of pre-internship was the educational bed per capita, which had a negative correlation with the coefficient (-0.85).

In the third step and for the evaluation and quantitative assessment of weights of assumed effective factors in education and the difference of different universities regarding these factors, the total weights of 19 educational factors within the first 5 universities in the input system and the entrance exam (Universities of Tehran, Shahid Beheshti, Shiraz, Mashhad and Iran) with the last 5 universities in the input system and the entrance exam (Universities of Yasouj, Kordestan, Zahedan, Baghiyattallah and Military) were compared and the total weights of 19 educational factors were presented in the last column (Table 2), then mean and standard deviation of both groups of quintuple universities were determined, the mean above the scores was registered in the first 5 universities in the entrance exam 1110.4 ± 158 and in the 5 last universities in the entrance exam 1101.3 ± 167, that did not have a significant difference. Moreover, due to different universities, some factors had higher scores, and some factors had fewer scores and totally there was not a significant difference in the educational facilities.

Table 2. General information related to the effective factors in education and outputs of 38 universities based on the tables in the database and the ranking book

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<td>27.58</td>
<td>84.50</td>
<td>39.91</td>
<td>51.22</td>
<td>27.65</td>
</tr>
</tbody>
</table>
### Table 3. Simple correlation coefficient of the effective factors in education with outputs of educational system

<table>
<thead>
<tr>
<th>Tables</th>
<th>Pre-internship test</th>
<th>Basic Science</th>
<th>Residency</th>
<th>Graduating</th>
<th>Total output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1</td>
<td>-</td>
<td>-</td>
<td>0.56</td>
<td>0.42</td>
<td>0.53</td>
</tr>
<tr>
<td>1-2</td>
<td>-</td>
<td>-</td>
<td>0.53</td>
<td>0.54</td>
<td>0.45</td>
</tr>
<tr>
<td>1-3</td>
<td>-</td>
<td>-</td>
<td>-0.75</td>
<td>-0.75</td>
<td>-0.61</td>
</tr>
<tr>
<td>1-4</td>
<td>-</td>
<td>-</td>
<td>-0.5</td>
<td>-0.66</td>
<td>-0.65</td>
</tr>
<tr>
<td>1-5</td>
<td>-</td>
<td>-</td>
<td>-0.47</td>
<td>-0.47</td>
<td>-0.52</td>
</tr>
<tr>
<td>1-6</td>
<td>-</td>
<td>-</td>
<td>0.33</td>
<td>0.74</td>
<td>0.4</td>
</tr>
</tbody>
</table>
Table 1-1 = the results of universities comparison in educational index
Table 1-2 = the results of universities comparison in index of comprehensive entrance exam
Table 1-3 = the results of universities comparison in index of density of basic science class
Table 1-4 = the results of universities comparison in index of density of pathophysiology class
Table 1-5 = the results of universities comparison in index of density of clinical class
Table 1-6 = the results of universities comparison in index of faculty members per students
Table 1-7 = the results of universities comparison in index of basic science level
Table 1-8 = the results of universities comparison in index of pathophysiology level
Table 1-9 = the results of universities comparison in index of clinical level
Table 1-10 = the results of universities comparison in index of educational facilities capita
Table 1-11 = the results of universities comparison in index of educational bed capita
Table 1-12 = the results of universities comparison in index of offering courses
Table 1-13 = the results of universities comparison in index of training courses
Table 1-14 = the results of universities comparison in index of internal tests
Table 1-15 = the results of universities comparison in index of clinical educational activities
Table 1-16 = the results of universities comparison in index of inter-section education
Table 1-17 = the results of universities comparison in index of clinical education
Table 1-18 = the results of universities comparison in index of informing
Table 1-19 = the results of universities comparison in index of supervisor
Table 1-20 = the results of universities comparison in index of educational rules

Table 1-21 = the results of universities comparison in the educational output index
Table 1-22 = the results of universities comparison in the graduating index
Table 1-23 = the results of universities comparison in the residency index
Table 1-24 = the results of universities comparison in the index of basic science comprehensive test
Table 1-25 = the results of universities comparison in the index of pre-internship comprehensive test

Discussion

The findings in Table 1 indicated that among the different outputs of education system, only the score in the pre-internship comprehensive test with system inputs in two universities of Tehran and Baghiyattallah were not appropriate and if we refer to Table 1-2 (score in the entrance exam) and Table 1-25 (score of pre-internship test) databases and ranking, this disproportion was observed and it was not unique for these two universities, being almost public. Moreover, all top universities in the entrance exam did not have a suitable rank in the pre-internship comprehensive test and on the other hand, high ranked universities in the pre-internship comprehensive test had low ranks in the entrance exam and that disproportion between the ranks of the entrance exam and the results of pre-internship comprehensive test could suggest that the training of medical students at the internship level in small medical universities was more successful. This matter could have resulted from various reasons including the following: A: in the newly established universities from the small cities, the ratio of patients per student in public and educational hospitals is greater than in big cities, therefore they have educational facilities, more patients and a better education. B: in small cities in comparison with big cities, more full-time clinical faculty members serve at the universities and educate students. For instance, in Yasouj, which has won the first place in the pre-internship exam, in 2004, its all faculty members (except for 1 person) served at the university.
full-time. c: because of the expensive cost in these cities, private hospitals have a less percentage of patients and a higher percentage of patients who refer to the public and educational hospitals and therefore are available for students. d: as private hospitals are less, experts spend more time in the educational hospitals and are available for students. e: due to the cultural level and low level of financial facilities in these cities, people generally do not make any difference between the private and educational hospitals and their selection criteria is the low cost, so most of them prefer to go to the public and educational hospitals. Maybe the above-mentioned reasons are part of the important reasons of failure of large universities in the pre-internship comprehensive tests, because obtaining mental and practical skills, which result from the triple relationship between the professor, student and patient in the process of education, in large universities are weak due to a large number of students.

In addition to the pre-internship comprehensive test, the simple regression of different factors indicated that the graduating rate and residency, and the results of basic science comprehensive test generally had a significant and negative relationship with the factors of density of basic science and pathophysiology classes, and also had a significant and positive relationship with the factors of faculty members per capita and clinical, pathophysiology, and basic science faculty members per capita, which indicated that the quantitative increase of the universities took place without an increase in the essential infrastructure including classrooms, faculty members and related centers. The results of multiple regression indicated that, generally, in multiple regression, the educational bed capitation, faculty members capitation and class density have entered to different models and the other effective factors by association with the above factors have been removed from the model. In the next step and based on Table 2, a trial was made to compare different effective facilities on education in the database and ranking among different universities including 5 first universities and 5 last universities in ranking of a comprehensive entrance exam, but the obtained results indicated that in general, there was no significant difference between the mean of facilities and weights of different criteria of the two groups of universities and it could result from different universities having a higher score in some proposed factors in the database and ranking book and a lower score in some factors and finally the total scores related to the educational criteria in different universities were almost the same. For instance, if we looked at the last column of Table 2 in the related rows to the density of basic science (1-3) and pathophysiology (1-4) and clinical (1-5) classes, it could be observed that all universities of Yasouj, Kordestan, Zahedan, Baghiyattallah and Military have obtained a high percentage of related score, while all universities of Tehran, Shahid Beheshti, Shiraz, Mashhad and Iran have obtained lower scores. Likewise, if we considered the factors of basic science (1-7), pathophysiology (1-8) and clinical (1-9) in Table 2, it was observed that the universities of Tehran, Shahid Beheshti, Shiraz, Mashhad and Iran have obtained high percentage of scores but the universities of Yasouj, Kordestan, Zahedan, Baghiyattallah and Military had the minimum related scores. If we referred to the table of criteria related to the educational issues in the database and ranking (page 47 of the related book), it was observed that the total weights of density of basic science and pathophysiology and clinical classes were 1.037 + 0.97 + 1.26 = 3.6 and, in general, the weights of basic science and pathophysiology and clinical faculty members capitations were 1.16 + 0.94 + 1.64 = 3.74, which did not have a significant difference with each other, indicating that different universities did not have a significant difference with each other from the viewpoint of the weights of various reasons, although some of these reasons, even with a low weight, play a decisive role in the success of students.

The correlation coefficients between the assumed effective factors with the outputs of the educational system including the graduating rate (Table 1-22) and residency (1-23) and the basic science comprehensive test (Table 1-24) and the pre-internship comprehensive test (Table 1-25), indicated that: generally, some of the assumed effective factors had a significant but negative relationship with the outputs of the educational system such as density of basic science (1-3) and pathophysiology (1-4) classes. The correlation coefficient of certain factors with the outputs is thinkable, for example the results of the pre-internship comprehensive test with the educational facilities capita and educational beds had a negative relationship with a coefficient of (-0.62) with P<0.001 and (-0.85) with P<0.001, no justification for it could be suggested, since it was expected that higher educational facilities, including the educational beds, should lead to a better quality of education and it became reflected in the pre-internship comprehensive test. The only justification which could be suggested for this, was that the distribution of facilities between universities was not based on the requirements or at least were on the basis of non-educational criteria, therefore not only further facilities have not improved education but also have had a negative effect on it. Some assumed proposed factors had no significant relationship with the outputs of the educational system like training courses, internal tests, educational activities, clinical education and educational rules which had the weights of around 13% from 51% of the total weight of the educational criteria, based on the table of the educational criteria in the database and ranking book (page 48), which indicated that some of the assumed educational criteria were not matched with the reality of medical universities of Iran. The identification of the lack of connection between the assumed factors and the quality of education of medical students caused that the Secretariat Council of
Graduate Medical Education of the Ministry of Health evaluated and ranked again with the new standards. In the recent ranking in 2011, realized by the educational deputy of the Ministry of Health [25], new factors of effective reasons in improving the quality of education were proposed and considered, which showed that the last assumed effective factors did not work and did not match the realities of the scientific centers of Iran. The new proposed effective factors in 5 different educational areas are the following: 1- The area of educational development (including removed courses, available courses and the newly established courses), 2- Management of education (including admission to higher education, clearing of information in the website of the educational deputy of the university and internal validity of the students’ test scores), 3- Qualitative development (including the key activities of the development center of the university for qualitative improvement, continuing education, the managers’ view points, special events and holding Shahid Motahari’s Festival), 4- Attention to the goals of comprehensive scientific map (including programming, performance of purposes, attention to the professional ethics and meeting the needs of society), 5- Governance (including planning and report of the activities, the activity of the university council, Councils of Education, meetings of the educational deputy, distribution of the budget, management stability and management of recruiting of the faculty [25]. But, the comments and conclusions of different researchers regarding the effective factors on the education were not used in the new evaluation and the review too.

Soleimani Motlagh [6] and Howeida and  Mulavi [7] and Yamani [8] studies of Tabarsa et al. [11], Kells [12], Raharjo et al. [21], Tsinidou et al. [22] knew that providing the educational programs is considered the most important effective factors in improving the quality of education.

Nili Ahmadabadi [5],  Khoshiri et al. [9], Farasatkah [10], studies of Tabarsa et al. [11], Lomas [16], Borden and Bottrill [17], Harbour [19] and Tsinidou et al. [22] knew that the role of faculty members was effective in improving the quality of education.

Huweida and  Mulavi [7], Khoshiri et al. [9], Farasatkah [10], Bowden and Marton [13], Harbour [19], Cabal [20] and Raharjo et al. [21] knew that the proportion of educational programs with the needs of society and being accountable to it, was considered one of the most important factors in improving the quality of education.

Khorshidi et al. [9], Farasatkah [10], Research Society of America [15], Borden and Bottrill [17], Care and Hanney [18], Cabal [20] and Li et al. [23] knew that the financial supports and variety of resources and costs were effective in improving the quality of education.

Nili Ahmadabadi [5], Soleimani Motlagh [6], Yamani [8], Farasatkah [10], Lagrosen et al. [14], and Care and Hanney [18] knew that evaluation was considered an important factor in improving the quality of education.

Nili Ahmadabadi [5], Soleimani Motlagh [6], Yamani [8], Lagrosen et al. [14], Lomas [16] and Cabal [20] mentioned the teaching method and performance of the faculty members as an effective factor in improving the quality of education.

Nili Ahmadabadi [5], Tabarsa et al. [11], Harbour [19], Raharjo et al. [21] and Li et al. [23] said that the professors’ and students’ welfare was one of the most effective factors in improving the quality of education.

Yamani [8], Khoshiri et al. [9], Care and Hanney [18], Harbour [19], Raharjo et al. [21] knew that the physical facilities and space and educational environment were the most effective factors in education.

Khorshidi et al. [9], Borden and Bottrill [17] and Harbour [19] knew that the students’ participation in the university governance, were effective in the quality of education.

However, from the UNESCO’s viewpoint, the quality in education is a multidimensional concept and it cannot be said that it follows or it is obtained from a public theory or a general pattern, but the quality of the education system is a special case that meets the particular needs of society at a particular time and place [13]. Since the quality of education is a very complex case and has various dimensions, it is great for the educational planners to constantly try to improve it and use the results of other researches to finally identify the effective factors on the education in their society and do their best to improve it.

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Nurse-family conflict beyond the walls of Iranian homes who have the mechanical ventilation dependent patient: a qualitative study

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Abstract
Rationale. Home health care (HHC) has been developed more than any other industry in the past decade. Conflict between nurse and family can diminish the service provided to the home care patients.
Objective. This study was conducted to explore the nature of conflicts between the client’s families and nurses in homes of critical care patients, in an Iranian context.
Methods and results. Using the qualitative content analysis method and the purposive sampling, 15 participants including 7 nurses (4 males and 3 females) working in homes and 8 family members who had a patient receiving mechanical ventilation at home, were interviewed during 2013 and 2014. The main sources of conflict were due to nurse expectations, family expectations, and special characteristics of nurses. The team leader tried to prevent the conflict by different measures, but in some cases, the conflict arose. Both family members and nurses accepted the team leader as the judge. At first, he tried to keep the situation stable and gave some notification to the nurse and some explanations to the family members. In some cases, that the family could not adapt to the situation and efforts to solve the conflict were unsuccessful, the team relation with the family being cut.
Conclusion. Home care situation is prone to conflict due to various factors. The mentioned sources of conflict in home care were different from the ones of the hospital. Based on these results appropriate interventions suitable for home conditions should be implemented.

Keywords: home care services, conflict, conflict resolution, communication, nursing

Introduction
Direction of health services is shifting from the facility based to community based [1] because of various changes in the health system such as the increase of more than 300 percent in the elderly population, increasing health care costs, as well as specialist nursing shortage [1-3]. Recent Technological advancement helped in the provision of the medical services to the complex patients at home [3]. Based on these changes, the numbers of complex patients, including the intensive care patients who are being cared for at home are increasing [4,5]. The transmission of such patients at home, usually occurs in situations when the patient is already receiving different drugs, is disoriented regarding the time and place, has sleep deprivation, malnutrition, as well as stress and fear of death [6,7]. Also, the client’s families are experiencing stress, anxiety, fear and uncertainty [8-10].

Some of the ICU patients need continuous care provided by health care professionals at home [11]. Nurses are the main care providers at home. Nursing profession is based on a collaborative relationship with colleagues and clients. If two people are viewing the situations from a different perspective, the conflict can compromise their relationship [12]. The home care setting is prone to conflict, because the nurses and clients’ families have different values, expectations, perceptions, and backgrounds [13,14]. Home care nurses are exposed to a variety of conflicts. Some of them are from the request for additional visits or family members who expect services more than usual, physicians who do not give orders in a timely manner [15].

The conflict with the client’s families is an important indicator of depersonalization and emotional exhaustion in home care workers [16]. Conflict outcomes are not always negative; if the conflict is managed skillfully, it can be a positive experience. If it is not managed well, it can lead to a reduced quality of care and escalate to violence and abuse [17-19].

Objective
Based on our knowledge, little attention was paid to the interpersonal relationship at home. Also, as it was
already mentioned, the home care situation is prone to conflict, so nurses should know how to manage these conditions. However, how this special type of conflict is experienced by nurses and families and how they can manage it, is not being addressed well. Thus, by using a qualitative approach we wanted to underline the nature of conflicts between the client’s families and nurses in an Iranian context.

Materials and methods

To understand the nature of relationship between the nurses and the client’s families and conflicts between them in an Iranian context, the qualitative content analysis method was used. Qualitative content analysis simplifies data and provides structure and discipline. The content analysis also explores the real meaning behind the raw data [20]. In this study, 6 nurses (4 males and 2 females) from the purposive sampling, working at homes, and 6 family members who had a patient receiving mechanical ventilation at home were interviewed during 2013 and 2014. Sampling was continued until the data saturation. Nurses who were working at home more than two years and had a thick and rich firsthand experience in caring for the ICU patients at home were included. In order to enhance the maximum variation, nurses of both genders, with different work experiences and different educational levels were selected. Moreover, family members from different cultures and socioeconomic levels, providing care for the patients with different levels of complexity were asked to participate. In addition, family members with different durations of involvement in home care were interviewed.

Semi-structured interviews were used for data collection and each lasted from 30 to 70 minutes. Interviews were done in a quiet place, which was offered by study participants. Most of interviews with the health care professions were done in their workplace and interviews with family members were done at their homes. One of the nurses was interviewed two times.

The first author of this article did the interviews. After several warm-up questions, the interviews were started with an open-ended question, which they were asked to narrate their experiences in as much details as possible. When needed, the probing and explanatory questions were used for additional clarification of the answers given by participants.

The data analysis was done by using a qualitative content analysis method. Immediately after each interview, it was transcribed verbatim and then it was read several times in order to obtain a general sense of the participant words. Then, by using the MAXQDA 10 software, the data was divided in meaning units, then coded, and arranged in different subcategories and categories based on their similarities and differences. The underlying meanings of the study were expressed in themes based on the principle of latent content analysis.

Lincoln and Guba criteria for rigor and trustworthiness were used in this study [21]. The researcher had a long-term engagement with the data and research field. Member checking was done by giving a summary of the primary result of each interview and the final results with 3 nurses and 3 family members checked as well. Also the analysis process was done by the agreement of two members of the research team and was audited by two external supervisors. In cases of disagreement, the discussion was continued until reaching an agreement. Furthermore, the quotes of participants were presented in the finding section.

The Ethical and Research Committee of the University of Social Welfare and Rehabilitation Sciences in Tehran approved this study. The aim and objective of the study were clarified for participants. Then, the written informed consent was obtained from participants. Moreover, their permission for recording the interviews was obtained. One participant refused the recording, so, the interview was done without a voice recorder. The time and place of the interviews was determined by participants and they were able to stop it, if they were exhausted or distressed.

Findings

In our study, sixteen interviews with 15 participants were done. 7 nurses participated in this study, including 4 males and 3 females, whose age ranged from 32 to 45 years, their working experience at home was between 3 and 12 years. One of nurses was interviewed two times. In addition, 8 family members, of whom 5 were male and 3 were female, participated in our study. All of them were close relatives of the clients. Two of them were the client’s wife, 2 mothers, 2 sons, and 2 were fathers. Their ages ranged between 29 and 65 years and provided care for their patients between 1 month to 5 years (Table 1,2). The data analysis explored 552 initial/ open codes. After reviewing and integrating the repetitive codes, 293 initial codes were derived. Then codes were clustered in subcategories and categories based on similarities and differences, so that, at the end of this process, five main themes emerged: (a) conflict due to nurses’ expectations; (b) conflict due to the client’s family expectations; (c) special characteristics of nurses; (d) conflict prevention and (e) conflict resolution (Table 3).
### Table 1. Characteristics of the client’s family members

<table>
<thead>
<tr>
<th>age</th>
<th>gender</th>
<th>Relationship with the patient</th>
<th>Duration of involvement in care</th>
<th>Patient’s diagnosis</th>
<th>Marital status</th>
<th>Duration of interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>65</td>
<td>female</td>
<td>client’s wife</td>
<td>6 months</td>
<td>CVA*</td>
<td>married</td>
<td>30</td>
</tr>
<tr>
<td>44</td>
<td>male</td>
<td>son</td>
<td>3 months</td>
<td>CVA</td>
<td>married</td>
<td>45</td>
</tr>
<tr>
<td>52</td>
<td>female</td>
<td>mother</td>
<td>8 months</td>
<td>Head trauma</td>
<td>married</td>
<td>38</td>
</tr>
<tr>
<td>44</td>
<td>female</td>
<td>mother</td>
<td>18 months</td>
<td>poisoning</td>
<td>married</td>
<td>53</td>
</tr>
<tr>
<td>31</td>
<td>male</td>
<td>father</td>
<td>6 months</td>
<td>ALS**</td>
<td>married</td>
<td>52</td>
</tr>
<tr>
<td>56</td>
<td>male</td>
<td>son</td>
<td>5 years</td>
<td>Brain ischemia</td>
<td>married</td>
<td>55</td>
</tr>
<tr>
<td>44</td>
<td>female</td>
<td>client’s wife</td>
<td>8 months</td>
<td>COPD***</td>
<td>married</td>
<td>48</td>
</tr>
<tr>
<td>29</td>
<td>male</td>
<td>father</td>
<td>1 year</td>
<td>ALS</td>
<td>married</td>
<td>39</td>
</tr>
</tbody>
</table>

**Abbreviations:**
* Cerebral vascular accident, ** Amyotrophic lateral sclerosis, *** Chronic Obstructive Pulmonary Disease

### Table 2. Characteristics of professional health care workers

<table>
<thead>
<tr>
<th>age</th>
<th>gender</th>
<th>position</th>
<th>Experience in home care (year)</th>
<th>Duration of interview (minute)</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>male</td>
<td>team leader</td>
<td>12</td>
<td>70</td>
</tr>
<tr>
<td>37</td>
<td>male</td>
<td>nurse</td>
<td>10</td>
<td>45 and 62</td>
</tr>
<tr>
<td>45</td>
<td>male</td>
<td>nurse</td>
<td>5</td>
<td>52</td>
</tr>
<tr>
<td>33</td>
<td>female</td>
<td>nursing assistant</td>
<td>3</td>
<td>32</td>
</tr>
<tr>
<td>41</td>
<td>male</td>
<td>nurse</td>
<td>11</td>
<td>68</td>
</tr>
<tr>
<td>36</td>
<td>female</td>
<td>nurse</td>
<td>6</td>
<td>41</td>
</tr>
<tr>
<td>32</td>
<td>female</td>
<td>nurse</td>
<td>4</td>
<td>43</td>
</tr>
</tbody>
</table>

### Table 3. List of codes and categories

<table>
<thead>
<tr>
<th>category</th>
<th>subcategory</th>
<th>Code (examples)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conflict due to nurses’ expectations</td>
<td>Mismatch between the job and nurse position</td>
<td>Expecting the nurse to clean the patient’s room</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Physical works done by nurses</td>
</tr>
<tr>
<td></td>
<td>Inappropriate behavior of family members</td>
<td>Behavior with the nurse such as a laborer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Direct order of family members to the nurses</td>
</tr>
<tr>
<td>Conflict due to the client’s family expectations</td>
<td>Painful stillness</td>
<td>Expectation of fast healing of the patient</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lack of improvement is painful</td>
</tr>
<tr>
<td></td>
<td>Expectation of nurse behavior according to family desire</td>
<td>Dissatisfaction of nurse sleeping during the night shift</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nurse should cook the patient’s food</td>
</tr>
<tr>
<td></td>
<td>Family interference in the treatment</td>
<td>Giving the drugs without prescription by family members</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Interference in the procedures</td>
</tr>
<tr>
<td>Special characteristics of nurses</td>
<td>Home care as the second job</td>
<td>Fatigue and exhaustion due to hospital work</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The hospital work is more important for the nurse</td>
</tr>
<tr>
<td></td>
<td>Poor communication skills</td>
<td>Poor management of an irritable family</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unwillingness to hear critique</td>
</tr>
<tr>
<td>Preventing the conflict</td>
<td>Determination of headlines of duties by the team leader</td>
<td>A meeting with the family members on the first day</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Clearing the mutual expectations of nurse and family</td>
</tr>
<tr>
<td></td>
<td>Family education and informing by the team leader</td>
<td>Highlighting the process of coming days</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Explaining the family expectation</td>
</tr>
<tr>
<td>Conflict resolution</td>
<td>Preparing the nurses</td>
<td>Communication management courses</td>
</tr>
<tr>
<td>---------------------</td>
<td>----------------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td></td>
<td>Communication management based on family stability</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Team leader as a judge</td>
<td>Team leader is the reference</td>
</tr>
<tr>
<td></td>
<td>All agree with the team leader</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The customer is always right</td>
<td>Considering the financial benefit of the team</td>
</tr>
<tr>
<td></td>
<td>Giving notification to the nurse</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Notification to the parties</td>
<td>Explaining the situation to the family</td>
</tr>
<tr>
<td></td>
<td>Notifying the families</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stop working with family</td>
<td>Continuing the care providing to the extent possible</td>
</tr>
<tr>
<td></td>
<td>Cutting the relation in unsuccessful tries</td>
<td></td>
</tr>
</tbody>
</table>

**Conflict due to nurses expectations**

Most of the nurses working at homes and providing care for intensive care patients are experienced, skilled, and proficient. Because of their background, they expect respect from the client’s family members and tend to have a special condition at their work place. However, the home and its special conditions, sometimes does not match their expectations. As a professional person, the nurse expects to manage the care plans with nobody’s interference. In some situations, the family interference is more than what is expected and can lead to conflict.

For example, a nurse said, “what I got during those years was that, the behavior of women with nurses at home is bad. When they want a work to be done by the nurse, they command the nurse. They behave with the nurse, as with an illiterate person who cleans the rooms for them. The nurse is a specialist and provides the special type of care there. This can lead to conflict. Basically, the nurse-family conflict occurs frequently” (Participant 2, a 12 years experienced nurse).

Another nurse says, “The level of the works done at home is not suitable for expert nurses. When we are working in hospital, the nursing assistant cleans the patient; hence, it is hard for us to do it at home. Some families have some expectations such as the nurse should clean the floor. Is it possible that the nurse also prepares the foods? Could the nurse change the bed sheet? However, the nurse does not accept these issues. These can be sources of conflict.” (Participant 3, a 4 years experienced nurse).

**Conflict due to the client’s family expectations**

The client’s family experiences a high level of stress, fear, and uncertainty due to the client’s complex situation. The family is not ready for the situation in which a complex patient with a team is present at home full time. Therefore, the family member is excitable and unstable. In addition, the family pays money and expects high quality services. The family has the direct responsibility of following up and supervising the treatment and care process. However, they are not familiar with the domains of the work, standards, as well as the steps of any procedure. As a result of these responsibilities, they have expectations that are sometimes not met. In some examples, the family members have different ideas regarding the way work should be followed up. Also they are not familiar with the nursing profession, so the expectations of these two major groups are not matched and may be a source of conflict. Otherwise, there is a close relationship between nurse and family; sometimes the domains of duties being mixed.

A family member said, “Who’s paying expects the healing and improvement. Our patient's situation did not change during the past weeks. Stagnation is painful for the client’s family. Our expectations are not met.” (Participant 12 who has been caring for her husband for 8 months).

Another participant said, “We do not have a special organization for home work. All the persons who are here, also work in hospital. The home care is their second job. Someone who is beside the patient should be responsible full time, but most of them have to go to the hospital early in the morning, so they sleep at the patients’ homes.” (Participant 9 who has been caring for his son for 5 years).

**Special characteristics of nurses**

In Iran, nurses almost see the home care as a second job. Therefore, they are spending most of their time and energy in the hospital. Due to the lack of a good communication skill, as well as fatigue and exhaustion, they may experience a bad communication with the family members. Another reason is that, most of them work in the controlled situation of ICU and cannot tolerate the full time presence of a family member. Therefore, the presence of a family member and the inappropriate communication skills of a nurse could be a source of conflict.

A family member said, “Every nurse who comes here has a unique style and behavior. Each of them does the suction, gavage, and change position in a special manner. Therefore, we have to adapt to different work styles and behaviors. It made the situation a little hard for us.” (Participant 7 who has been caring for his father for 1 year).
Another family member said, “Most of them work for subsistence and have physical and mental fatigue. Moreover, they are impatient and cannot tolerate critique. They communicate badly. Some of them do not know how to respond to our requests.” (Participant 6 who has been caring for his father for 6 months).

**Preventing the conflict**

In most cases, team members have some conflict prevention strategies. They believe that the family is placed in a conflicting and new situation. They are exposed to a situation to which they do not have any previous experience, and, as a result, they do not know how to manage this new situation. Most of the teams have a meeting with the family members on the first day of the transfer of the patient home and offer some explanations about the situation and headlines of the duties. Also the communication rules and mutual expectations are cleared. The teams also have some communication management courses for nurses. Team leaders teach them how to manage the unstable families. They also teach them how to work in a stable manner so that the family does not abuse them.

For example, a team leader said, “before transferring the patient home, we have a meeting with our team members. We talk about the patient’s situation, the needed care plan, and also the behavioral situation of the family. Based on these comments we have a communication plan for every family. Also we have a session with the family members in the first hours after the patient’s transfer. We talk to them about their patient’s situation and works that the nurse should do. In addition, their duties are defined. This act could prevent the conflict in most cases.” (Participant 6, an 11 years experienced team leader).

**Conflict resolution**

The disagreement between the family members and the nurse increases gradually and reaches to a limit that cannot be solved between them. Therefore, they search for a reference for judgment between them. Usually, the private team leader is the first reference for the problem solving. The conflict is reported and the situation is completely assessed by the team leader. Different problem solving methods are used. Based on the situation, in this step, the team leader decides to use one of the possible solutions. At first, he considers the financial situations of the team and gives the right to the family members. Therefore, in this first step he gives some notifications to the nurse. In more complex cases, the team leader gives some reminders to the family members as well as to the nurse. In severe conflicts, the incompatible person is withdrawn from the care program. The team leader tries to continue the care providing to the extent possible. In some cases, the family cannot adapt to the situation and efforts to solve the conflict are unsuccessful, in addition, the team relation with the family will be cut.

One of the team leaders said, “I try to prevent the conflict. Usually, I talk to the nurse to get shorter, and, after that, I speak to the family members and warn them about their behavior. In most cases, this can prevent severe conflict. For example, one of the nurses was going out of the patients’ room much. The client’s daughter told me he works well, but he is going out of the room much and watches TV. I reported him. The problem was solved.” (Participant 8, a 10 years experienced team leader).

Another nurse said, “The patients’ daughter and mother were intervening very much. We reported the situation to the team leader. He spoke to them. At present, the situation is better.” (Participant 8, a 3 years experienced nurse).

**Discussion**

Our findings showed that due to various factors, the home environment is prone to conflict. Conflict could arise from the nurse’s expectation, family members’ expectation or related to the special characteristics of nurses. The main themes or concepts of this study were related to conflict due to the family’s expectations, the nurse’s expectations, special characteristics of nurses, preventing the conflict and conflict resolution. Most of studies about conflict are done in hospital setting and only little attention is paid to the home based conflicts. These studies indicated that poor communication skills is the most important factor in conflicts between the client’s family and the nurse [22,23]. Some of these conflicts are also seen in home setting, but it seems that the types of conflicts in home setting are different. In the hospital, the family members are outsiders and have some problems in entering the treatment circumstance, but at home, the nurse is an outsider [24]. Hence, he should try to enter the home environment and adopt this new situation.

The first theme extracted from the data analysis was the conflict due to the nurse’s expectations. As a professional member of the health team, the nurse has some expectations that may not be achieved at home. One of the reasons for this phenomenon is different between the viewpoint of the nurse and the one of the client’s family. The difference in values, goals and believes could lead to conflict [25]. It is possible that the family members are not able to understand the situation well.

The second theme of this study was the unmet expectations of the client’s family members. The client’s family members did not receive any financial support from the insurances and paid all the costs from their pocket. Therefore, they expected high quality care and good outcomes. Sometimes this viewpoint leads to a severe conflict with nurses. Families are anxious about the money and their patient’s outcome. Other studies mention
the financial problems as a source of conflict [22]. Nurse could give timely and enough information about the cost of interventions and help the family choose between different possible treatments. This intervention could prevent the conflict.

In addition, the family members are not well prepared for this stressful and hard situation. Therefore, maybe they are irritable and prone to conflict. Education is a communication bridge [22]. Giving the proper information to the family members about the client’s situation and the treatment process is helpful [26]. Also, empathy with family members could reduce the anxiety [27].

Special characteristics of nurses were one of the important predictors of conflict. Nurses described the poor communication skills as an important factor resulting in conflict. Effective nurse-family relationship is considered central to quality nursing and emotional support [28]. Nurses can mitigate the conflict effects by improving their communication skills [29]. In Iran, we do not have a comprehensive framework for home care. Most of the qualified nurses work at home as a second job. So, they are stressed, frustrated and angry [30]. Many of other formal caregivers are unprofessional and have poor communication skills. The studies published in our country show the nurse-family relationship inappropriate and ripe to conflict [31,32]. Inappropriate relationship could cause stress, temper, lack of confidence, violence and dissatisfaction [22].

Poor communication is described as a conflict building factor, but the friendship and calm relationship between nurse and family members could lead to interest [33]. So, fulltime professional nurses with good communication skills are needed in our country. Stress is seen in family members, the nurses should see this need and use a collegial relationship instead of coercion [17].

Conflict prevention is very important in the field of home health care. Before discussing about the intervention for conflict resolution, it is better to prevent it. The home has a different circumstance compared to the hospital and has unique challenges, so, the nature of conflict is different. Most of the existing articles suggest the ways of conflict resolution [12,34]. The prevention of conflict in home care setting is not well addressed in literature. Most of the teams have a meeting with the family members on the first day of transferring the client home in order to specify the headlines of duties.

Nurses who know the way the conflict is escalated, it is possible to prevent it and improve care providing [12]. Client centered care is one of the methods that give information to the patient and participate in decision making [35]. This strategy could prevent the conflict.

Despite the preventive strategies, the conflict may happen and lead to critical incidents. Various methods of conflict resolution are used based on cultural diversities. In most references, there are five styles of confrontation with conflict including avoidance, competition, accommodation, compromise and collaboration [29]. Each strategy is useful for its appropriate situation and nurses should learn to judge which strategy is useful for each situation. In this study, the avoidance was the most frequently used strategy. Because of the financial benefit of the team, the nurse managers usually neglect the value and rights of nurses. Others also report that avoidance is the most commonly used strategy [23]. In this strategy, the person neglects his own goals, values and concerns [19]. It is also called a lose-lose strategy and has the worse outcome for nurses. The collaboration is described as the best way for conflict management. Collaboration results in a resolution with desirable outcomes, so, this strategy is the win-win [36].

Study limitations
Because of the cultural barriers, the entrance in the homes for doing the interviews was one of the hardest parts of this study. The families refused that the researcher enters their home. Since the team leaders had a close relationship with the family members and in most cases were respected by them, we wanted the team leaders to coordinate the time of interviews.

The other problem was regarding the voice recording. Some family members did not accept the voice recording. Therefore, one of the interviews was done without sound recorder and in other cases, sound recording was stopped whenever the participants requested.

Conclusion
Home care situation is prone to conflict due to various factors. The mentioned sources of conflict in home care are different from the hospital. Based on these results, appropriate interventions suitable for home conditions should be implemented.

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References

The effect of radiology services outsourcing on patients’ satisfaction in Tehran city hospitals


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Abstract

Background: In order to have a developed society we should have healthy, active, and happy individuals and present that extended healthcare services play an important role in increasing the society’s health level. Health in a society includes the society’s and people satisfaction with the condition and an assuring the situation that they can live healthy. On the other hand, considering the self-governing plan of hospitals from 1995, the hospital authorities should choose a method of presenting services, and, the hospital is able to present those activities during its own activities from an economic point of view. The present research was done while aiming to determine the effect of the Outsourcing of the Radiology Unit on the patients’ satisfaction in hospitals of Tehran.

Method: The present research was done in a case-evidence and sectional study. Considering the weight of a month’s references to the Radiology Unit, which included around 1200 individuals, the volume of samples for measuring the rate of the patients’ satisfaction with the means of Morgan table was equal to 291 individuals. In order to decrease the error percentage in each hospital we questioned 300 individuals. (n+10) were questioned and the gathered data were analyzed by means of SPSS software version 21 and were then studied by climagraph – Smirnoph, Du Whitman – Vitney K tests.

Findings: the median of the patients’ satisfaction of turned over and non-turned over Radiology Unit services were 41.46 and 45, respectively (from the maximum score of 60). A significant difference was observed between the patients’ satisfaction in the two hospitals from the statistical point of view (p-value<0.001) and there was also a significant difference between the patients’ waiting time (p-value<0.001). The research’s findings showed that the outsourcing has a negative effect on the patients’ satisfaction and the duration of their waiting time.

Conclusion: most of the times, managers do the outsourcing without considering human and organizational dimensions and characteristics by justifying it based on decreasing the expenses. Therefore, it is essential for authorities to consider not only the financial aspects but also the individual and human aspects while setting the outsourcing contracts and arrangements.

Keywords: outsourcing, hospital, efficiency, effectiveness

Introduction

Hospitals have a special importance as the biggest and most expensive operational unit of healthcare and treatment systems. Hospitals use 50-80 percent of all the expenses in the whole healthcare section and have a great share of educated and highest level of personnel [1].

The authority of government places a lot of pressure on the policymaking, execution, and observation of this section and leads the hospital system to turn over some of its administrative activities to the non-governmental section, in order to improve its efficiency [2]. However, the process of changing the expenses and decreasing the resources is always increasing and the gap between the achievable and required resources is developing on a daily basis. What is more, is that the private hospitals, especially in developing countries, which are directly governed by the state authorities, have weak performances, and efforts to improve their performance were not very efficient by applying internal management modifications [3]. During recent years, Iran has turned over a part of the healthcare services to the private section aiming to improve the quality of healthcare and treatment services, increasing the patients’ satisfaction and decreasing expenses [4]. Outsourcing includes the act of transferring some of the internal activities of an organization to its supplier outside of the
organization and transferring the decision making right to the outside of the organization based on a contract. In fact, the outsourcing does not only imply activities but also manufacturing agents (human resources, equipments, facilities, technologies and other assets) and the authority of decision making in most cases is transferred [5]. Organizations try to turn over the internal affairs of the organization and make their body as small as possible due to various reasons [6]. Alvani believes that benefits resulted by outsourcing are factors such as decreasing expenses, organization’s concentration on its main activities, saving the time for doing the internal affairs of the organization, decreasing the risk by entering in partnership with another unit in an unsafe business environment, improving consumer service, decreasing the company’s employees, creating the sense of competition in various sections of the organization [7]. Outsourcing was used in order to lead to an efficient management of the resources and increasing the quality and satisfaction of various parties. Considering the existence of the possibility of outsourcing in so many sections of the hospital, we could benefit from it in governing the hospital and we could evaluate the success rate by defining specific indexes [8]. The patients’ satisfaction is an important scale to evaluate services or received product because satisfied patients are more eager to continue using medical and healthcare services, keeping their contact with the service supplier and following the medical and control regimes [9]. Con Vikticle et al. defined the care quality as the satisfying of physical needs with providing professional care, social-mental support, satisfaction with care [10] and ensuring the presence of general and multi-dimensional cares to the patient [10,11]. Many experts consider the patients’ rate of satisfaction from the hospital services as one of the most important indexes of efficiency and service quality in various sections [12]. It seems that studying the patients’ satisfaction is one of the most important outputs of the healthcare systems [13,14] and evaluating the care by the patient is also one of the major methods to measure and scale the quality of medical and healthcare services [15]. Moreover, Peiravi also mentioned in his research that in Iran, the Ministry of Health has obligated all hospitals to do periodic evaluations regarding the patients’ satisfaction and also required interventions to increase the patients’ satisfaction, since 2011, so that it can comply with its main mission [16]. Considering the mentioned issues about the patients’ satisfaction, we should also point out the important issue that although nowadays companies move toward outsourcing, it represents a part of their responsibilities in the whole world, so that they can achieve benefits such as decreasing expenses to get hold of advanced technology. Nevertheless, the difference in organizational cultures and complexity of managing created relations means that outsourcing could lead to failure or lack of satisfaction [17]. Therefore, all the above-mentioned issues confirmed that we should select a method that the present services to the patients should work with, having the lowest expense and highest quality, so that the hospital’s expenses could be minimized on one hand and the hospital should be enabled to continue working and present the highest quality services to the patients on the other hand. This way, not only their expenses decrease but they also achieve their satisfaction. Therefore, the present research was executed while aiming to study the effect of outsourcing on the efficiency and affectivity of Radiology Unit services in Hospitals of Tehran City.

Method

The present research was an analytical and witness based study, its results being applicable, and its time duration being periodic, during the time period of June until January 2013. The present research was done in the Educational-Medical Hospitals of Tehran. The statistical society included all the patients during a month in the Radiology Unit in both hospitals (N=1200). Considering the fact that a load of people coming to the Radiology Unit was around 1200 individuals in each hospital, the sample volume to measure the patients’ satisfaction rate was calculated to be equal to 291 individuals by means of Morgan table. 300 individuals (n+10) were questioned in each hospital to lower the error percentage and the simple accidental sampling method was used for sampling. The method to gather data for the study of the radiology patients’ satisfaction was the field method and its tool was a questionnaire. This questionnaire included 12 questions about the condition of the unit, 2 related to the waiting duration. The mentioned questionnaire was scaled by means of Likert scale from 1 to 5 in such a manner that number 1 was related to the lowest level of satisfaction and number 5 was related to the highest rate of satisfaction, the maximum point being 60 points. Questions related to the waiting time duration were divided into two sections. The first question was related to the time between the entrance and admission of the patients and the second question was related to the time between the admission and receiving radiology services. The questionnaire was designed by Medical University lecturers and its admissibility–stability was also confirmed by lecturers and also hospitals clinical governance committee. To confirm the credibility and admissibility, the questionnaire was analyzed and confirmed by 10 experts. What is more, is the fact that in order to determine the stability of the questionnaire, Cronbach alpha was applied. After gathering the research data, finally, the gathered data were analyzed by SPSS version 21 and, to analyze data, descriptive statistics was used in redundancy, median, standard deviation tables, and deductive statistics.

Findings

Findings of the present research indicated that the median of the patients’ satisfaction in the turned over unit was equal to $41/46$ (7/$3\pm$) from the maximum 60 points, equal to (69%) and the median of the patients’ satisfaction in the non-turned over unit was equal to $45$ (6/$94\pm$) from the maximum score of 60 points (75%). This fact indicated a lower satisfaction of pointers in the turned over section in comparison with the public section, and, the minimum medians among all aspects, was related to the patients’ satisfaction in turned over Radiology Units, also being related to giving turns to the system with the lowest median of 3.11, satisfaction of the existing comforting equipments in the unit with a median of 3.36, and personnel behavior while getting accepted, 3.41.

In order to determine the norm of distributing data related to the patients’ satisfaction the climagraph-Smirnoph test was used. By means of this test, it was determined that the distribution score of the patients’ satisfaction was abnormal (p-value=0.000). Therefore, in order to compare the median scores in the two units, nonparametric Uman-Vitney test for the patients’ satisfaction score was used. A significant difference was observed between the patients in these two hospitals (p-value=0.000) and since the p-value was so small, it clearly showed the severity of differences among medians. Therefore, it was obvious that the outsourcing had a great impact on the patients’ satisfaction.

Also, the results indicated that most patients were accepted in a time duration of 16 to 20 minutes after entering the unit in turned over units, while in non-turned over units, most of the patients (42%) were accepted in 5 to 10 minutes. Findings also showed that most patients (42%) of turned over units, were X-rayed in a 16-20 minutes time period, after they were settled, while in non-turned over units, most patients (33.3%) were X-rayed 5-10 minutes after they were received. Time duration patients waited for to be received in two units, showed a significant difference based on K2-test (p-value-0.000) and the waiting time in-between, and the X-ray in both units was less significant based on K2-test (p-value - 0.000). Since the p-value was so small in both cases, it indicated that the outsourcing had a great influence on the patients’ waiting time duration since they entered, were received, and were X-rayed. Patients’ waiting time duration is presented in Table 1.

Results also indicated that 225 individuals among patients of turned over unit (75% ) and 277 individuals among the patients of the non-turned over unit (92.3%) category suggested these units to others and this difference was significant based on the J2-test (p-value-0.000). Therefore, the outsourcing had a great impact on suggesting the Radiology Unit to other patients.

![Fig. 1 Median comparison of each dimension of the patients' satisfaction in two hospitals](image)

**Table 1.** Redundancy percentage of waiting time duration between the patients’ entrance and being received

<table>
<thead>
<tr>
<th>Time duration between entrance and being received</th>
<th>10 -5</th>
<th>15 -11</th>
<th>20 -16</th>
<th>30 -21</th>
<th>45 -31</th>
<th>More than 45</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Firuzgar Hospital</strong> number</td>
<td>25</td>
<td>73</td>
<td>129</td>
<td>60</td>
<td>12</td>
<td>1</td>
<td>300</td>
</tr>
<tr>
<td>percentage</td>
<td>8.3%</td>
<td>24.3%</td>
<td>43.0%</td>
<td>20.0%</td>
<td>0.4%</td>
<td>0.3%</td>
<td>100.0%</td>
</tr>
<tr>
<td><strong>Valiasar Hospital</strong> number</td>
<td>126</td>
<td>104</td>
<td>54</td>
<td>11</td>
<td>2</td>
<td>3</td>
<td>300</td>
</tr>
<tr>
<td>percentage</td>
<td>42.0%</td>
<td>34.7%</td>
<td>18.0%</td>
<td>3.7%</td>
<td>0.7%</td>
<td>1.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td><strong>Total</strong> number</td>
<td>151</td>
<td>177</td>
<td>183</td>
<td>71</td>
<td>14</td>
<td>4</td>
<td>600</td>
</tr>
<tr>
<td>percentage</td>
<td>25.2%</td>
<td>29.5%</td>
<td>30.5%</td>
<td>11.8%</td>
<td>2.3%</td>
<td>0.7%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>
Findings resulted in the present research, showed that the median of other sectors authorities’ satisfaction with the turned over unit of 29.26 (5.65±) had the maximum score of 70 points and the median of other sectors authorities’ satisfaction of 28.97 (5.1±) had a maximum score of 70 points. The authorities’ satisfaction with the turned over section and non-turned over section was almost equal. The lowest median observed among items related to the authorities’ satisfaction with a turn over radiology unit was related to question number 3 in relation with on time access to portable radiology devices with the minimum median of (2.72) and accepting suggestions and also applying them by the median of (3.05).

### Discussion

The present research was done aiming to determine the effect of outsourcing on the efficiency and effectiveness of hospitals Radiology Unit. Results showed that the weight media of patients’ satisfaction score in turn over radiology units was (41.46) and in non-turned over was (45), being significant from the difference statistical point of view. Results indicated that the patients’ satisfaction was higher with non-turned over radiology units in comparison with the other factors in turned over units. The mentioned median was equal to (3.36) in non-turned over unit and this was more due to the lack of work force to move the wheelchair, while this median was equal to (3.54) in the turned over unit due to the lack of equipments inside the unit.

The second factor, which had the lowest rate of satisfaction, was related to the welfare equipments, which was observed in both turned over and non-turned over units. The mentioned median was equal to (3.36) in non-turned over unit and this was more due to the lack of work force to move the wheelchair, while this median was equal to (3.54) in the turned over unit due to the lack of equipments inside the unit.

The third factor that showed the lowest median in comparison with the other factors in turned over units was the personnel’s behavior while receiving the patient, with a median equal to (3.41) and such a claim could be justified by the reception of the personnel’s high work load and their exhaustion. Therefore, to fix this problem, not only should we decrease workload but it is also essential to educate the critical communication skills to turned over units’ personnel.

The results of the present research also indicated that most of the patients (43%) were received in a time duration of 16-20 minutes while the receiving time duration in non-turned over for most of the patients (42%) was equal to 5-10 minutes after entering the unit, which showed a significant statistical difference. Badroldin concluded in a research entitled “Patients’ satisfaction with medical services in educational hospitals of Saudi Arabia” that the most important factor expressed by patients about their dissatisfaction with medical services was the long time duration of waiting to receive their medications [18]. Moreover, Amerion found out a study entitled “Outpatients and inpatients’ satisfaction of army hospitals” that the greatest dissatisfaction (19.2%) in the pharmaceutical sector, was the long waiting time to receive medication, and the minimum rate of dissatisfaction (19.2%) in clinic, was related to the fact that doctors made patients wait and generally, the most important reason of dissatisfaction in this research, was related to the waiting time to receive medication (19.2%) [14].

Table 2. Redundancy percentage of time duration between being received and radiography

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Firozgar</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>19</td>
<td>58</td>
<td>121</td>
<td>66</td>
<td>23</td>
<td>13</td>
<td>100.0%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>percentage</td>
<td>6.3%</td>
<td>19.3%</td>
<td>40.3%</td>
<td>22.0%</td>
<td>7.7%</td>
<td>4.3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Valiasr</td>
<td>Number</td>
<td>100</td>
<td>91</td>
<td>63</td>
<td>28</td>
<td>9</td>
<td>9</td>
<td>100.0%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>percentage</td>
<td>33.3%</td>
<td>30.3%</td>
<td>21.0%</td>
<td>9.3%</td>
<td>3.0%</td>
<td>3.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>number</td>
<td>119</td>
<td>149</td>
<td>184</td>
<td>94</td>
<td>32</td>
<td>22</td>
<td>100.0%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>percentage</td>
<td>19.8%</td>
<td>24.8%</td>
<td>30.7%</td>
<td>15.7%</td>
<td>5.3%</td>
<td>3.7%</td>
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<td></td>
</tr>
</tbody>
</table>
What is more important is the fact that based on obtained results, 225 individuals among the patients who went to turned over radiology (75%) and 277 individuals among the patients who went to non-turned over radiology (92.3%) recommended these hospitals to others and the higher percentage of non-turned over radiology indicated the higher rate of patients’ satisfaction with these types of units.

Conclusion

The present research showed that the rate of patient’s satisfaction with radiology services was decreased and this showed that managers usually turn over services without any consideration related to human and organizational characteristics and dimensions, justifying it by decreasing costs. Therefore, it is essential and critical for authorities to consider not only the financial aspects but also the individual and human aspects of the process while settling an outsourcing contract.

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References


An evaluation of high-risk behaviors among female drug users based on Health Belief Model

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Abstract

Objectives. Due to the physiological nature of female reproductive system, women are susceptible to infectious diseases, especially STD and AIDS. Addiction and high-risk behaviors also increase the risk of these diseases. The purpose of this study was to investigate high-risk behaviors among female drug users based on the Health Belief Model.

Methods. Participants of this cross-sectional study were 106 female drug users aged 18 years and older; with the lowest level of literacy skills and been involved in sexual relationships. They came to Drop-In-Centers (DIC) in Tehran, capital of Iran. Data analysis was conducted by using a logistic regression analysis and Pearson correlation analysis.

Results. The results indicated that women’s overall awareness was moderate. There were significant correlations between awareness and age (p=0.006), awareness and education (p<0.0001), and awareness and marital status (p=0.062). Perceived sensitivity and severity were significantly associated with education level (p=0.007) and (p=0.014), respectively. Mean scores of perceived benefits and perceived severity for high-risk behaviors were estimated to be higher than other components.

Conclusion. Awareness and perceived susceptibility must be raised regarding the educational schedule, which is based on the health belief model in the addiction field, to reduce perceived barriers in risky behavior prevention of women who use drugs.

Keywords: risky behavior, health belief model, drug or substance using women

Introduction

Drug abuse as a serious global problem would lead to irreparable damages to each society with regard to the individual and social characteristics of persons in that society [1]. Drug users’ interaction with the environment and their adaptive mechanisms as well as their behaviors are psychologically regarded as topics of paramount importance. In some cases, these topics are considered as the cause and effect of addiction. High-risk behaviors are those that bring about very unpleasant consequences for addicts or other people [2]. Statistics showed that 7.4 percent of the world’s population aged 15 years or older are drug users [3]. Iran has the highest per capita rate of heroin and opium addiction in the world. According to the 2006 Census, the number of drug users was estimated at 1.2 million, i.e. almost one out of every 2.2 people from adult population [4]. It is estimated that 10 percent of women in Asian countries and 40 percent of them in European countries are drug users. Therefore, the number (16 to 38 million) of female drug abusers in the world is significant [5].

The United Nations Office on Drugs and Crime (UNODC) reported that 11-21 million people in the world use injectable drugs. Up to 2008, approximately 250,000 injecting drug users had been identified in Iran. Statistics indicated that the rate of injecting drug use was 33 percent over the last 30 years and it has had an increase of almost 10 percent over each decade [6].

It is commonly thought that drug abuse and addiction are primarily attributable to men and that women are less likely to use drugs. Although there is no accurate statistics on the population of female drug users in the country, according to some research, female population include 6.9 percent of addicts of the country. The Ministry of Health also reported that there is one female drug user besides each eight male drug users [7]. There is an increase in the likelihood of developing viral infections such as hepatitis B, C, AIDS, among injecting drug users [8]. Women make up 3-5 percent of injecting drug users [5]. The numbers of female drug users are less than their male counterparts; however, the destructive effects and the severity of addictions as well as the risks are higher for women [9]. The results of research carried out in Iran indicated that about 5-17 percent of female drug abusers...
have unprotected sexual relations [10]. Injecting female drug users have a disproportionately higher prevalence of HIV than men [11]. Compared to men, sharing syringes and needles is higher for women who live with partners due to the fact that the availability of injection tools is determined and controlled by their sexual partner [12]. Women share needles and syringes with partners who have high-risk sexual behaviors [13]. Methamphetamine increases sexual activity and the use of this material is associated with the use of syringes and needles [14]. HIV infection for this population is twice as much as others [12]. Because of sharing needles, 2-4 million people in developing countries have been infected with hepatitis C that can be spread to other people. Reviewing the literature reveals that the prevalence of hepatitis C among injecting drug users ranges from 1.9 to 100% [15]. The possibility of women prostitution for the sake of money and drugs increases the risk of HIV infection [16]. Tattoos are created by 35.7 percent of female drug users and the use of shared needles to perform the operation is estimated in about 45 percent of cases [17]. A lot of research has shown that the incidence of sexually transmitted diseases in injecting and non-injecting drug users are more prevalent, as syphilis is reported to be of 1-6 percent, Chlamydia 1-5 percent, and herpes type II 38-61 percent and HPV types 16 and 18 among female addicts 38 and 42 percent, respectively [18]. HBM is one of the first models which uses behavioral science theories for the assessment of health-related problems and it is widely used to explain preventive behaviors [19]. This model is comprehensive, further contributes to the disease prevention, and shows the relationship between beliefs and behavior. It is founded on the assumption that the preventive behaviors are decreasing an individual’s vulnerability to diseases and the impact of illness on individual lives. They also include hygiene measures in reducing the severity of diseases [20]. In fact, it investigates the psychological and probable factors affecting the persons’ decisions. Studies have seconded that this model has been proven useful in predicting why people accept or reject various health behaviors. HBM is used as a theoretical framework to study and identify the impact of health beliefs on healthy behaviors [21]. The components included in this model contain barriers, perceived benefits, perceived susceptibility, and perceived severity. These can satisfy the objective of investigating high-risk behaviors associated with female drug users.

**Material and Method**

Participants in this cross-sectional study included 106 women with drug-use disorders who came to two Drop-In-Centers (DIC) affiliated to the State Welfare Organization and Family Health Association of Iran in Tehran. After obtaining approval from the ethics committee of Tehran University of Medical Sciences along with getting a referral from the health departments and submitting it to the relevant agencies and departments, the researcher thoroughly described the purpose of the study. The selection criteria for female drug users participating in the study were being 18 years or older and having sexual relations. After checking the eligibility of participants and having their consent and written permission, they were ensured of the confidentiality of all information submitted. The questionnaire consisted of seven parts as it follows. Data in this questionnaire-based study were collected through spatial databases, books, and articles. The tool consisted of seven parts as it follows:

- **a) Demographic information** containing three parts; personal information with 13 items, 14 items on the history of drug use and sexual behavior background with 16 items, b) **Awareness** (18 items), c) **Perceived sensitivity** of high-risk behaviors (9 items), d) **Perceived severity** of the high-risk behavior consequences (9 items), e) **Perceived benefits and Perceived barriers of preventive behaviors**, each containing 6 and 13 items, f)

**Results**

Demographic characteristics of the 106 participants revealed a mean age score of 35.7 ± 7.9
years and a standard deviation of the highest frequency of 67% for the age group 30 years and older. A majority of these participants (n=69; 65.1%) had elementary and secondary levels of education. With regard to their marital status, most of them (n= 43; 40.6%) were divorced or widowed (Table 1).

Table 1. Characteristic descriptive statistics (n=106)

<table>
<thead>
<tr>
<th>Demographic characteristic</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-29</td>
<td>25</td>
<td>24.0</td>
</tr>
<tr>
<td>30-39</td>
<td>45</td>
<td>43.3</td>
</tr>
<tr>
<td>40+</td>
<td>34</td>
<td>32.7</td>
</tr>
<tr>
<td>Level of Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>5</td>
<td>4.7</td>
</tr>
<tr>
<td>Elementary and middle school</td>
<td>69</td>
<td>65.1</td>
</tr>
<tr>
<td>Diploma and above</td>
<td>32</td>
<td>30.2</td>
</tr>
<tr>
<td>Permanent marriage</td>
<td>29</td>
<td>27.4</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temporary marriage</td>
<td>31</td>
<td>29.2</td>
</tr>
<tr>
<td>Divorced and Widow</td>
<td>43</td>
<td>40.6</td>
</tr>
<tr>
<td>Single</td>
<td>3</td>
<td>5.8</td>
</tr>
</tbody>
</table>

The most common drugs used were glass (81%), opiates (66.7%), heroin (41.9%), methadone (43.8%) and cannabis (26.7%). The most common ways of using drugs were non-injection (85%) and intravenous drug injection (15%). As it was noted, they first experienced drugs used with their husbands (47.1%) and then with their friends (32.1%).

The mean score observed for women's awareness with SD ±21.3 was 61 as the lowest and highest scores were 25 and 100, respectively. The scores were divided into three levels: low, medium, and high. Subsequently, the results showed that most of the participants (42.1 percent) had moderate awareness about high-risk behaviors. The mean score of perceived sensitivity to high-risk behaviors was 65.2± 17 with the lowest and highest scores of 28.1 and 100.

Dividing the perceived sensitivity into three groups (namely low, medium, and high), the majority of participants (55.6%) were located in a moderate group. It was in the case that 61.5 percent of participants obtained a high score regarding the perceived severity of the consequences of high-risk behaviors. That is, the mean score of perceived severity with the lowest and highest scores of 11 and 100, was 76.5 ± 17.2. The mean score of the perceived benefits of preventive behaviors with the lowest and highest scores of 25 and 100 was 79.2 ± 19, and 73.6 percent of the participants obtained a high score in this section. It is worth noting that the highest mean score was obtained for this section. The majority of women also recognized small obstacles in performing high-risk behaviors (mean = 44.5± 19.9; Refer to Table 2).

Table 2. Women's knowledge based on health believe model

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean (SD)</th>
<th>Min</th>
<th>Max</th>
<th>Low N (%)</th>
<th>Moderate N (%)</th>
<th>High N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>knowledge</td>
<td>61 (21.3)</td>
<td>25.0</td>
<td>100</td>
<td>21 (19.8)</td>
<td>52 (42.1)</td>
<td>33 (31.1)</td>
</tr>
<tr>
<td>susceptibility</td>
<td>65.2 (17.7)</td>
<td>28.1</td>
<td>100</td>
<td>4 (3.8)</td>
<td>59 (55.6)</td>
<td>43 (40.6)</td>
</tr>
<tr>
<td>severity</td>
<td>76.5 (17.2)</td>
<td>11.1</td>
<td>100</td>
<td>3 (2.9)</td>
<td>37 (35.6)</td>
<td>64 (61.5)</td>
</tr>
<tr>
<td>benefits</td>
<td>79.2 (19.9)</td>
<td>25.0</td>
<td>100</td>
<td>4 (3.8)</td>
<td>24 (22.6)</td>
<td>78 (73.6)</td>
</tr>
<tr>
<td>barrier</td>
<td>44/5 (19.9)</td>
<td>0</td>
<td>100</td>
<td>21 (19.8)</td>
<td>52 (42.1)</td>
<td>33 (31.1)</td>
</tr>
</tbody>
</table>

Using the Spearman correlation test, the results showed that the awareness had a significant correlation with age (p=0.006), education (P< 0.0001) and marital status (P=0.062). This means that awareness increased with the increasing in age and levels of education. A significant relationship (α= 0.10) was also observed between awareness and marital status. Logistic regression analysis was also carried out to simultaneously investigate the effect of age, education level, and marital status on awareness. It was observed that the marital status had no significant relationship in the presence of the other two variables (Table 3).

Table 3. Correlation of Knowledge, Age, Level of Education and Marital Status

<table>
<thead>
<tr>
<th>Age group</th>
<th>Low N (%)</th>
<th>Knowledge Moderate N (%)</th>
<th>High N (%)</th>
<th>Sum N(%)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-29</td>
<td>3 (12.)</td>
<td>10 (40.0)</td>
<td>12 (48.0)</td>
<td>25 (100)</td>
<td>0.006</td>
</tr>
<tr>
<td>30-39</td>
<td>9 (37.8)</td>
<td>19 (42.2)</td>
<td>17 (37.8)</td>
<td>45 (100)</td>
<td></td>
</tr>
</tbody>
</table>
Perceived sensitivity was not significantly associated with age and marital status; however, it had a significant correlation with the education level (P=0.007). The higher the education level was, the greater the perceived sensitivity. Perceived severity and benefits had no significant relationship with age, education level, or marital status. It was in the case that a significant relationship was observed between perceived barriers and education levels (P=0.014) (Table 4,5).

**Table 4. Correlation of Perceived Susceptibility, Perceived Severity, Age, level of Education and Marital Status**

<table>
<thead>
<tr>
<th>Demographic Characteristics</th>
<th>Perceived Susceptibility</th>
<th>Perceived Severity</th>
<th>P value</th>
<th>Perceived Benefits</th>
<th>Perceived Barriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age group</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-29</td>
<td>1 (4.0)</td>
<td>25 (100)</td>
<td>*0.735</td>
<td>2 (41.2)</td>
<td>14 (58.3)</td>
</tr>
<tr>
<td>30-39</td>
<td>1 (2.2)</td>
<td>15 (33.3)</td>
<td></td>
<td>10 (30.3)</td>
<td>21 (63.6)</td>
</tr>
<tr>
<td>40+</td>
<td>1 (2.9)</td>
<td>15 (44.1)</td>
<td></td>
<td>10 (52.9)</td>
<td>18 (54.0)</td>
</tr>
<tr>
<td>Level of Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>1 (20.0)</td>
<td>1 (5)</td>
<td>*0.007</td>
<td>0 (0)</td>
<td>4 (40.0)</td>
</tr>
<tr>
<td>Elementary and Middle school</td>
<td>2 (2.9)</td>
<td>23 (33.3)</td>
<td></td>
<td>6 (36.7)</td>
<td>18 (72.0)</td>
</tr>
<tr>
<td>Diploma and Above</td>
<td>1 (3.1)</td>
<td>19 (59.4)</td>
<td></td>
<td>17 (38.7)</td>
<td>18 (61.8)</td>
</tr>
<tr>
<td>Marital Status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permanent Marriage</td>
<td>1 (3.4)</td>
<td>11 (37.9)</td>
<td>**0.728</td>
<td>0 (0)</td>
<td>1 (40.0)</td>
</tr>
<tr>
<td>Temporary Marriage</td>
<td>0 (0)</td>
<td>12 (38.7)</td>
<td></td>
<td>11 (36.7)</td>
<td>17 (64.7)</td>
</tr>
<tr>
<td>Divorced and Widow</td>
<td>3 (7.0)</td>
<td>18 (51.2)</td>
<td></td>
<td>15 (34.9)</td>
<td>27 (62.8)</td>
</tr>
<tr>
<td>Single</td>
<td>0 (0)</td>
<td>2 (66.7)</td>
<td></td>
<td>0 (0)</td>
<td>2 (100)</td>
</tr>
</tbody>
</table>

* Spearman’s Rho Correlation  ** Fisher’s Exact Test

**Table 5. Correlation of Perceived Benefits, Perceived Barriers, Age, level of Education and Marital Status**

<table>
<thead>
<tr>
<th>Demographic Characteristics</th>
<th>Perceived Benefits</th>
<th>Perceived Barriers</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age Group</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-29</td>
<td>1 (4.0)</td>
<td>6 (24)</td>
<td>*0.313</td>
</tr>
<tr>
<td>30-39</td>
<td>0 (0)</td>
<td>16 (35.6)</td>
<td>*0.014</td>
</tr>
<tr>
<td>40+</td>
<td>3 (8.8)</td>
<td>16 (41.2)</td>
<td>*0.062</td>
</tr>
</tbody>
</table>

* Spearman’s Rho Correlation  ** Fisher’s Exact Test
Discussion

The results obtained showed that the mean age score of participants was 35.7 ± 7.9 years. Also a mean age of 34.5 ± 11.2 years was reported, which is in line with that of the present study. In this study, the main drugs used were reported first to be glass and then methadone and heroin, and hashish. The reported order of these commonly used drugs was as it follows: opium, crack, glass, ecstasy, and heroin [22]. Comparing the results, it can be concluded that changes in drug users’ attitudes are due to the fact that glass is of lower cost and easily accessible. Most participants had first experienced using drugs with their husbands. They stated that men shared drugs with their wives in order to avoid their objections and to have a companion in using drugs.

The mean score of women’s awareness of high-risk behaviors was moderate. Behaviors such as tattooing (49.5%) and lack of condom use in each 10 sexual relationships (45.9%) were also reported over the last three months. The experience of shared use of syringes and needles and symptoms of sexually transmitted diseases were respectively reported; 17.9% and 34% during the past three months. Karimi’s research on male drug users indicated that 52.8 percent of them had a high awareness, while 39.5 percent of them did not perform well and had not taken preventative measures. They also had a background of high-risk behaviors such as unprotected sex and drug injection [3].

The two studies reviewed above led to a conclusion that women are less aware than men, perhaps due to gender differences, lower employment, lower education levels, and less social interactions. Women’s awareness level in the current study was significantly associated with age, education level, and marital status. Increasing age was also associated with higher awareness in the Sabooteh’s study [23]. In this study, women having diploma or higher education levels were more cognizant. It is clear that individuals with higher education levels possess higher awareness levels and observe themselves more susceptible to damages. Education and awareness play a key role in maintaining health. Illiteracy can cause lack of responsibility for health and treatments issues [24]. Another study found that teenagers with higher levels of education were more cognizant and saw themselves as more vulnerable; however, adolescents with high levels of education are more likely than others to finance more risky sexual behavior [25]. Age mostly affects high-risk behaviors that occur in adolescence. Tenkorang claimed that age is a predictor of high-risk behaviors, especially sexual behavior in adolescents since they do not see themselves exposed to major risks such as AIDS and are more likely to attempt risky behavior [25]. In his study, Hanton found no link between awareness and education/age, whereas a high level of awareness in this study was reported. This reflects the young age of the participants ranging 15-24 years [26].

In the present study, the HBM constructs of perceived sensitivity to high-risk behaviors had a significant relationship with education level. However, there was no significant relationship between perceived sensitivity and age/marital status. The present study is in consensus with Solhi’s [24]. Perceived sensitivity has a strong cognitive component and is somewhat dependent on individual knowledge [27].

It can be concluded that more sensitivity is probably due to training classes in drop-in centers and shelters or to regular and periodic examinations in order to detect new cases of HIV and hepatitis. Rahmati also obtained the same results based on the above-mentioned model. The researcher introduced media as its cause [20]. In studies conducted by Vakili, Aser, and Soldi, constructs of perceived sensitivity were met in a lowest rate. It is perhaps because the participants in this study saw themselves at no risk. For example, women who participated in Vakili’s study served as health liaisons. Monogamous women participating in Aser’s study ignored the risk of HIV infection. Participants of Solhi’s study included barbers who did not know themselves susceptible to hepatitis and AIDS [21,24,28].

Participants who are less sensitive to being infected with HIV are more susceptible. This reduced sensitivity leads to a decrease in accuracy of prudent behaviors and exposes many people to the risk of HIV/AIDS as well [29]. Perceived sensitivity has the prime role in understanding the behavior. If a person is sensitive to health problems and recognizes that symptoms cannot only be due to certain diseases, this sensitivity then leads to the prevention of high-risk behavior and HIV infection [24]. High-perceived sensitivity is necessary to enhance the motivation of participants in preventive health
behaviors [21]. Compared to men, women considered themselves more susceptible to AIDS and would choose protective behavior such as using condom and having fewer sexual partners [26]. The perceived severity of the present study was high. It seems that people perceive diseases such as AIDS and Hepatitis as diseases with severe consequences and consider themselves at risk. This is because the women participating in our study observed the risk of illness or death in their family due to AIDS and hepatitis.

Tenkorang mentioned that experiences and consequences surrounding the death of families could have a more positive effect on perceived severity and feeling higher risk than others [25]. Like sensitivity, severity also has a strong cognitive component and is dependent upon individual knowledge [27]. The results showed that age, education level, and marital status have no significant relationship with perceived severity. These results are in a similar vein with other studies [20,24,30]. A high score means that the variables are not associated with perceived severity. Tenkorang, albeit, found a correlation between education level and perceived severity and 62.5 percent of the participants in his study with high school education level perceived no risk of high-risk behaviors. He also mentioned that the high education level is associated with the rejection of traditional and religious teachings [25]. Zack found out that students have had little perceived severity of STD and have taken less preventive behaviors about it [31], which may be due to the above reason. The perceived benefits of the present study were high and the highest mean score was related to this component.

It can be concluded that participants who received a service in these centers took preventive actions. Perceived benefits had no significant relationship with any of the variables (namely age, education level, and marital status). Vakili argued that fairly individuals’ high levels of perceived benefits represent their understanding of the potential preventive behaviors [21]. Lin et al. reported that the above-mentioned perceived benefits about one preventive factor lead to performing more preventive behaviors than other constructs [32].

According to the health belief model, when an individual reaches an appropriate understanding level of beliefs about sensitivity and severity, he does not accept health recommendations unless the potential benefits versus the obstacles of that behavior are well-understood [30].

Aser et al. introduced perceived benefits of condom use as one of the most important structural aspects of the health belief model. This study showed that the relationship between benefits and the use of condoms exist as a preventive behavior [28]. The majority of women in this study scored medium for perceived barriers. Perceived barriers had no significant relationship with age and marital status, while they had a significant relationship with the education level. Perhaps, it is because of paying more attention to removing barriers in adopting a behavior. Perceived barriers play a vital role in predicting protective health behaviors [3]. Namdar also confirmed a significant relationship between perceived barriers and education level of women aged 20-65 years [33]. Volk’s findings indicated that perceived barriers among men and women are only a part of the Health Belief Model and are effective on the behavior of condom use [34]. People who perceived fewer barriers have more preventive behaviors [32]. Zaho et al. showed that perceived barriers to condom use in prostitutes were more than the perceived benefits. Thus, reducing barriers to condom use is more effective than raising awareness [35].

**Conclusion**

Due to the fact that the high perceived sensitivity to enhance the motivation of individuals to adopt preventive health behaviors and that perceived benefits are one of the most important structural aspects of the Health Belief Model, and that awareness and perceived barriers are predicted to account for strong acquired behaviors, it seems that educational planning should be provided and executed based on behavior change models like the HBM in order to prevent high-risk behaviors in this group of vulnerable women and to reduce barriers and increase their awareness of other structures and models. One of the limitations of this study is the participants’ self-reporting. The goal was set out to reach the highest accurate data from the participants through their ensuring of the confidentiality of the questionnaires and gift giving. Another limitation is that the participants of this study were just those women coming to drop-in centers. As a result, the findings of this study cannot be generalized to those women not coming to these centers, attending drug rehab camps, and homeless women. Hence, mobile treatment teams are required to investigate their high-risk behaviors.

**Ethical considerations**

The study was approved by the ethics committee of the Iran University. The researcher obtained approval from the participants. All women were informed regarding the confidential nature of the data. All participants were informed that they would be voluntary in refusing to answer any questions. All participants were informed that they would be free to withdraw from the study at any time. All participants were encouraged to ask any questions or concerns about their participation.

**Acknowledgement**

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Effect of neurofeedback in improving the deaf students’ reading after cochlear implantation

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Abstract
The aim of this study was to evaluate the effectiveness of neurofeedback in improving reading in deaf children after cochlear implantation. This study was a statistical sample of 8 children (5 boys and 3 girls) aged 8-14 years with an IQ of 80, according to Wechsler test listed in the student’s file. After identifying the students based on certain criteria, they and their parents participated in the study, which took place in Ava center in Ilam, and, afterwards heard the explanations about the way they could run the business themselves. No history of seizure disorders, epilepsy and brain trauma was recorded. The cochlear implant was performed at 18 months and at maximum 24 months. The participants were randomly divided into an experimental group and a control group. The experimental group received neurofeedback treatment for 20 sessions of 40 minutes each (three sessions per week). The instruments used in this study were a demographic questionnaire (which included information such as age, grade, and IQ), a reading disorder test, and the neurofeedback devices. The ability to read the neurofeedback group showed that the reading difficulties in the experimental group were lower. In addition, the functional groups, relocation, replacement and reverse readings improved.

Keywords: deaf, cochlear implant, problems with reading, neurofeedback

Introduction
Normal hearing implies the ability to understand the spoken words of others without any need to treatment aids or special procedures [1]. According to this definition, a person whose hearing has been damaged needs special procedures to understand the spoken words of others. The Education act has defined hearing disability as a hearing impairment, which goes beyond so that the student will not be able to process the others’ verbal information without a hearing aid. Hearing impairment has been reported among 28 million Americans, of whom, 1% has been seen with severe hearing impairment [1]. With regard to the investigations undergone by practitioners of the education center, in average, about 50% of the children require an education program and people with a hearing handicap require special aids. In this area, the main problem lies in how to train individuals who face limitation. Children with a hearing impairment cannot set relationships with others, thus the feelings such as isolation, failure and loneliness will dominate them, whereby this problem will complicate the issue of education for them [2]. Hearing loss is a reality throughout the world, which dates back in the literature on exceptional Children. Factors, which have been discussed in the area of deaf children, include discussion and exchange of ideas about sensorineural hearing loss, oral methods, oral method with finger movements, oral (lip-reading) method, both sensory and multi-sensory methods, single sensory methods. Each of the proposed educational procedures for deaf children had reasonable evidence, thus we could witness diversity in the educational styles in working with deaf children, where hopeful outcomes concerning efforts made to date could be observed [3]. About 30%-40% of deaf or hard-of-hearing babies have been seen with nerve growth status or mental retardation. According to the statistics research board, the most common statuses in hearing impairment include mental retardation, learning disabilities, and attention problems. Further, some disabilities might not emerge until childhood or adolescence, resulting in an increase of these figures. Despite the exposure with some similarities with mentally retarded children and children without mental retardation, in investigating general issues related to deafness in children, it could be observed that deaf children pass cognitive and linguistic
stages similar to normal children, who repeated mistakes the same as mistakes by normal children at certain stages of evolution of language. Almost 30% of the children with a hearing impairment, in addition to hearing loss, also have other disabilities including mental retardation, significant vision impairment, learning disabilities, and attention deficit disorder. Furthermore, emotional or behavioral problems, cerebral palsy, bone problems might also occur with hearing loss. Looking into the previous experiences at the area of fostering children with newly diagnosed hearing impairment indicated that the early diagnosis of hearing impairment and use of intervention programs could be the best way to help for progress. To use the advantage of ductility of the central nervous system, maximize treatment, and reduce functional defects, the intervention must be started, followed by the diagnosis. Children with an early hearing-loss detection and intervention compared to the children with late hearing-loss detection have better cognitive, social, and linguistic skills and all these factors help the children attend in conjunctive normal classes and open environments. In recent decades, intervention programs have been increasingly expanded to prevent behavioral disorders and mental health problems of deaf children. Some of these programs could train the children with the required skills such as response inhibition, knowledge of impulsive behavior, emotion regulation. The council of exceptional children and the council of deaf children have had some standards for teachers of deaf children for over one decade, in which all the needs required for deaf children were considered. Studies have shown that the children who attended training courses for executive functions one or two years earlier, presented a huge progress in their social skills, skill of problem solving and cognitive performance, such that all these progresses related to executive functions [4].

Learning subjective subjects and theoretical contexts cannot be practicable, which is difficult for the person with a hearing impairment and the reason for this is the impairment in speaking, thinking, and visualizing. Hence, it can be said that hearing impairment causes pseudo-academia and laziness. The studies on academic achievement of children with hearing impairment indicated the lack of academic achievement of these children. In this regard, Peter Rimmer quoted from Saeedi in his studies, stating that he had perceived these children under their education level for 5 years. Using the Stanford Achievement Test (SAT-HT), which was standardized in 1972 on 6871 children with hearing impairment, Kretschmer found disorders of reading in these students. Reading is one of the most important education skills; it requires coordination and combination of skills of word recognition and understanding the meanings [10]. Reading disorder is one of the most common disorders in learning. Most of the people with a reading disorder have been seen with a lack of progress in their brain cells, and expanding problems in their reading derived from visual and auditory problems. This derives from problems in neurons, which have developed a network in brain, deemed allocating for time changes. Reading, as one of the skills and abilities acquired in school, plays a major role in the personal growth of a person and his attendance in society. Reading is a cognitive and linguistic process, which has a close relationship with other linguistic processes including speaking, writing, listening, which the child acquires. Notably, children with a hearing impairment face problems in their subjective activities such as processing, storage, and retrieval of data. A variety of studies have been conducted in the area of problems of reading comprehension among deaf children. In 1916, two English scholars [5] formulated a test to evaluate the reading skill, in which deaf students in the age group 14-16 years were asked to read some sentences and apply the instructions to the read the text, whereby the results indicated that the deaf students in the age group 14-16 years had the same function as the 7 years old students. In the process of understanding the reading comprehension input that was the text, finally, the semantic output was produced, whereby the meaning of the text was understood; thereby, the ability of reading without understanding the concept of terms was not accounted as a complete process to achieve the ultimate aim of reading, that was, the understanding of the meaning of the text. The linguistic processing must be fulfilled during special stages at different levels including syntactic, phonological, and morphological words, thus the required ability for reading implies phonological awareness, reading comprehension and dominance on reading the words [6]. Due to deficits in working the memory, deaf students have a poorer comprehension and reading [7].

The results of the study quoted by KakuJoybari [8] indicated that 0.95 of the deaf students who graduated from school, were deemed as 7 years old students in terms of reading comprehension.

Other studies showed that the deaf students face substantial problems in their life in terms of verbal communication skills, such as understanding the meanings of words, speaking, reading comprehension, and writing [8]. Deaf education is the education of students with a variety of hearing levels, which dates back to a long time ago; teaching reading and writing is an unavoidable necessity to increase communication skills of hearing-impaired children. Reading is one of the cognitive skills that was developed as the result of the interaction between the nervous system and cultural experience [9]. Reading comprehension is a complicated procedure that requires coordination and combination of skills of word recognition and understanding the meanings [10]. Reading is one of the most important skills for children in learning courses. Proficiency in reading through speaking
and listening or reading and writing comes to be realized by the use of signs and symptoms [11].

Studies in the context of deaf children’s reading comprehension have had disappointing results. It must be noted that these results do not indicate an intellectual disability of deaf children, but the weakness in the reading comprehension in this group derives from the factors with cognitive nature. Reading comprehension is both a cognitive and linguistic process, which has a close relationship with the other linguistic processes including speaking, writing, listening, which the child acquires. Notably, the children with a hearing impairment face problems in their subjective activities such as processing, storage, and retrieval of data. Since reading comprehension and learning reading skill require the acquisition of visual recognition of linguistic elements including letters, words and sentences, thus identifying strengths and weaknesses in both cognitive and linguistic areas, it seems that essential brain waves depending on the frequency are classified into four groups: Delta (1 to 3 Hz), theta (4 to 7 Hz), alpha (8 to 13 Hz) and beta (14 to 30 Hz). We can witness alpha activity when a person is relaxed, but alert. Yet, when a person involves in a cognitive activity or problem resolving, we can witness beta waves. Delta waves are observed when individuals are in deep sleep or in a coma, and theta waves are seen when the person is in light sleep [12]. Neurofeedback is a treatment model for changing or modifying cognitive, emotional, and physiological processes in patients. The results of studies indicated that neurofeedback fosters the brain for activity or proper pattern during various sessions. However, a variety of studies on treatments for learning disabilities concerning neurofeedback have been conducted; in a study it was indicated that children with learning difficulties are different from other children in terms of EEG indicators. One of the methods for the normalization of the brainwave of children with learning disabled (LD) can use Valproate Sodium. Neurofeedback therapy is another technique that normalizes brainwaves. Neurofeedback refers to the process of factor conditioning in which the individuals learn to change the electrical activity of their brain [13]. Neurofeedback aims to treat EEG abnormalities, whereby improvement of cognitive or behavioral performances will result. Neurofeedback is inhibited as a form of conditioning the electrical activity of the brain. It is believed that neurofeedback recalls growth and brings about changes in brain cell surfaces, which supports the brain function and the cognitive/behavioral performance [12].

The sensorimotor cortex helps the cerebral cortex in the simultaneous performance of physical and cognitive tasks, and this comes out of executive performances. It can be understood why early pioneers in the neurofeedback area have started the education process during the sensorimotor cortex.

Further, Ratey [14] mentioned that brain circuits that are used to regulate a subjective practice are those used to regulate a physical practice, i.e. The sensorimotor cortex works out in conducting physical and mental processes, and this cortex is more likely used for sensorimotor functions. Hence, the clients who have difficulties in understanding their cognitive tasks can use the neurofeedback education in their treatment process. Neurofeedback education using the systems which deal with emotion, feeling, attention and working memory, develops the energy source, movement, reasoning and thinking. Regarding the SMR area, in another explanation for finding of this research, it can be said that the activation of neuronal circuits involved in cognitive processes comes to be realized. Previous studies have shown that the working memory is based on a neuronal circuit, which is acquired from the interaction between the attention control system in the prefrontal cortex and the sensory information storage in the dorsal prefrontal association area. In this study, a part of the protocol was used for the suppression of theta waves, and the related works indicated that theta relates to poor performance, and the results indicated that the suppression of theta waves caused a better cognitive performance. In other words, neurofeedback education has positive effects on the individuals’ subjective performance and cognitive processing, confirming the findings of this research.

Another explanation for the effect of neurofeedback thalamus, regarding the early changes in the activity, more likely occurring via neurofeedback, mentioned that these changes might modify EEG through thalamocortical circuits. Hence, changes in the EEG were deemed as the result of complex reorganization of neuronal activity. A variety of studies have been conducted in the area of effectiveness of neurofeedback in improving the students’ reading difficulties, whereby significant results have been obtained [15,16]. To date, this method has not been used to improve the reading comprehension in deaf children. In this study, the researcher tried to find an approach to increase the reading comprehension in deaf children so that to help improving the educational, communicative, and social abilities of deaf children, besides other educational approaches of deaf children.

Research method

A semi-experimental study was used in this study. After the cochlear implantation, the deaf students
who have accomplished their auditory training therapies or treatments such as auditory and linguistic processing in the Ava Center in Ilam were selected as the sample group. The inclusion criteria include DSM-IV diagnosis of the reading disorder and inclusion tests to measure the reading disorder. 8 students (5 boys and 3 girls) in the age group of 8-14 years old with an IQ of 80 regarding the Wechsler test, were involved in the study. After identifying the students with the inclusion criteria, their parents participated in the Ava Center in Ilam and after hearing the explanations, they tried to run the business themselves. The inclusion criteria included the following: not having any medical history of diseases of epilepsy, seizures, and brain damage. About 18-24 months must have passed since the cochlear implantation, and the age of participants had to be between 8 and 14 years old. At first, participants filled in the demographic questionnaire with the help of their teachers and parents, and then the reading test took place, the researcher taking them in a calm room. The teachers and parents, and then the reading test took place, the researcher taking them in a calm room. The voice recorder was used to record contents, and timer was used to record the reading time in the tasks relating to speed of calling and reading. Then, the participants were divided into two test and control groups; the test group received neurofeedback in 20 sessions during 40 minutes, and the control group just stared at purposeless images on the screen of a computer. At the end of the course, the groups participated in a post-test of reading disorder, and then the results were considered after one month.

The instruments used in this research

Demographic questionnaire (information on age, education level, and IQ)
Reading disorder test

The reading disorder test developed and normalized by Nesfat et al. [17] was used to diagnose children with reading difficulties. According to this test, three clinical characteristics including mistakes in reading, speed of reading and reading comprehension of students were measured. According to this test, a score was given to each participant per any error, and the sum of scores of the participant was considered as his total errors; further, a score was given to each participant per any response to the reading comprehension questions. Finally, the time spent by the participant from the start to the end of reading the text, was considered as the index of speed of reading: further, coefficients of reading validity of 0.56, 0.61 and 0.68 at third, fourth and fifth grades were obtained [17].

Neurofeedback device: the neurofeedback device was used for two purposes: 1-to register brain waves, 2- to present feedback. The device used in this research included five channels named ProComp 5.5 made in Canada, with its sensitivity of sampling equal to 256 Hz. In this study, two treatment protocols were used for the purpose of treatment by using the neurofeedback therapy in children with reading difficulties.

Neurofeedback therapy

Neurofeedback therapy is the first treatment protocol used for the suppression of alpha/theta in the Cz, aiming at increasing alpha and reducing theta.

The second protocol: the SMR protocol was implemented in C3, C4 areas. In this protocol, SMR (subset of beta) was strengthened for 12 to 15 Hz, and theta was suppressed for 4 to 7 Hz. These two protocols were repeated during all 20 education sessions. Since session seven, any student seen with progress, received a CD box. They also received a CD in the thirteenth and nineteenth sessions. The rational reason for the treatment used in this study relied on the factors below: in comparing EEG in normal and LD children, the highest amount of EEG frequency was in LD children by increasing the theta activity [18-20]. In the second protocol, theta (407) and hyper-beta (22-30), suppression of SMR (subset of beta) in encoding physical and cognitive tasks helped the cerebral cortex, adding that the encoding of physical and cognitive tasks helped the cerebral cortex in brain circuits. Brain circuits which were used to regulate a subjective practice, were those used to regulate a physical practice. Hence, the clients who had difficulties in understanding the logical sequence of cognitive tasks could use the neurofeedback therapy in their sensorimotor cortex of the right hemisphere (C4) to recall their emotions and feelings. Education in midpoint or Cz facilitated a mixed response. In other words, increasing the activity at the central cortex was followed by increasing the activity in skills of both hemispheres as a precondition for a successful learning and acquisition of the reading skills. Neurofeedback sessions were organized until the twelfth session during three sessions in a week, and sessions of 12 to 19 were organized during two sessions in a week. Treatment processes: the participant was sat on a chair in front of a computer screen in a room in a total silence; he prepared tulip ear-tips and areas C4, C3, Cz by using alcohol and gel, for which Alpha-theta protocol was performed. For this, the active electrode was transferred to point Cz. Feedback of alpha-theta protocol was in the form of voice (sound of waves in ocean - River), that the participant used to listen to the sound with his eyes closed, and if he fell asleep, the device had to be alerted. In this protocol, the person found the ability to establish a balance and coordination between alpha and theta, where this protocol was performed in any session during 20 minutes. The next 20 minutes were considered for training protocol SMR, where theta waves of 4-7 Hz and beta waves of 22-30 Hz were suppressed, and SMR waves were strengthened. At the end of each session, the threshold was written down for the next session.
Findings

Table 1. The characteristics of the experimental and control groups

<table>
<thead>
<tr>
<th></th>
<th>The experimental group (n = 4)</th>
<th>The control group (n = 4)</th>
<th>Significant level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>Standard deviation</td>
<td>Mean</td>
<td>Standard deviation</td>
</tr>
<tr>
<td>Age</td>
<td>11.23</td>
<td>11.23</td>
<td>11.9</td>
</tr>
<tr>
<td>IQ</td>
<td>94.8</td>
<td>8.48</td>
<td>89.6</td>
</tr>
</tbody>
</table>

Table 1 shows the coordinated characteristics of students in both groups. The T test shows no significant differences between the experimental and control groups.

Table 2. The results of London Tower test in control and experimental groups

<table>
<thead>
<tr>
<th>Elimination</th>
<th>The experimental group</th>
<th>The control group</th>
<th>Significant level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>pre</td>
<td>post</td>
<td>deviation</td>
</tr>
<tr>
<td>add</td>
<td>2/ 53</td>
<td>0/ 98</td>
<td>2/ 0</td>
</tr>
<tr>
<td>relocation</td>
<td>4/ 82</td>
<td>3/ 39</td>
<td>1/ 11</td>
</tr>
<tr>
<td>replacement</td>
<td>10/ 53</td>
<td>5/ 4</td>
<td>0/ 92</td>
</tr>
<tr>
<td>mirror reading</td>
<td>12/ 34</td>
<td>7/ 6</td>
<td>1/ 35</td>
</tr>
</tbody>
</table>

Table 2 represented the results of neurofeedback therapy on the reading comprehension of two test and control groups in pre-test and post-test. The results indicated that the reading comprehension of the test group went beyond the control group, where that difference lied on adding. The results indicated that the displacement in the test group went beyond the control group, and that difference was significant in adding. Further, the displacement in the test group went beyond the control group, and that difference was significant. The reading inversion in the test group went beyond the control group, and that difference was significant.

Discussion and conclusion

Besides all the studies on exceptional individuals, on linguistic, cognitive and verbal abilities of deaf individuals and their comparison with normal individuals to investigate the differences, have been more likely drawn into attention in scientific communities. With regard to the ability of deaf individuals concerning the achievement of life skills, attention to training these individuals is important. Deaf children often cannot foster the terms and concepts relating to language in them. If hearing impairment occurs at the early childhood, the deaf child might find some of the different types of learning impossible. As the early experiences of the children are often visual and tactile, their first dialogues are generally through sign language and gestures. The children who have hearing difficulties, learn in their early childhood how to talk with so much difficulty, because proper dialogue relies on copying from others’ speech. Hearing impairment affects formation of concept. Progress in reading has a slow trend in the person with a hearing impairment [8], who believes that reading comprehension in deaf children is poorer compared to normal children.

The studies in the two recent decades have given use of more absolute responses, the responses that have confused the teachers and have obliged them to have a revision on their methods about fostering deaf children. By studying brain injuries and their complications on reading, some researchers called important brain activities involved in brain injuries. A special electroencephalogram (EEG) pattern has been observed in children detected with dyslexia [19]. It was revealed that there is a significant difference between normal children and children affected by a reading disorder concerning EEG waves. Neurofeedback seeks to train the individuals to normalize their brain waves reaction to the stimulants. Neurofeedback can be used to stimulate or regulate the activity of the brain. Neurofeedback is also used for normal individuals' neurofeedback causes increasing the capacity of working memory and attention to education performance, and besides, neurofeedback had significant results in LD treatment. The therapists enabled to indicate that training neurofeedback could cause an improvement of the cognitive functions. These results are relevant and similar with the results of the study by Vernon et al [5]. A part of the protocol used in this study was regarded as the increase of Cz. To define this finding, it can be said that neurofeedback education affects three sensorimotor cortices. Therefore, it can be assumed that neurofeedback facilitates information processing, because SMR reduces the voluntary control of the motor system interference in Cognitive Information Processing.

References

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The significance of chest ultrasound and chest X-ray in the diagnosis of children clinically suspected of pneumonia

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Abstract

Background. Community-acquired pneumonia (CAP) is one of the most common diseases and an important cause of morbidity and mortality worldwide. This study intended to compare and evaluate the benefits and significance of chest X-ray and chest ultrasound in the diagnosis of CAP in children.

Methods Study Population. One hundred children of one-month to five-years of age who referred to the Children’s Hospital in Bandar Abbas for pneumonia were evaluated by chest ultrasound and chest X-ray by different radiologists.

Results. Evidence of involvement was observed in 96% of the chest X-rays of those children, and also in 9% of the chest ultrasounds (6% opacity, 3% effusion). Pleural effusion was observed in 3 of the children only by ultrasound.

Conclusion. The use of ultrasound is an appropriate method to evaluate the complication of pneumonia.

Keywords: pneumonia, chest X-ray, ultrasound

Background

Pneumonia is one of the most common infectious diseases of the lower respiratory tract in children and an important cause of morbidity and mortality worldwide, affecting over 150 million children and leading to 3 million deaths of children under 5 years old annually [1]. Community Acquired Pneumonia (CAP) is one common type of pneumonia. This disease is often accompanied by fever, cough, pleuritic chest pain, and dyspnea. If untreated, pneumonia can lead to respiratory failure, cardiac arrhythmia, and renal failure. The prevalence of this disease is of 12 in 1000 individuals [2]. Viral and bacterial pneumonias are often associated with the infection of the upper respiratory tract, lasting for several days with runny nose and cough. Viral pneumonia is typically associated with fever, which is milder than bacterial pneumonia. Tachypnea is the most common clinical persistent symptom of pneumonia [3]. Difficulty in breathing, intercostal and subcostal retraction, suprasternal retraction, and using accessory muscles of respiration are also common in pneumonia. Severe infections were associated with cyanosis, weakness, and respiratory fatigue especially in infants [4]. In patients with clinical signs of pneumonia, chest X-ray was highly effective in the diagnosis of pneumonia. Symptoms of bacterial pneumonia are were usually the result of the direct invasion of bacteria of the chest cavity. These include pleural effusion and empyema. The correct diagnosis, appropriate and timely treatment, and identification of complications are considerably important. Diagnosis is based on clinical symptoms in most parts of the world. The diagnosis is confirmed with a chest X-ray. Ultrasound is a method used for the early diagnosis of pneumonia complications such as pleural effusion. In a recent study, ultrasound was used for the diagnosis of pneumonia. Will Bogus showed 93.4% sensitivity and 97.7% specificity of ultrasound in the diagnosis of pneumonia [5,6]. Therefore, we attempted to examine the patients with clinical signs of pneumonia and compare their chest X-ray and ultrasound results to confirm their diagnosis in order to reduce exposure to radiation, which can be problematic especially in children. In addition, we attempted to use ultrasound in suspicious cases and even diagnosed some symptoms in early stages.

Methods

This prospective observational study was conducted on 100 patients aged from one-month to five-year children who were brought to Bandar Abbas
Children’s Hospital and were hospitalized for pneumonia in 2012 and 2013. In addition to chest X-ray, on the third day, the children underwent an ultrasound evaluation. Clinical data along with age and sex from the patients’ records and the data from chest X-ray and ultrasound results were added to the questionnaires. Criteria for inclusion in the study were:

1. Age, which was between one-month to five-years.
2. Pneumonia symptoms such as fever, cough, rale lung sounds, respiratory distress symptoms (increased respiratory rate based on age: infants > 50 per minute, 1 to 5 years > 40 per minute, over 5 years > 30 per minute) with chest X-ray results changes [1].

The exclusion criteria were the lack of cooperation of parents or unwillingness to participate in the study after the explanation. The data was entered into the questionnaire, encoded, and entered into the statistical software SPSS version 19, and the t-test was used to analyze the data.

Results

In this study, 100 patients were examined, which included 53 males, and 47 females. The mean age of subjects was 26.3 months. The difference between the mean age of males and females was significant (p-value = 0.019). Chest X-ray and ultrasound findings are displayed in Table 1, and the clinical data are given in Table 2.

Table 1. Ultrasound and chest X-Ray findings in children hospitalized for pneumonia

<table>
<thead>
<tr>
<th>Chest X-ray</th>
<th>Chest Ultrasound</th>
<th>Pulmonary involvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>6</td>
<td>Consolidation</td>
</tr>
<tr>
<td>-</td>
<td>3</td>
<td>Effusion</td>
</tr>
<tr>
<td>31</td>
<td>-</td>
<td>Unilateral Reticular</td>
</tr>
<tr>
<td>45</td>
<td>-</td>
<td>Bilateral Reticular</td>
</tr>
</tbody>
</table>

Table 2. Clinical symptoms of the children hospitalized due to the diagnosis of pneumonia

<table>
<thead>
<tr>
<th>Clinical Symptoms</th>
<th>% with the symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever</td>
<td>80</td>
</tr>
<tr>
<td>Cough</td>
<td>97</td>
</tr>
<tr>
<td>Rhinorhea, and nasal congestion</td>
<td>65</td>
</tr>
<tr>
<td>Conjunctivitis</td>
<td>5</td>
</tr>
<tr>
<td>Tachypnea</td>
<td>92</td>
</tr>
<tr>
<td>Retraction</td>
<td>64</td>
</tr>
</tbody>
</table>

Discussion

The acute infection of the lower airways (mainly pneumonia) is the leading cause of death in children in developing countries. The prevalence of this infection is of 1.9 million children annually. The accurate diagnosis of pneumonia largely depends on clinical examination and precise imaging [7].

Confirming lung disease especially in children is considerably important. There is a balance between the high dosage of harmful potential rays in chest X-ray and the accurate diagnosis. Chest ultrasound is an alternative diagnostic method to evaluate pleura and pulmonary lesions and anterior mediastinum [8]. Ultrasound probably gives us a better image of the status of the lungs in the diagnosis of pneumonia due to the thinning of chest thoracic walls and large volume of the lungs in children compared to adults.

Chest X-ray requires cooperation to undergo a high dose of radiation and willingness to be transferred to the radiology department. However, ultrasound was highly accessible and was performed at the patients’ bedside in most cases, and since the results were instantly available, they were highly beneficial. Unfortunately, the ultrasound was problematic due to its higher cost and inaccessibility of skilled ultrasound operators, and burden of transferring patients out of the hospital to another facility.

It was decided that ultrasound was the main diagnostic tool, due to its benefits mentioned above, and due to the fact that it was performed at the patient’s bedside, along with the proper diagnosis of pulmonary infections. If the diagnostic procedures showed a high degree of accuracy, they were used. As a result, the patients did not experience a high dosage of radiation; moreover, they were no longer required to be transferred outside the hospital.

Pulmonary lesions spread to the pleura up to 98.5% in adults, which can easily be observed in
ultrasound. However, children have smaller pulmonary tissue and there is a little chance for the lesion to spread to the pleura. Therefore, ultrasound is a suitable alternative to X-ray in the evaluation and follow-up of children with pneumonia.

In this study, 100 children between one month and 5 years, who were hospitalized for pneumonia in Bandar Abbas hospital, were evaluated with chest X-ray and ultrasound. Evidence of involvement supporting the diagnosis of pneumonia was observed in 96% of their chest X-rays while the findings supporting pneumonia were observed in 9% of the cases in chest ultrasound. The latter was also consistent with X-ray results. Pleural effusion was observed in 3 patients who were diagnosed by ultrasound while no effusion was found in the X-ray results. This was similar to the other studies, which showed the importance of ultrasound in the diagnosis of pneumonia and extra pulmonary involvement.

In contrast to our findings, the findings in other studies confirmed the usefulness and high consistency between chest X-ray and ultrasound. Shebl showed that ultrasound could be used for the diagnosis of pneumonia. They had 17 positive ultrasound criteria [7,8]. On the other hand, there was no finding confirming pneumonia in chest X-ray results. Ressing showed that ultrasound acted 10 times stronger in the diagnosis of pneumonia in the German department compared to our study. The follow-up of patients was done by using ultrasound in order to diagnose pneumonia. Finally, the results revealed that chest ultrasound had a high sensitivity and specificity. Only 8% of the cases of pneumonia were not diagnosed by ultrasound while they were diagnosed by using chest X-ray [9]. Jean Eudes et al. showed that ultrasound was 9 times more sensitive than chest X-ray in the diagnosis of pneumonia compared to our study. Jean Eudes et al. recommended that ultrasound is used as the first diagnostic method compared to chest X-ray.

Since the subjects had a mean age of 26 months, younger infants had to be diagnosed with the ultrasound. The ultrasound device and probe specific to children that were used, differed from the device and probe used in similar studies. The ultrasound device used in this study was the same as that used for adults. This device was also used on children’s chest, which lowered the sensitivity of the method. Another reason for the difference between these results and similar studies was the restlessness and lack of cooperation of children in evaluating all thoracic directions by the sonographer. In similar studies, the ultrasound technique with a specific probe and the waves within the range of 7.5 to 10 MHZ were used to examine all directions of the lungs (including parasagittal, transverse, coronal, mid-clavicle, anterior, posterior, mid-axillary chest lines) [7,8].

Community Acquired Pneumonia can affect interstitial and pleural pulmonary tissues. Based on similar studies, ultrasound had a high sensitivity and specificity in the diagnosis of pleural effusion and peripheral lesions. However, only 9% of the positive ultrasound findings confirming pneumonia was found in the present study due to the involvement of central and unilateral reticular zones (31%) bilateral reticular zones (45%) in chest X-ray. It should be noted that there was no synchronization between chest X-ray and ultrasound in most cases. In our study, the patients were sent for an ultrasound on the third day. Prior to the ultrasound, patients were under antibiotic and other therapeutic measures. However, they would have been if the ultrasound had been performed at first. Then, X-rays would have been performed on the third day due to the risk of X-ray findings in sync with the clinical symptoms.

One of the controversial issues was that the reason for the insufficient detection in pneumonia patients through ultrasound was that they entered the study without considering the reason for their viral or bacterial infections, since turbidity was more likely to be observed in the bacterial cases which counted for the majority of the cases in the intensive care units [11,12].

In this study, 97% cough, 96% tachypnea, 80% fever, and retraction were observed in 64% of the patients. These cases were consistent with those findings in other studies. This represented a major role of the clinical examination in the diagnosis of pneumonia, especially in developing countries. This also indicated the importance of the precise examination of the patients with cough, fever and tachypnea symptoms in early and immediate diagnosis [8].

Conclusion

The present study indicated the lack of accuracy of ultrasound in the diagnosis of pneumonia and the detection of complications such as pleura.

Recommendations

Due to the small sample size as well as the inconsistent results with those in similar studies, it is recommended that further studies with a larger sample size and assessment of patients under 3 months old and thin chest walls (which shows usefulness of ultrasound) are conducted in order to confirm the application of ultrasound in the diagnosis of pneumonia. It is also recommended that the subjects are divided into three groups including healthy subjects such as the ones in the
control group, bacterial infections and viral infections, in order to compare and evaluate the ultrasound results.

Limitations
This study had several limitations. One was the reluctance of some parents to giving the consent for X-ray and removing their children from the hospital 3 days before the treatment, which led to the exclusion of several patients from the study. Another limitation was the lack of cooperation of the hospital staff in transferring patients to outside sources in order to conduct ultrasound by a radiologist, which prolonged the study in order to collect the patients.

Acknowledgment
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References

Comparison of anti-Mullerian hormone level between uterine artery embolization and myomectomy in uterine fibroma

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Abstract

Background: Uterine fibroma is a common gynecologic condition. When pharmacological therapies fail, surgical interventions such as myomectomy, hysterectomy, or uterine artery embolization (UAE) are used for this condition. This study aimed to compare anti-Mullerian hormone level between two methods of UAE and myomectomy in the treatment of uterine fibroma.

Material and Method: In this clinical trial held in Imam Reza Hospital of Kermanshah, 40 patients with uterine fibroma were entered into the UAE group (20 cases) and myomectomy (20 cases). Anti-Mullerian hormone levels were measured twice (before and after therapeutic interventions) using the Monobinal kit. The data were analyzed by the SPSS (ver. 20.0) software by applying the Leven’s test, paired and independent t-test, Wilcoxon, and Mann-Whitney tests.

Results: There was no significant difference regarding age between two groups (P> 0.05). No significant difference was observed in terms of anti-Mullerian hormone level before and six months after the medical intervention in either group (P> 0.05). Also, no significant difference was detected between the two groups regarding the anti-Mullerian hormone level (P= 0.58).

Conclusion: The results obtained demonstrated that there was no statistically significant difference between UAE and myomectomy with regard to anti-Mullerian hormone, which reflects ovarian capacity. Therefore, UAE, which is a less invasive method, can be a suitable substitute for surgical methods in the treatment of symptomatic uterine fibroids among females of reproductive age.

Keywords: Anti-Mullerian hormone, uterine artery embolization, myomectomy, uterine fibroma

Introduction

Uterine fibroid (fibroma) is a non-cancerous tissue growth with elastic property in the uterine wall. It is one of the most common gynecologic disorders. Symptomatic uterine fibroids are associated with considerable complications and affect 20-40% of childbearing age women [1]. The most common symptom, which necessitates treatment of fibroids, comprises menorrhagia, which can potentially lead to iron deficiency anemia [2].

When symptoms of fibroids progress and medical treatments fail, it may become necessary to implement the intervention. Considering the location of fibroids, surgical methods such as myomectomy or hysterectomy were performed in the past. However, in recent years less invasive methods like uterine artery embolization (UAE) have been used. In the past decade, UAE has been used as an alternative to surgical methods to reduce the abnormal uterine bleeding. As the best non-surgical method, UAE was first introduced by Ravina in 1995 [3].

Several randomized clinical trials have demonstrated that at 24-months follow-up, UAE was associated with comparable outcome with hysterectomy and myomectomy in treatment of uterine fibroids [4]. However, ovarian failure, as a complication of UAE, has created some concern about UAE [4]. Therefore, studies have targeted this complication of UAE.

The real rate of ovarian failure after UAE is not known. But, in some studies it has been reported at less than two percent [5]. One of the diagnostic methods for persistent ovarian failure is raised serum LH and FSH levels [6]. Mara et al. (2008) showed that the FSH level was significantly higher in those treated by UAE when compared to myomectomy group [7]. In contrast, some studies advocated that UAE did not result in premature ovarian failure [8]. For instance, the reports made by Rashid et al. (2010) as well as Hovsepian et al. (2006) did not mention a significant difference in this regard at follow-up period after UAE and surgical intervention [8,9].

Another diagnostic method to diagnose ovarian failure is the measurement of anti-Mullerian hormone (AMH) level [7]. This hormone has an important role in the
ovarian function after birth and is involved in primary follicle development; in fact, AMH level is related to the number of ovarian follicles [7]. This hormone reaches its peak level after puberty and gradually decreases during ovulation periods [10]. Diminished ovarian reserve could be determined better and more precisely with the measurement of AMH. AMH has been recognized as a reliable marker for ovarian reserve, in particular antral follicles [11]. In contrast to LH and FSH, it is not necessary to do an AMH measurement on the third day of the menstrual period. In limited former studies, most studied subjects were at pre-menopausal age and the probability of premature ovarian failure was emphasized. In much limited studies, the ovarian capacity in younger patients has been assessed. In addition, ovarian capacity was determined by measuring LH and FSH, not AMH. Since the results of studies about ovarian capacity after UAE and myomectomy is controversial and there is limited knowledge about the comparison of ovarian capacity between UAE and myomectomy with 6-months follow-up, this study was performed with the objective of comparing AMH between UAE and myomectomy in the treatment of uterine fibroma.

Material and Method

This was a clinical trial, which, after being verified by the Ethics Committee of Kermanshah University of Medical Sciences, was done in the Gynecology Department of Imam Reza Hospital. Using a confidence of 99% and power of 95% and mean (± SD) of AMH in myomectomy and UAE groups of 8.9 (±0.7) and 9.9 (±0.1), the minimum sample size was calculated as having 20 persons in each group. Measures were undertaken to keep the names of patients confidentially and to avoid any cost on them. Also, at the start of the study, the details of the interventions were explained by the gynecologist and resident to the patients. Then the patients voluntarily decided to receive UAE or myomectomy, while considering the required criteria for receiving the treatments. In addition, the patients were categorized in four age groups including 20-25, 25-30, 30-35, and 35-40 years and were matched in the two groups. Demographic and background information (age, hospitalization duration, pain severity after one week, re-intervention, the cost, and time elapsed for the patient to return to work) as well as clinical and laboratory findings were gathered by the resident and documented in a checklist. AMH measurement was done by the Monobinal kit and all laboratory tests were done at Razi Laboratory. AMH level was measured before the interventions. Pain severity was determined on the third post-intervention day. The hospitalization duration was documented. The phone number of the resident was delivered to all patients to contact her in case of facing any problem after discharge from hospital.

Six months later, the patients were contacted by the resident and were asked to present to the hospital for a free consultation and physical examination. At that visit, the AMH level as well as serum hemoglobin levels were measured. Also, the patients were asked about pain, additional treatments such as hormonal agents, re-intervention, re-presentation to hospital, and time period required to return to work.

The gathered data were entered in SPSS (ver. 20.0) software. The descriptive indices including mean and standard deviation (SD) were used to report the results. The analyses were accomplished by employing the Leven’s test, paired and independent t-test, Wilcoxon, and Mann-Whitney U test. The significance level was set at 0.05.

Results

The sample studied included 40 women with the age range of 27-40 years. They were divided into two groups: UAE (20 cases) and myomectomy (20 cases). As shown in Table 1, the mean age of the myomectomy group was 35.5 years and in UAE group this was 34.55 years, with no significant difference (P= 0.968). Pain score in myomectomy group was 6.3 and in UAE, it was 7.2. Hospitalization duration was significantly higher in the myomectomy group (P< 0.001). However, the cost of UAE was higher than the myomectomy (Table 1).

<table>
<thead>
<tr>
<th>Table 1. Mean (SD) of background variables in uterine artery embolization (UAE) and myomectomy groups</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
</tr>
<tr>
<td>Mean (SD)</td>
</tr>
<tr>
<td><strong>Pain</strong></td>
</tr>
<tr>
<td><strong>Hospitalization (day)</strong></td>
</tr>
<tr>
<td><strong>Treatment costs</strong></td>
</tr>
<tr>
<td><strong>Time taken to return to work</strong></td>
</tr>
</tbody>
</table>

Regarding the need for re-intervention, follow-up at six months showed that no patient required re-intervention.
Also, regarding the the Kolmogorov–Smirnov test, AMH level before and after six months had a normal distribution and no statistically significant difference was seen (P= 0.839).

Also, the analyses showed that no significant difference existed between UAE and myomectomy groups regarding AMH level (Table 2).

<table>
<thead>
<tr>
<th>Treatment group</th>
<th>AMH level</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>P value</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myomectomy</td>
<td>Before intervention</td>
<td>0.12</td>
<td>2.20</td>
<td>2.91</td>
<td>4.42</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(N= 20)</td>
<td>After intervention</td>
<td>0.1</td>
<td>21</td>
<td>3.05</td>
<td>4.62</td>
<td>0.070</td>
<td></td>
</tr>
<tr>
<td>UAE (N= 20)</td>
<td>Before intervention</td>
<td>0.1</td>
<td>7.11</td>
<td>2.24</td>
<td>2.97</td>
<td>0.58</td>
<td></td>
</tr>
<tr>
<td></td>
<td>After intervention</td>
<td>0.1</td>
<td>20.8</td>
<td>2.14</td>
<td>2.14</td>
<td>0.839</td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Anti-Mullerian hormone (AMH) level before and after six months in uterine artery embolization (UAE) and myomectomy groups

Discussion

This study was done with the objective of comparing AMH level between UAE and myomectomy groups in treatment of uterine fibroma. Myomectomy is a standard surgical option for women with symptomatic uterine fibroma who desire to preserve fertility and do not respond to medical treatment. UAE is a less invasive method in the treatment of this condition. Since there is limited evidence about the ovarian capacity at 6-months follow-up after UAE and myomectomy, this study was done at Imam Reza Hospital of Kermanshah.

In this clinical trial, the two groups did not have a significant difference regarding age. The two groups were matched regarding age, which was an advantage of this study. This variable has not been assessed in other studies.

No significant difference was seen regarding pain score between the two groups, though patients in UAE experienced more severe pain. Hehenkamp et al. (2006) and Edwards et al. (2007) stated that pain in the first 24-hours after the intervention was significantly less severe in UAE than in the hysterectomy group [12,13], which was not in agreement with our results. However, generally speaking, pain severity was comparable between the two groups. According to Mara et al. (2008), pain and nausea were not mentioned as main problems after the intervention and these two issues were comparable in UAE and surgery groups, but bleeding, pain, and pelvic pressure were more common in the UAE group than in the hysterectomy group [7]. In Volker et al. (2007) study, severe hemorrhage was more prominent in UAE than in hysterectomy, but no significant difference was observed regarding other complication such as pain and pelvic pressure [14].

In terms of hospitalization, a significant difference was seen between the two studied groups. This time was shorter in UAE than in the myomectomy group. Likewise, the hospitalization period was shorter in UAE compared to myomectomy and hysterectomy groups according to Hehenkamp et al. (2006), Edwards et al. (2007), Pinto et al. (2003) studies [4,13,15]. In Razavi et al. study (2003), the hospitalization time in UAE was shorter [16].

In the current study, no significant difference was observed about the time needed to return to work. But, in Razavi et al. (2003) and Hehenkamp et al. (2006) studies, the return to work and other normal daily routine was shorter in the UAE group [8,16], which contradicted what we observed.

In the current study, costs related to UAE were higher than those of the myomectomy group. This is in agreement with reports by Pourrat et al. (2003) who reported that UAE costs were higher than trans-vaginal hysterectomy costs [17].

According to most studies, a main disadvantage of UAE is the need to re-intervention after five years; Van-Rooij et al. (2005) and Moss et al. (2010) reported the need for re-intervention in UAE group compared to the hysterectomy group and this was mostly in the first two-years period after embolization [11,18]. However, in the current study, no difference was seen between the two groups regarding the need for re-intervention.

AMH level before and after 6 months post-intervention was studied in the current study. No difference was seen in this regard in either group. When comparing the two groups, also no significant difference was seen in the AMH level, as a marker for ovarian capacity. This was in agreement with most studies. In the clinical trial of Hehenkamp et al. (2007), no significant difference was seen regarding the FSH level between UAE and hysterectomy groups. After 24 months of follow-up, a significant increase in the FSH level was seen in the UAE group. It is to be noted than women in the mentioned study entered menopause after the intervention [4]. Also in the latter study, the AMH level was measured, which was revealed to decrease in all period times, which were anticipated considering the fact that women aged. The results of the study showed that both UAE and hysterectomy affected the ovarian capacity [4]. Rashid et al. (2010) and Mara et al. (2008) measured FSH as a marker for ovarian capacity [7,8]. The first study reported that among women with FSH levels higher than 40 IU/ L, no difference was seen between UAE and myomectomy,
which was compatible with our results [8]. In contrast, Mara et al. (2008) who used the cut-off point of 10 IU/L for FSH, reported that most patients of the UAE group had FSH levels of more than 10 IU/mL, which was significantly higher when compared to the myomectomy group [7]. Kahn et al. (2011) also showed that the FSH level was higher in the UAE group compared to myomectomy [19], which were not in agreement with our results.

Gupta et al. (2012) reported that myomectomy is associated with a better fertility outcome compared to UAE, but this was not significant. No significant differences were seen between these two methods regarding major complications. Ovarian failure and intervention failure was also comparable between the two methods [20]. In Hovsepian et al. (2006) study, even though a gradual increase in the FSH level was seen as a marker for ovarian capacity, no significant difference was seen regarding the FSH between UAE, myomectomy, and hysterectomy groups at 1, 3, and 6 months follow-up [9]. In a similar way, no difference was seen regarding the ovarian failure in the 12-months follow-up period between UAE and surgery, in Rashid et al. study (2010) [8].

The damage to the ovarian reserve in the two methods of treatment is hard to diagnose since a single reliable test has not been defined yet. However, regarding the findings of this study and similar ones it seems that there was no significant difference between UAE and the surgical methods regarding ovarian capacity.

Conclusion

In general, the results of this study showed that no significant differences existed between UAE and myomectomy regarding the hospitalization period, and the time elapsed to return to work which were in agreement with the former studies. Also, it was highlighted that no significant difference was seen between the two groups regarding the AMH level, which is a marker for ovarian capacity. Therefore, UAE can be used for childbearing age females as a less invasive method. A disadvantage of this method is its high costs. Considering the low sample size we had, it is recommended that further studies employ more sample size and apply AMH levels, an accurate marker for ovarian capacity. Also, it is better to follow patients for longer periods of time.

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Conflict of Interest

The authors have no conflict of interest to declare.

References


Predictors of slow and no-reflow as detected by Thrombolysis in Myocardial Infarction [TIMI] flow grade following Primary Percutaneous Coronary Angioplasty

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Abstract

Background: Primary percutaneous coronary intervention (PCI) is still associated with a noticeable incidence of suboptimal coronary flow thrombolysis in myocardial infarction (TIMI). The predictors of slow and no-reflow in patients who underwent primary PCI in our institute was searched for and the relationship of these parameters with major adverse cardiovascular events (MACE) was assessed.

Material and Method: 397 patients with AMI presenting within 24 hours from the symptom onset were retrospectively enrolled and underwent primary PCI between March 2006 and March 2012. Demographic, clinical, and procedural data were retrieved from our institutional databank. The baseline and post-PCI blood flow in the revascularized artery was graded according to the TIMI grading system. The follow-up visits were performed after 1, 6 and 12 months from hospitalization. All the mortalities and complications were recorded within this period to assess the MACE.

Results: The frequency of diabetes mellitus and renal failure were significantly higher in patients with a TIMI flow of 0-1 (p=0.03 and p=0.01, respectively). Similarly, serum levels of creatine were significantly higher in patients with a TIMI flow of 0-1. The predictors for TIMI flow included the use of Adenosin or Integrilin, diabetes mellitus, POIT, long tubular lesion, and lesion in the LAD territory. The incidence of MACE was significantly higher in patients with a TIMI flow of 0-1 (P=0.001) and the survival in this subgroup was significantly poorer (Hazard ratio=4.96; P<0.001).

Conclusion: A low TIMI flow is accompanied by a poorer survival and a higher MACE and is influenced by some clinical and vascular characteristics.

Abbreviations

ACE = Angiotensin converting enzyme, ARB = Angiotensinogen receptor blocker, BMI = Body mass index, DBP = Diastolic blood pressure, EF = Ejection fraction, FBS = Fasting blood sugar, Hb = Hemoglobin, HDL = high density lipoprotein, LDL = Low density lipoprotein, MPV = Mean platelet volume, SBP = Systolic blood pressure, STEMI = ST-elevation myocardial infarction, WBC = White blood cell, AHA = American Heart Association, LAD = Left Anterior Descending, LCx = Left circumflex, LM = Left main, PCI = Percutaneous coronary intervention, RCA = Right coronary artery, SVG = Saphenous vein graft, CI = Confidence interval, LAD = Left anterior descending artery, CABG = Coronary artery bypass graft, MACE = Major adverse cardiac events, MI = Myocardial infarction, TLR = Target lesion revascularization, TVR = Target vessel revascularization

Keywords: TIMI Flow, myocardial infarction, no reflow, Percutaneous Coronary Intervention

Introduction

Primary percutaneous coronary intervention (PCI) has become the treatment of choice for acute myocardial infarction (AMI). In spite of the advances in the stenting and angioplasty procedures, primary PCI is still associated with 4−11% incidence of suboptimal coronary flow thrombolysis in myocardial infarction (TIMI) [1-4]. Current evidence shows that the AMI patients with angiographic suboptimal reflow have a weak functional recovery and a higher rate of post-AMI complications compared to the patients with an optimal reflow [3,5,6]. While the TIMI 3 flow following PCI is an important predictor for the outcome in patients with AMI, patients with a TIMI flow of up to grade 2 had a poor prognosis [7-8].

No-reflow was defined as suboptimal myocardial reperfusion through a part of coronary circulation without angiographically proving a mechanical vessel obstruction [9]. Several factors, including age, infarct localization, the extent of the initial AMI area, the lack of residual blood flow in the infarct-related artery, previous AMI, elevated levels of C-reactive protein can increase the risk of poor final coronary blood flow [8,10]. Although several methods have been utilized to increase the success of PCI and reduce the mortality and morbidity [11], the recognition of
the predictors of reperfusion failure can help increase the quality of the procedure and thereby, its rate of success.

In the present study, we aimed to find out the predictors of slow and no-reflow in patients who underwent primary PCI in our institute. Moreover, we assessed the relationship of these parameters with major adverse cardiovascular events (MACE).

Material and Method

In this cohort study, we retrospectively enrolled 397 patients with AMI presenting within 24 hours from the symptom onset and underwent primary PCI between March 2006 and March 2012 in Tehran Heart Center. Tehran Heart Center is a 460-bed tertiary center for cardiovascular diseases, affiliated to Tehran University of Medical Sciences, Tehran, Iran. Patients who were treated via thrombolysis or coronary artery bypass graft (CABG) surgery were not included. Data of the enrolled treated via thrombolysis or coronary artery bypass graft (CABG) surgery were not included. Data of the enrolled patients, including the demographic, clinical and procedural parameters, were retrieved from the angioplasty databank of our center [12].

All the recruited patients had signed a written informed consent at the time of admission, declaring that their clinical data could be used anonymously for research. The study protocol was approved by the Research Board of Tehran Heart Center, and the Committee of Medical Ethics of Tehran University of Medical Sciences.

The ST-segment elevation acute myocardial infarction was diagnosed in the presence of chest pain lasting for more than 20 minutes associated with the electrocardiographic changes (ST-segment elevation of more than 1 mm in at least 2 extremity electrocardiographic leads or more than 2 mm in at least 2 contiguous precordial leads or new onset left bundle branch block). The diagnosis was confirmed by coronary angiography in all patients.

The angiography and PCI was performed in the catheterization laboratory of Tehran Heart Center under local anesthesia. All angioplasty procedures were performed according to current standard guidelines [13-15]. All the patients received 325 mg Aspirin orally, 600 mg Clopidogrel, 80 mg statin and a weight adapted bolus of intravenous heparin (100 IE/ kg) prior to PCI. Stenting was performed in more than 90% of the cases, bare metal stents being mostly used. The angiography videos were revised by a cardiologist, who was unaware of the study protocol, in order to increase the intra- and inter-observer reliability. The baseline and post-PCI blood flow in the revascularized artery was graded according to the TIMI grading system [16]. In fact, grade 0 perfusion represented no antegrade flow beyond the occlusion; grade 1 was a minimal incomplete perfusion of contrast medium around the clot; grade 2 (partial perfusion) was a complete but delayed perfusion of the distal coronary bed with contrast material; and grade 3 (complete perfusion) was an antegrade flow to the entire distal vessel at a normal rate. The diagnosis of no-reflow was made based on the following criteria: [1] angiographic evidence of reopening the occluded coronary artery and the successful stent placement with no evidence of flow-limiting residual stenosis (<50%), spasm, dissection, or apparent thrombus and [2] angiographic evidence of a TIMI flow grade ≤2, at least 10 minutes after the end of the PCI procedure.

The post-PCI antiplatelet therapy consisted of clopidogrel (75 mg/ d for at least 1 to 6 months) and aspirin (80 mg/ d administered orally). The other cardiac conditions were treated based on the judgment of the responsible physician. The follow-up visits were routinely performed after 1, 6, and 12 months from hospitalization in our center. All the mortalities and cardiac related complications were recorded within this period and were used to assess the MACE. MACE was defined as inhospital mortality, cardiac death, nonfatal myocardial infarction (MI), or target vessel revascularization. In-hospital MI was diagnosed within the first seven days following the procedure if new abnormal Q waves were observed with an increase in serum creatine kinase-MB (CK-MB) isoenzyme or just an increase in CK-MB more than threefold in the case of absence of the Q waves [17-18].

Statistical Analysis

The mean ± standard deviation or median with quartiles, and frequency (percentage) were used to describe the continuous and categorical variables, respectively. The continuous variables were compared between the TIMI groups by using the student’s t or Mann-Whitney U test. Categorical variables were compared between the mentioned groups by using chi-square or the Fisher’s exact test. A multivariate logistic regression analysis was performed to determine the clinical and angiographic variables that could independently predict the poor post-interventional coronary reflow. All data were processed with the PASW, version 18.0 (Chicago, Illinois, USA). P-values less than or equal to 0.05 were considered statistically significant.

Results

The present study consisted of 397 patients (mean age = 56.57 ± 12.43 years), male gender = 312 (78.6%) whose data were reviewed and who underwent an elective coronary angiography in our center. Slow/ no-reflow occurred in 18 (4.5%) patients. Baseline characteristics of the study subjects were compared based on the final TIMI flow grade subgroups as shown in Table 1. Regarding this comparison, the frequency of diabetes mellitus and renal failure were significantly higher in patients with a TIMI flow grade of 0-1 (p=0.03 and p=0.01, respectively). Similarly, serum levels of creatine were significantly higher in patients with TIMI flow grade = 0-1. The use of aspirin, beta-blockers, nitrates and clopidogrel was significantly higher in patients with a TIMI flow of 2 (p=0.001, p=0.02, p=0.004, and p=0.004, respectively). Also, the use of adenosine and integrilin was significantly higher in patients with TIMI flow grade 2.
lowering agents was more frequent in patients with a TIMI flow grade of 0-1.

Table 1. Baseline characteristics of the study population

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>TIMI = 0.1 (n=18)</th>
<th>TIMI = 2 (n=151)</th>
<th>TIMI = 3 (n=228)</th>
<th>P-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>57.94 ± 16.78</td>
<td>56.69 ± 11.67</td>
<td>56.39 ± 12.58</td>
<td>0.86</td>
</tr>
<tr>
<td>Male gender</td>
<td>11 (61.1)</td>
<td>123 (81.5)</td>
<td>178 (78.1)</td>
<td>0.13</td>
</tr>
<tr>
<td>BMI</td>
<td>28.82 ± 4.05</td>
<td>27.30 ± 3.76</td>
<td>26.85 ± 4.20</td>
<td>0.31</td>
</tr>
<tr>
<td>Abdominal circumference</td>
<td>107.5 (97.0, 113.5)</td>
<td>99.0 (93.5, 105.5)</td>
<td>99.0 (93.0, 106.0)</td>
<td>0.11</td>
</tr>
<tr>
<td>Medical history</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family history of CAD</td>
<td>2 (11.1)</td>
<td>25 (16.6)</td>
<td>49 (21.5)</td>
<td>0.33</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>9 (50.0)</td>
<td>50 (33.6)</td>
<td>54 (23.8)</td>
<td>0.01</td>
</tr>
<tr>
<td>Hypertension</td>
<td>9 (50.0)</td>
<td>67 (45.0)</td>
<td>102 (44.9)</td>
<td>0.91</td>
</tr>
<tr>
<td>Dyslipidemia</td>
<td>10 (55.6)</td>
<td>106 (71.6)</td>
<td>150 (66.7)</td>
<td>0.3</td>
</tr>
<tr>
<td>Smoking</td>
<td></td>
<td></td>
<td></td>
<td>0.3</td>
</tr>
<tr>
<td>Current</td>
<td>3 (16.7)</td>
<td>49 (32.9)</td>
<td>77 (33.9)</td>
<td></td>
</tr>
<tr>
<td>Former</td>
<td>1 (5.6)</td>
<td>19 (12.8)</td>
<td>20 (8.8)</td>
<td></td>
</tr>
<tr>
<td>Stable angina</td>
<td>0 (0)</td>
<td>10 (6.6)</td>
<td>23 (10.1)</td>
<td>0.2</td>
</tr>
<tr>
<td>Unstable angina</td>
<td>1 (5.6)</td>
<td>19 (12.6)</td>
<td>33 (14.5)</td>
<td>0.53</td>
</tr>
<tr>
<td>Angina pectoris</td>
<td>9 (50.0)</td>
<td>76 (50.3)</td>
<td>123 (53.9)</td>
<td>0.62</td>
</tr>
<tr>
<td>STEMI</td>
<td>16 (88.9)</td>
<td>143 (94.7)</td>
<td>211 (92.5)</td>
<td>0.54</td>
</tr>
<tr>
<td>Non-STEMI</td>
<td>3 (16.7)</td>
<td>12 (7.9)</td>
<td>20 (8.8)</td>
<td>0.46</td>
</tr>
<tr>
<td>CVA</td>
<td>0 (0)</td>
<td>2 (1.3)</td>
<td>6 (2.6)</td>
<td>0.64</td>
</tr>
<tr>
<td>Renal failure</td>
<td>1 (5.6)</td>
<td>1 (0.7)</td>
<td>0 (0)</td>
<td>0.03</td>
</tr>
<tr>
<td>Drug history</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aspirin</td>
<td>15 (83.3)</td>
<td>132 (87.4)</td>
<td>164 (71.9)</td>
<td>0.001</td>
</tr>
<tr>
<td>ACE inhibitor</td>
<td>11 (61.1)</td>
<td>98 (64.9)</td>
<td>126 (55.2)</td>
<td>0.16</td>
</tr>
<tr>
<td>ARB</td>
<td>1 (5.6)</td>
<td>9 (6.0)</td>
<td>6 (2.6)</td>
<td>0.25</td>
</tr>
<tr>
<td>Beta-blocker</td>
<td>13 (72.2)</td>
<td>120 (79.4)</td>
<td>153 (67.1)</td>
<td>0.02</td>
</tr>
<tr>
<td>Nitrate</td>
<td>12 (66.7)</td>
<td>122 (80.7)</td>
<td>150 (65.7)</td>
<td>0.004</td>
</tr>
<tr>
<td>Calcium channel blocker</td>
<td>0 (0)</td>
<td>8 (5.2)</td>
<td>14 (6.1)</td>
<td>0.53</td>
</tr>
<tr>
<td>Lipid lowering agent</td>
<td>7 (38.9)</td>
<td>57 (37.7)</td>
<td>56 (24.5)</td>
<td>0.01</td>
</tr>
<tr>
<td>Statin</td>
<td>6 (33.3)</td>
<td>58 (38.4)</td>
<td>76 (33.3)</td>
<td>0.59</td>
</tr>
<tr>
<td>Glucose lowering agent</td>
<td>6 (33.3)</td>
<td>21 (13.9)</td>
<td>36 (15.7)</td>
<td>0.11</td>
</tr>
<tr>
<td>Insulin</td>
<td>2 (11.1)</td>
<td>4 (2.7)</td>
<td>5 (2.1)</td>
<td>0.13</td>
</tr>
<tr>
<td>Warfarin</td>
<td>1 (5.6)</td>
<td>1 (0.7)</td>
<td>1 (0.5)</td>
<td>0.18</td>
</tr>
<tr>
<td>Verapamil</td>
<td>0 (0)</td>
<td>5 (3.3)</td>
<td>7 (3.0)</td>
<td>1</td>
</tr>
<tr>
<td>Adenosine</td>
<td>4 (22.2)</td>
<td>43 (28.4)</td>
<td>18 (7.8)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Integlin</td>
<td>10 (55.5)</td>
<td>86 (56.9)</td>
<td>60 (26.3)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>SBP</td>
<td>135.0 (119.0, 155.0)</td>
<td>131.0 (120.0, 150.5)</td>
<td>130.0 (120.0, 150.0)</td>
<td>0.99</td>
</tr>
<tr>
<td>DBP</td>
<td>77.0 (70.0, 80.0)</td>
<td>85.0 (70.0, 100.0)</td>
<td>81.0 (75.0, 97.5)</td>
<td>0.09</td>
</tr>
<tr>
<td>Heart rate</td>
<td>72.0 (60.0, 95.5)</td>
<td>78.5 (68.7, 90.0)</td>
<td>78.0 (65.0, 86.0)</td>
<td>0.71</td>
</tr>
<tr>
<td>Hb</td>
<td>14.57 ± 1.57</td>
<td>14.61 ± 1.64</td>
<td>14.76 ± 1.79</td>
<td>0.71</td>
</tr>
<tr>
<td>Hematocrit</td>
<td>42.30 ± 3.68</td>
<td>43.04 ± 4.06</td>
<td>43.44 ± 5.44</td>
<td>0.82</td>
</tr>
<tr>
<td>WBC</td>
<td>110.54 ± 3488.94</td>
<td>10261.22 ± 3178.09</td>
<td>10610.40 ± 3681.88</td>
<td>0.56</td>
</tr>
<tr>
<td>Platelets</td>
<td>212000 (167550, 261000)</td>
<td>215000 (174000, 264000)</td>
<td>223000 (189750, 257250)</td>
<td>0.51</td>
</tr>
<tr>
<td>MPV</td>
<td>10.43 ± 0.85</td>
<td>9.77 ± 1.06</td>
<td>9.85 ± 0.90</td>
<td>0.18</td>
</tr>
<tr>
<td>FBS</td>
<td>169.0 (100.0, 228.0)</td>
<td>119.0 (102.0, 158.0)</td>
<td>116.0 (97.0, 156.7)</td>
<td></td>
</tr>
<tr>
<td>BS</td>
<td>186.0 (138.7, 348.0)</td>
<td>144.0 (113.0, 199.0)</td>
<td>141.0 (114.5, 205.0)</td>
<td>0.18</td>
</tr>
<tr>
<td>HbA1c</td>
<td>9.54 ± 1.43</td>
<td>8.36 ± 2.46</td>
<td>8.45 ± 2.04</td>
<td>0.54</td>
</tr>
<tr>
<td>Total Cholesterol</td>
<td>176.80 ± 47.93</td>
<td>184.00 ± 46.10</td>
<td>183.39 ± 41.02</td>
<td>0.82</td>
</tr>
<tr>
<td>Triglyceride</td>
<td>139.0 (83.0, 177.0)</td>
<td>129.0 (90.0, 176.0)</td>
<td>138.0 (99.0, 178.0)</td>
<td>0.56</td>
</tr>
<tr>
<td>LDL</td>
<td>106.13 ± 37.97</td>
<td>114.55 ± 38.85</td>
<td>113.90 ± 35.27</td>
<td>0.7</td>
</tr>
<tr>
<td>HDL</td>
<td>42.0 (26.0, 53.0)</td>
<td>41.0 (35.0, 47.0)</td>
<td>41.0 (36.0, 47.0)</td>
<td>0.91</td>
</tr>
<tr>
<td>Creatinine</td>
<td>1.1 (1.0, 1.2)</td>
<td>1.0 (0.8, 1.1)</td>
<td>1.1 (0.9, 1.2)</td>
<td>0.004</td>
</tr>
<tr>
<td>Global EF</td>
<td>50.0 (35.0, 50.0)</td>
<td>45.0 (37.75, 50.0)</td>
<td>45.0 (35.0, 55.0)</td>
<td>0.78</td>
</tr>
<tr>
<td>right ventricular diameter</td>
<td>3.25 (3.0, 4.0)</td>
<td>3.2 (2.9, 3.5)</td>
<td>3.0 (3.0, 3.5)</td>
<td>0.21</td>
</tr>
</tbody>
</table>

*P-value ≤ 0.05 was considered as statistically significant

ACE = Angiotensin converting enzyme, ARB = Angiotensinogen receptor blocker, BMI = Body mass index, DBP = Diastolic blood pressure, EF = Ejection fraction, FBS = Fasting blood sugar, Hb = Hemoglobin, HDL = high density lipoprotein, LDL = Low density lipoprotein, MPV = Mean platelet volume, SBP = Systolic blood pressure, STEMI = ST-elevation myocardial infarction, WBC = White blood cell
The comparison of the procedural parameters showed that the rate of angioplasty in the TIMI flow grade 0-1 subgroup was significantly less than the one in other groups while right coronary artery had a more frequency in this group. Post dilatation maximum balloon inflation pressure was significantly higher in the TIMI-3 subgroup. On the other hand, thrombosis migration and ostial dilatation was significantly more observed in the TIMI flow grade 0-1 subgroup (P<0.001 for both variables). The long tubular lesion was significantly more observed in the TIMI flow grade 3 subgroup (P=0.004) while the diffuse lesion was more prevalent in the TIMI flow grade 0-1 subgroup (P=0.008). The total occlusion and dissection was more observed in the TIMI flow grade 0-1 subgroup (P=0.03). The details of the procedural variables are depicted and summarized in Table 2.

Table 2. Comparing the angiographic parameters between the TIMI subgroups

<table>
<thead>
<tr>
<th>Parameter</th>
<th>TIMI = 0,1 (n=18)</th>
<th>TIMI = 2 (n=151)</th>
<th>TIMI = 3 (n=228)</th>
<th>P-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reperfusion time</td>
<td>6.70 ± 3.75</td>
<td>8.16 ± 6.98</td>
<td>7.42 ± 7.52</td>
<td>0.22</td>
</tr>
<tr>
<td>Target vessel</td>
<td></td>
<td></td>
<td></td>
<td>0.001</td>
</tr>
<tr>
<td>LAD</td>
<td>13 (72.2)</td>
<td>110 (72.8)</td>
<td>125 (54.8)</td>
<td></td>
</tr>
<tr>
<td>LCX</td>
<td>1 (5.6)</td>
<td>9 (5.9)</td>
<td>36 (15.8)</td>
<td></td>
</tr>
<tr>
<td>RCA</td>
<td>3 (16.7)</td>
<td>32 (21.2)</td>
<td>66 (28.9)</td>
<td></td>
</tr>
<tr>
<td>SVG</td>
<td>1 (5.6)</td>
<td>0 (0)</td>
<td>1 (0.4)</td>
<td></td>
</tr>
<tr>
<td>AHA grade (B2, C)</td>
<td>14 (77.7)</td>
<td>127 (86.4)</td>
<td>193 (84.6)</td>
<td>0.88</td>
</tr>
<tr>
<td>Number of lesions</td>
<td>2.0 (2.0, 2.0)</td>
<td>2.0 (2.0, 2.0)</td>
<td>2.0 (2.0, 2.0)</td>
<td>0.4</td>
</tr>
<tr>
<td>Lesion length</td>
<td>20.0 (15.2, 25.7)</td>
<td>21.5 (16.0, 28.5)</td>
<td>20.0 (15.0, 27.5)</td>
<td>0.07</td>
</tr>
<tr>
<td>Stent diameter</td>
<td>3.5 (2.7, 3.5)</td>
<td>3.0 (3.0, 3.5)</td>
<td>3.0 (2.7, 3.5)</td>
<td>0.18</td>
</tr>
<tr>
<td>Stent length</td>
<td>18.0 (12.0, 24.0)</td>
<td>23.0 (18.0, 28.0)</td>
<td>20.0 (18.0, 28.0)</td>
<td>0.09</td>
</tr>
<tr>
<td>Stent inflation pressure</td>
<td>12.0 (9.0, 14.0)</td>
<td>12.0 (12.0, 14.0)</td>
<td>12.0 (11.0, 14.0)</td>
<td>0.46</td>
</tr>
<tr>
<td>Post dilatation Maximum balloon inflation pressure</td>
<td>11.0 (7.0, 12.0)</td>
<td>16.0 (14.0, 19.5)</td>
<td>18.0 (14.0, 20.0)</td>
<td>0.008</td>
</tr>
<tr>
<td>Maximal inflation pressure</td>
<td>10.0 (8.0, 12.0)</td>
<td>10.0 (8.0, 12.0)</td>
<td>10.0 (8.0, 12.0)</td>
<td>0.72</td>
</tr>
<tr>
<td>New thrombectomy</td>
<td>4 (22.2)</td>
<td>31 (21.2)</td>
<td>21 (9.7)</td>
<td>0.005</td>
</tr>
<tr>
<td>Persistent dye stasis distal to occlusion</td>
<td>4 (22.2)</td>
<td>19 (11.1)</td>
<td>16 (6.1)</td>
<td>0.04</td>
</tr>
<tr>
<td>Thrombosis migration</td>
<td>8 (44.4)</td>
<td>23 (15.2)</td>
<td>13 (5.7)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Ostial lesion</td>
<td>4 (22.2)</td>
<td>7 (4.6)</td>
<td>5 (2.2)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Proximal lesion</td>
<td>6 (33.3)</td>
<td>78 (51.7)</td>
<td>100 (43.9)</td>
<td>0.17</td>
</tr>
<tr>
<td>Non-proximal</td>
<td>8 (44.4)</td>
<td>62 (41.1)</td>
<td>111 (48.7)</td>
<td>0.34</td>
</tr>
<tr>
<td>Long tubular</td>
<td>4 (22.2)</td>
<td>41 (27.2)</td>
<td>97 (42.5)</td>
<td>0.004</td>
</tr>
<tr>
<td>Diffuse lesion</td>
<td>13 (72.2)</td>
<td>94 (62.3)</td>
<td>110 (48.2)</td>
<td>0.008</td>
</tr>
<tr>
<td>Calcified lesion</td>
<td>0 (0)</td>
<td>4 (2.6)</td>
<td>13 (5.7)</td>
<td>0.23</td>
</tr>
<tr>
<td>Bilurcation</td>
<td>0 (0)</td>
<td>12 (7.9)</td>
<td>8 (3.5)</td>
<td>0.09</td>
</tr>
<tr>
<td>Eccentric</td>
<td>0 (0)</td>
<td>18 (11.9)</td>
<td>49 (21.5)</td>
<td>0.008</td>
</tr>
<tr>
<td>Tortuous or angulated lesion</td>
<td>7 (38.9)</td>
<td>68 (45.4)</td>
<td>78 (34.2)</td>
<td>0.1</td>
</tr>
<tr>
<td>Proximal segment tortuosity</td>
<td></td>
<td></td>
<td></td>
<td>0.77</td>
</tr>
<tr>
<td>Mild</td>
<td>11 (61.1)</td>
<td>101 (98.1)</td>
<td>124 (96.9)</td>
<td></td>
</tr>
<tr>
<td>Severe</td>
<td>0 (0)</td>
<td>2 (1.9)</td>
<td>4 (3.1)</td>
<td></td>
</tr>
<tr>
<td>Angulated segment</td>
<td>0 (0)</td>
<td>7 (6.7)</td>
<td>10 (7.8)</td>
<td>0.62</td>
</tr>
<tr>
<td>Thrombus</td>
<td>7 (38.9)</td>
<td>46 (30.5)</td>
<td>54 (23.7)</td>
<td>0.17</td>
</tr>
<tr>
<td>Total occlusion</td>
<td>15 (83.3)</td>
<td>107 (70.9)</td>
<td>139 (61.0)</td>
<td>0.03</td>
</tr>
<tr>
<td>Degenerated vein graft</td>
<td>1 (5.6)</td>
<td>0 (0)</td>
<td>1 (0.4)</td>
<td>0.08</td>
</tr>
<tr>
<td>Procedure</td>
<td></td>
<td></td>
<td></td>
<td>0.01</td>
</tr>
<tr>
<td>Direct stenting</td>
<td>1 (5.6)</td>
<td>21 (13.9)</td>
<td>28 (12.3)</td>
<td></td>
</tr>
<tr>
<td>Primary stenting</td>
<td>11 (61.1)</td>
<td>108 (71.5)</td>
<td>173 (75.9)</td>
<td></td>
</tr>
<tr>
<td>Secondary stenting</td>
<td>3 (16.7)</td>
<td>6 (4.0)</td>
<td>18 (7.9)</td>
<td></td>
</tr>
<tr>
<td>Ballooning</td>
<td>3 (16.7)</td>
<td>16 (10.6)</td>
<td>9 (3.9)</td>
<td></td>
</tr>
<tr>
<td>Stent type</td>
<td></td>
<td></td>
<td></td>
<td>0.69</td>
</tr>
<tr>
<td>Bare metal stent</td>
<td>14 (77.7)</td>
<td>110 (61.5)</td>
<td>178 (81.3)</td>
<td></td>
</tr>
<tr>
<td>First generation drug eluting stent</td>
<td>1 (5.6)</td>
<td>11 (8.1)</td>
<td>22 (10.0)</td>
<td></td>
</tr>
<tr>
<td>Second generation drug eluting stent</td>
<td>0 (0)</td>
<td>14 (10.4)</td>
<td>19 (8.7)</td>
<td></td>
</tr>
<tr>
<td>Side branch occlusion</td>
<td>0 (0)</td>
<td>3 (2.0)</td>
<td>0 (0)</td>
<td>0.12</td>
</tr>
<tr>
<td>Dissection</td>
<td>1 (5.6)</td>
<td>0 (0)</td>
<td>5 (2.2)</td>
<td>0.06</td>
</tr>
<tr>
<td>Result</td>
<td></td>
<td></td>
<td></td>
<td>0.001</td>
</tr>
<tr>
<td>Successful</td>
<td>15 (83.3)</td>
<td>145 (96.0)</td>
<td>227 (99.5)</td>
<td></td>
</tr>
<tr>
<td>Acceptable</td>
<td>3 (16.7)</td>
<td>6 (4.0)</td>
<td>1 (0.4)</td>
<td></td>
</tr>
<tr>
<td>Type of PCI</td>
<td></td>
<td></td>
<td></td>
<td>0.9</td>
</tr>
<tr>
<td>Single vessel</td>
<td>15 (83.3)</td>
<td>130 (86.1)</td>
<td>198 (86.8)</td>
<td></td>
</tr>
</tbody>
</table>
In the regression analysis, the predictors for TIMI flow grade were the use of adenosine or Integrilin, history of diabetes mellitus, POIT, long tubular lesion, and lesion in the LAD territory. Predictors of TIMI flow grade are listed in Table 3.

Table 3. Independent predictors of TIMI flow score

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Odds ratio</th>
<th>CI 95%</th>
<th>P-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adenosine</td>
<td>2.45</td>
<td>1.32-4.52</td>
<td>0.004</td>
</tr>
<tr>
<td>Integrilin</td>
<td>3.05</td>
<td>1.89-4.90</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>1.73</td>
<td>1.04-2.85</td>
<td>0.03</td>
</tr>
<tr>
<td>POIT</td>
<td>0.37</td>
<td>0.22-0.63</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Long tubular lesion</td>
<td>0.55</td>
<td>0.33-0.91</td>
<td>0.02</td>
</tr>
<tr>
<td>LAD territory</td>
<td>2.07</td>
<td>1.25-3.46</td>
<td>0.004</td>
</tr>
</tbody>
</table>

CI = Confidence interval, LAD = Left anterior descending artery

The incidence of the 12-months MACE in the study population was 14.1%. However, the incidence of MACE was significantly higher in patients with a TIMI flow grade of 0-1 (P=0.001). There was no non-cardiac mortality in any of the subgroups but the frequency of cardiac mortality was significantly higher in the TIMI flow grade of 0-1 subgroup (P<0.001). The frequency of MACE within each TIMI flow grade subgroup and the comparison between these subgroups are listed in Table 4. Similarly, the survival of the patients with a TIMI flow grade of 0-1 were significantly poorer than the ones of the other two subgroups (Hazard ratio =4.96; 95% confidence interval: 2.25-10.94; P<0.001) (Fig. 1).

Table 4. Comparing the frequency of the 12-months MACE between the TIMI subgroups

<table>
<thead>
<tr>
<th>Parameter</th>
<th>TIMI = 0-1 (n=18)</th>
<th>TIMI = 2 (n=151)</th>
<th>TIMI = 3 (n=228)</th>
<th>P-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-hospital mortality</td>
<td>4 (21.1)</td>
<td>10 (6.6)</td>
<td>5 (2.2)</td>
<td>0.007</td>
</tr>
<tr>
<td>TVR</td>
<td>0 (0)</td>
<td>7 (4.6)</td>
<td>16 (7.0)</td>
<td>0.34</td>
</tr>
<tr>
<td>TLR</td>
<td>0 (0)</td>
<td>2 (1.3)</td>
<td>5 (2.2)</td>
<td>0.69</td>
</tr>
<tr>
<td>Non-fatal MI</td>
<td>1 (5.6)</td>
<td>5 (3.3)</td>
<td>8 (3.5)</td>
<td>0.88</td>
</tr>
<tr>
<td>CABG</td>
<td>0 (0)</td>
<td>5 (3.3)</td>
<td>10 (4.4)</td>
<td>0.59</td>
</tr>
<tr>
<td>Cardiac death</td>
<td>8 (44.4)</td>
<td>11 (7.3)</td>
<td>7 (3.1)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Mortality</td>
<td>8 (44.4)</td>
<td>11 (7.3)</td>
<td>7 (3.1)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Total MACE</td>
<td>8 (44.4)</td>
<td>21 (13.9)</td>
<td>27 (11.8)</td>
<td>0.001</td>
</tr>
</tbody>
</table>

CABG = Coronary artery bypass graft, MACE = Major adverse cardiac events, MI = Myocardial infarction, TLR = Target lesion revascularization, TVR = Target vessel revascularization

Discussion

In this study, the rate of slow/ no-reflow was 4.5%, which is comparable to previous reports [19-20]. It was observed that the TIMI flow grade is influenced by the use of adenosine or Integrilin, history of diabetes mellitus, POIT, long tubular lesion, and lesion in the LAD territory. Moreover, patients with a low TIMI grade have a high risk for MACE and thereby a poor survival.

The no reflow phenomenon, or marked impairment of the coronary flow without evident obstruction or distal embolization, is seen in about 2%-11% of all coronary procedures, depending of the indication and type of intervention [21]. Therefore, the TIMI flow grade is a useful tool for the direct evaluation of coronary flow.

Fig. 1 The survival of the patients with a TIMI flow grade of 0-1.
measurement of coronary blood flow and the stratification of the patients after the procedure.

Several different predictors for slow/ no-reflow phenomenon, such as the C-reactive protein, atrial natriuretic peptide [22], endothelin-1 [23], thromboxane A2 [24], intraplatelet melatonin [25], white blood cell count [26], or plasma glucose level at admission [27], and composition of the culprit plaques in intracoronary ultrasound [28,29], have been identified in previous studies. It should be noted that not all of these factors can be evaluated in routine practice and more applicable factors are needed to be implemented. Therefore, in the present study, the clinical factors that are routinely used in the management of PCI patients were evaluated and it was found out that the use of adenosine or Integrilin, history of diabetes mellitus, POIT, long tubular lesion, and lesion in the LAD territory were the independent predictors for slow/ no-reflow. Although diabetes mellitus was identified as a predictor for no-flow [30], old age was not a predictor in our study despite the previous report [31].

Clinical factors that can be assessed before the procedure are more important as they provide a prospect for the clinicians to consider all the necessary measures for preventing slow/ no-reflow during the procedure beforehand. These measures can include the control of blood glucose in diabetic patients [32] or the use of glycoprotein IIb/ IIIa inhibitors [33,34].

In the present study, TIMI flow was significantly associated with MACE. This was consistent with previous studies that suggested the TIMI flow grade as a predictor for MACE [35,36]. Moreover, PCI have been shown as an effective method in the treatment of patient with chronic total occlusion [37]. Hence, it seems that the final TIMI flow grade is the main predictor for MACE rather than the initial coronary flow state. Considering the literature and our findings, the final TIMI flow grade can be suggested as a useful predictor for the survival in AMI patients who undergo primary PCI. We also presumed that patients with persistent no-flow might be proper candidates for pharmacomechanical treatment strategies, such as the treatment with glycoprotein IIb/ IIIa inhibitors.

Study limitations
There are some limitations to our study. First, this was a single-center, retrospective study. Secondly, glycoprotein IIb/ IIIa inhibitors were used in limited cases due to their price in Iran and our current guidelines. The follow up period of the patients was of 12 months and longer durations may help in better evaluating the predictors of the TIMI flow. Diabetes mellitus was diagnosed based on the patient's history or the use of glucose lowering agents and we did not evaluate the patients for glucose intolerance.

Conclusion
Briefly, the use of adenosine or Integrilin, history of diabetes mellitus, POIT, long tubular lesion, and lesion in the LAD territory can be used as predictors for the lower TIMI grade. Moreover, patients with a lower TIMI grade have a higher MACE and a lower survival.

Acknowledgments
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Conflict of Interest
The authors have no conflict of interest to declare.

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Clinical results of MyoRing implantation in keratoconic eyes by using the Femtosecond laser technology

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Abstract
Purpose: To evaluate the clinical results after the implantation of the MyoRing (DIOPTEX, GMBH, Linz, Austria) by using femtosecond laser technology in eyes with keratoconus.

Methods: A prospective, nonrandomized, clinical trial was conducted. Twenty-seven eyes of 15 patients with stable keratoconus (6 females and 9 males), with ages ranging from 14 to 49 years were included. All cases presented with reduced best-corrected visual acuity, contact lens intolerance or discomfort, and central corneal thickness of more than 350 μm. MyoRing inserts of 320 μm in thickness and 5 mm in diameter were implanted in all cases into an intrastromal corneal pocket created by using femtosecond technology. Visual, refractive errors, corneal topography, and pachymetry changes were evaluated during a 6-months follow-up period.

Results: The mean UDVA (uncorrected distance visual acuity) significantly improved from 1.73 ± 0.53 log MAR preoperatively to 0.54 ± 0.40 log MAR postoperatively. The mean CDVA (corrected distance visual acuity) significantly improved from 0.59 ± 0.47 log MAR preoperatively to 0.27 ± 0.16 log MAR postoperatively. The change in the mean UDVA and CDVA was statistically significant (P< 0.000). The mean decrease in the mean keratometry from preoperatively to 6 months postoperatively was -6.41 ± 3.62 D. This change was statistically significant (P< 0.000). The mean minimum and maximum keratometry values were also statistically significant at less than 6 months preoperatively. A significant improvement in UDVA and CDVA was observed 6 months after surgery, which was consistent with the significant reduction in sphere and cylinder. Furthermore, a significant corneal flattening with a mean value of -6.41 ± 3.62 diopters (D) was found.

Conclusion: MyoRing implantation using femtosecond technology would be a safe, effective, and predictable method to treat selected cases of keratoconus, being a useful option for the treatment of keratoconus.

Keywords: MyoRing, keratoconus, femtosecond laser

Introduction
Keratoconus is a non-inflammatory progressive corneal thinning, characterized by inferior nasal steepening. The corneal thinning induces high regular and irregular astigmatism, often with myopia, resulting in mild to marked impairment in the quality of vision. This disorder is usually bilateral, although one eye may be affected initially [1-3]. In most cases, the cornea remains clear and the refractive defect is managed with rigid contact lenses or spectacles. In advanced keratoconus with corneal opacities and scarring, penetrating keratoplasty (PK) is an accepted surgical plane. In patients who are intolerant to spectacles or rigid contact lens when the cornea remains clear [1-3].

Corneal modeling by inserting intrastromal implants has been proposed and investigated as an alternative of treatment option in corneal keratoconus [4]. The use of full-ring implants has also been purposed as a potential solution for the treatment of irregularly shaped keratoconic corneas [5-6].

A new surgical option referred to as the “corneal intrastromal implantation system” (CISIS), in which the MyoRing flexible full-ring implant (DIOPTEX GMBH, Linz, Austria) is inserted into a corneal pocket, and has recently been developed and proven to be effective in keratoconus [7].

A mechanical specified device developed for CISIS, the Pocket Maker (DIOPTEX GmbH), has been used until now for the creation of this intrastromal pocket. MyoRing implantation by using this mechanically procedure has been proven to be safe and effective in decreasing myopia, corneal steepness, and decentration of the corneal apex. [5-8]. However, it is well known that femtosecond laser technology may allow the surgeon to program a corneal stromal dissection at a predetermined
Patients and Methods

In this prospective nonrandomized, clinical trial study we evaluated eyes with keratoconus that were treated by the implantation of MyoRing (Dioptex GmbH, Linz, Austria) in a corneal pocket created by using femtosecond technology. The study included 27 eyes of 15 patients with ages ranging from 14 to 49 years. An informed consent was obtained from all the patients. The institutional ethical review board approval was obtained for the procedures and the tenets of the Helsinki Declaration were followed. All the cases were diagnosed with corneal keratoconus according to the standard criteria. Keratoconus diagnosis was based on corneal topography and slit-lamp examination: asymmetric bowtie pattern with or without skewed axis and the presence of stromal thinning, conical protrusion of the cornea at the apex vogt striae [10].

The severity of Keratoconus was graded according to Amsler Krumelch classification [11].
- Stage 1: eccentric steeping; myopia or induced astigmatism of less than 5.00 D, or both; and mean central k readings of less than 48.00 D.
- Stage 2: myopia or induced astigmatism from 5.00 D to 8.00 D, or both; and mean central k readings of less than 53.00 D; absence of scarring; and minimum corneal thickness of more than 400 um.
- Stage 3: myopia or induced astigmatism from 8.00 D to 10.00 D, or both; mean central k readings of more than 53.00 D; absence of scarring; and minimum corneal thickness of 300 to 400 um.
- Stage 4: no measurable refraction, mean central k readings of more than 55.00 D; central corneal scarring; and minimum corneal thickness of 200 um.

The inclusion criteria were keratoconus, reduced best corrected visual acuity, contact lens intolerance or discomfort and central corneal thickness of more than 350µm. The exclusion criteria were, pregnancy, active ocular disease (cataract, glaucoma and diabetic retinopathy), history of herpes keratitis, previous ocular surgery, diagnosed autoimmune disease, systemic connective tissue disease and any previous corneal surgery, concurrent corneal infections, patients with poor compliance, then an informed consent was obtained from all the subjects. A complete ocular examination including slit lamp examination, fundoscopic examination, manifest refraction, uncorrected distance visual acuity (UDVA), corrected distance visual acuity (CDVA), spherical and cylindrical components of the manifest refraction, spherical equivalent (SE), keratometry values and corneal thickness, were calculated by pentacam HRS system (Oculus, Optikgerate GmbH, Germany) one month and 6 months after MyoRing implantation. The UCVA and BCVA were obtained in decimal scaling and transformed into log MAR for the statistical analysis.

Surgical procedures

Surgical procedures were performed under topical anesthesia (Tetracaine 0.5% ophthalmic drops, Darou Pakhsh Phama Co., Iran) by the same experienced surgeon (M. Gh).

All MyoRings were implanted into intrastromal corneal pockets. Pocket reaction was performed with femtolaser (Zeimer Ophthalmic System Group, Port, Switzerland).

The pocket diameter was of 8mm with 300µ depth. Pocket entrance was selected at supratemporal position and the size was 5 or 6 mm according to MyoRing size. Ring was inserted into the pocket and was centered based on the pupil with mild decentration according to cone center.

The antibiotic eye drop (Ciplex, Ciproflaxacin HCl 0.3% Sinadarou, Tehran, Iran) was instilled and bandage contact lens was inserted.

Postoperative management

All the patients were given topical Ciplex eye drops (Ciproflaxacin HCL 0.30% Sina Darou, Tehran, Iran) and Betasonate eye drops (Betamethadone 0.1%, Sina Daro, Tehran, Iran) 4 times a day for seven days.

The postoperative visit was scheduled for the first postoperative day, the first week, 1 month and 6 months after surgery. The first and seventh day after the procedure, the patients were examined for survey epithelial healing, postoperative infection, MyoRing position, and corneal integrity. In the remaining postoperative visits, the same clinical examinations as preoperatively were performed.

Statistical analysis

Data were analyzed by using SPSS software (v 18; SPSS, Inc., Chicago, IL). Statistical comparisons of preoperative and postoperative values were performed by
using t-student test for UCVA, BCVA, mean refractive SE, and mean K-values. Statistical data are presented as mean ± SD. The changes in data were considered statistically significant when the P value was less than 0.05.

Results

MyoRing segments were successfully implanted in all eyes without any intraoperative complication. All the patients completed the 6-months postoperative follow-up. A total of 27 eyes of 15 patients were included. The mean age of the 6 women (40%) and 9 men (60%) was 28.35 ± 8.29 years (ranging between 14 and 49 years). The mean central corneal thickness was 422.42 ± 36.96 preoperatively and postoperatively it was 445.08 ± 28.00 (p=0.020). There was a statistically significant improvement in all parameters from preoperatively to postoperatively (Table 1).

Visual acuity
Uncorrected visual acuities, best corrected distance preoperatively and 6 months postoperatively are shown in Table 1. The mean UDVA significantly improved from 1.73 ± 0.53 log MAR preoperatively to 0.54 ± 0.40 log MAR postoperatively. The mean CDVA significantly improved from 0.59 ± 0.47 log MAR preoperatively to 0.27 ± 0.16 log MAR postoperatively. The change in the mean UDVA and CDVA during the follow-up period was statistically significant (P< 0.000).

Preoperatively, the UDCA, was 0.1 (20/ 200) or worse in 23 (0.85%) eyes and postoperatively, it was 0.5 (20/ 40) or better in 9 (33%) eyes.

Table 1. The means and standard deviations for all data (preoperative and postoperative)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Preoperative</th>
<th>Postoperative</th>
<th>Mean Difference*</th>
</tr>
</thead>
<tbody>
<tr>
<td>UDVA (log MAR)</td>
<td>1.73 ± 0.53</td>
<td>0.54 ± 0.40</td>
<td>-1.19 ± 0.59</td>
</tr>
<tr>
<td>CDVA (log MAR)</td>
<td>0.59 ± 0.47</td>
<td>0.27 ± 0.16</td>
<td>-0.32 ± 0.49</td>
</tr>
<tr>
<td>Sphere (D)</td>
<td>-7.86 ± 3.70</td>
<td>-9.94 ± 5.20</td>
<td>2.08 ± 5.13</td>
</tr>
<tr>
<td>Cylinder (D)</td>
<td>-4.25 ± 2.39</td>
<td>-1.87 ± 2.12</td>
<td>2.38 ± 2.37</td>
</tr>
<tr>
<td>SE (D)</td>
<td>-9.99 ± 3.83</td>
<td>-1.88 ± 2.83</td>
<td>8.11 ± 3.84</td>
</tr>
<tr>
<td>kMIN (D)</td>
<td>49.78 ± 3.57</td>
<td>44.78 ± 2.99</td>
<td>-5.00 ± 3.58</td>
</tr>
<tr>
<td>K MAX (D)</td>
<td>53.81 ± 4.15</td>
<td>47.60 ± 3.58</td>
<td>-6.21 ± 4.24</td>
</tr>
<tr>
<td>Average k (D)</td>
<td>51.97 ± 3.43</td>
<td>45.24 ± 2.61</td>
<td>-6.73 ± 3.62</td>
</tr>
</tbody>
</table>

UDVA= uncorrected distance visual acuity; CDVA= corrected distance visual acuity; SE= spherical equivalent; K= keratometry

The mean efficacy index (ratio of postoperative UDVA and preoperative CDVA) was 1.36 ± 1.51 (range 0.2 to 8).

As shown in Fig. 1, the safety graph, of the 27 eyes, 2 eyes (8%) lost lines of CDVA and 16 eyes (59%) gained 2 lines or more at the last follow-up (mean safety index was 2.01 ± 1.66).

Table 2 shows the mean visual acuity and Table 3 the mean refractive outcomes over the time based on preoperative keratometry. In eyes with a preoperative keratometry of 48.0 D or less and of 48.0 to 53.0 D, the
improvement in UDVA and CDVA and reduction in SE and refractive cylinder were statistically significant (Table 2,3).

Table 2. Mean visual acuity outcomes by preoperative mean keratometry

<table>
<thead>
<tr>
<th>Preop. keratometry (n=27)</th>
<th>Mean UDVA ± SD</th>
<th>p. value</th>
<th>Mean CDVA ± SD</th>
<th>p. value</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤48 (5)</td>
<td>1.80 ± 0.45</td>
<td>0.001</td>
<td>0.50 ± 0.08</td>
<td>0.98</td>
</tr>
<tr>
<td>48-53 (10)</td>
<td>1.49 ± 0.67</td>
<td>0.000</td>
<td>0.58 ± 0.57</td>
<td>0.094</td>
</tr>
<tr>
<td>&gt;53 (12)</td>
<td>1.89 ± 0.37</td>
<td>0.000</td>
<td>0.64 ± 0.49</td>
<td>0.051</td>
</tr>
</tbody>
</table>

Although we had good results in UDVA outcomes in 3 groups, the improvements in CDVA were more significant in group 1 [keratometry ≤48 D] compared to the 2 other groups.

Table 3. Mean refractive outcomes by preoperative mean keratometry

<table>
<thead>
<tr>
<th>Preop. keratometry</th>
<th>Mean SE ± SD</th>
<th>p. value</th>
<th>Mean cylinder ± SD</th>
<th>p. value</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤48</td>
<td>-10.5 ± 5.46</td>
<td>0.001</td>
<td>-6.10 ± 1.77</td>
<td>0.002</td>
</tr>
<tr>
<td>48-53</td>
<td>-8.22 ± 2.28</td>
<td>0.000</td>
<td>-3.60 ± 1.65</td>
<td>0.010</td>
</tr>
<tr>
<td>&gt;53</td>
<td>-11.24 ± 3.87</td>
<td>0.000</td>
<td>-4.40 ± 2.60</td>
<td>0.003</td>
</tr>
</tbody>
</table>

Table 4. Mean visual acuity outcomes by preoperative mean central corneal thickness

<table>
<thead>
<tr>
<th>Preop. central corneal thickness</th>
<th>Mean UDVA ± SD</th>
<th>P. value</th>
<th>Mean CDVA ± SD</th>
<th>P. value</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤400</td>
<td>1.35 ± 0.75</td>
<td>0.094</td>
<td>0.29 ± 0.15</td>
<td>0.47</td>
</tr>
<tr>
<td>≥400</td>
<td>2.00 ± 0.00</td>
<td>0.000</td>
<td>0.61 ± 0.50</td>
<td>0.012</td>
</tr>
</tbody>
</table>

Complications
There were no serious postoperative complications. Mild glare was reported in most cases, especially in the initial postoperative period. No MyoRing was removed for side effects or complications.

Discussion
Keratoconus is an ectatic corneal disorder with progressive steepening and corneal thinning, especially in the inferior part of the cornea. By inserting intrastromal implants, corneal remodeling can improve the visual acuity, changing the curvature of the ectatic cornea [4]. Incomplete rings available on the market are Intacs, Ferrara ring, and Keraring. The implanting of a complete intrastromal ring, MyoRing (Dioptex GmbH, Austria), is an alternative technique, which has been safe and effective in the previous studies in the treatment of keratoconus [5,7,11-13].

The main advantages of a complete ring are easy implantation, good centration, and the postoperative possibility of changing the ring position, if necessary [6]. A mechanical device was specifically developed for the creation of this intrastromal pocket [9]. Femtosecond laser technology may allow a surgeon to perform a corneal stromal dissection at a predetermined depth with an extremely high degree of accuracy, thus avoiding the potential inaccuracies of a mechanical dissection that is dependent on the surgeon’s manual skills [14,15].

In eyes with a preoperative keratometry of 53.0 D or more, the improvement in UDVA and reduction in SE were statistically significant; however, the changes in CDVA were not significant.

In spite of the significant improvement in the visual acuity outcomes for all cases, there was not significant improvement between them for eyes with central corneal thickness of less than 400 µm (Table 4).

The current study evaluated the visual, refractive, pachymetry and keratometry outcomes after MyoRing implantation in eyes with Keratoconus by using the femtosecond laser technology for the creation of intrastromal pocket in an Iranian population. In this present study, at one month after surgery, a statistically significant reduction in myopia and cylinder was observed, with no significant changes during the remaining follow-up. At 6 months, the mean reduction in sphere was 6.92 ± 3.67 D and the mean reduction in refractive cylinder was 2.55 ± 2.00 D. These levels of refractive change were consistent with those previously reported after MyoRing implantation [8-9].

In Alio et al. study, a total of 12 eyes of 11 patients with ages ranging from 17 to 50 years were included. All cases presented with reduced CDVA, contact lens intolerance or discomfort, and central corneal thickness of more than 350 µm. MyoRing inserted of 280 µm in thickness and 5 mm in diameter were implanted in all cases into an intrastromal corneal pocket created by means of femtosecond technology. A significant improvement in UDVA was observed which was consistent with the significant reduction in sphere and refractive cylinder.
As expected, the significant reduction of refractive errors achieved with MyoRing implants in our study was associated with a significant increase of UCVA. The mean UDVA significantly improved from 1.73 ± 0.53 log MAR preoperatively to 0.54 ± 0.40 log MAR postoperatively. The mean CDVA significantly improved from 0.59 ± 0.47 log MAR preoperatively to 0.27 ± 0.16 log MAR postoperatively. The change in the mean UDVA and CDVA during the follow-up period was statistically significant (P< 0.000). The mean efficacy index (ratio of postoperative UDVA and preoperative CDVA) was 1.36 ± 1.51 (ranging from 0.2 to 8). Daxer A et al. showed the mean UDVA improved by almost 10 lines, from 0.07 log MAR to 0.56 log MAR, and the mean CDVA improved by almost 3 lines, from 0.42 log MAR to 0.77 log MAR [6].

UCVA improvement in Mahmood et al., Daxer et al. and Alio et al. studies were 7, 10 and 7 lines, respectively. With regard to CDVA, we observed an improvement by 2 lines of log MAR in 16 eyes (59%), which was consistent with the previous study results [5,6-11].

It seems that the MyoRing implants have a greater potential of myopic and astigmatic correction in Keratoconus than ICRS probably because of the more significant arc-shortening effect achieved with a completely circular mid-peripheral implant [13]. A significant central flattening was observed after surgery, which was consistent with the induced refractive change. The mean decrease in the mean keratometry from the preoperative period to 6 months postoperatively was 6.41 ± 3.62 D. In Hosny et al. study, the mean change in K was 6.13 D (standard deviation, 4.37 D). This flattening effect was comparable to that reported by (mean change in maximum keratometry of 9.60 D) after Ferrara ring segment implantation in severe keratoconus [16]. It was also comparable to those reported by Mahmood et al., Daxer et al., and Alio et al. who also used the MyoRing in keratoconus [5-11].

The keratoconic patients were divided into 3 groups based on their preoperative keratometry (keratometry ≤48 D, 48-53 D, >53 D) and compared the outcomes between the 3 groups. In eyes with a preoperative keratometry of 48.0 D or less and of 48.0 to 53.0 D, the improvement in UDVA and CDVA and reduction in SE and refractive cylinder were statistically significant. Good results were obtained in UDVA outcomes in all groups, but the improvement in CDVA was more significant in group 1 (keratometry ≤48 D) compared to 2 other groups. Therefore, it might be concluded that the MyoRing is a good option for this subgroup of Keratoconus patients. Furthermore, Alio et al. found a significant corneal flattening of a mean value of 8.03 diopters (D) [11] and a significant corneal flattening of a mean value of 9.78 D was found in Jabbarvand et al. study [12]. The mean K reading decreased by 5.76 D, from 48.96 D to 43.20 D in Daxer A study [6].

In our study, the mean central corneal thickness was 422.42 ± 36.96 preoperatively and postoperatively it was 445.08 ± 28.00 (p= 0.020). Significant improvements were shown in the visual acuity outcomes of all cases, there was no significant improvement between them for eyes with central corneal thickness of less than 400 µm.

Our finding was near to Jabbarvand et al. study that a significant increase in central corneal thickness [439.4 ± 19 to 452.2 ± 20 µm] was observed during the 1-month postoperative period [17].

The other interesting study was performed by Jabbarvand et al. MyoRing was implanted in 15 eyes of 14 patients with ectasia after LASIK by using a femtosecond laser. UDVA (1.02 ± 0.48 to 0.30 ± 0.18 log MAR), maximum keratometry (50.14 ± 1.82 to 43.80 ± 1.21 diopters), and sphere (-4.4 ± 4.8 to +1.50 ± 0.61 diopters) were significantly improved from the preoperative values at 1 month after surgery. A significant improvement in CDVA (0.30 ± 0.1 to 0.17 ± 0.13 log MAR) was observed [17].

An intrastromal corneal ring was implanted in stromal depths of 300-µm by using femtosecond laser technology for all patients. Jabbarvand et al. evaluated the clinical outcomes of intrastromal MyoRing implantation at 2 different depths of 250 and 300 µm by using femtosecond laser. No differences were observed in keratometry, visual and refractive outcomes; in the 2 study groups. According to Jabbarvand et al. study, the conclusion was that an implantation depth of 250 µm has comparable outcomes with the previously applied 300-µm implantation depth and it may be appropriate for the selected cases of keratoconus with lower pachymetry [18].

In our study, no MyoRing was removed for side effects or complications but in Alio et al. study, the MyoRing explanation was performed in a very advanced keratoconus because of the extremely poor visual outcome [11] and in Jabbarvand et al. study, MyoRing explanation was performed in (4%) 4 eyes, after a mechanical implantation of a MyoRing (Dioptex GmbH) [12].

Conclusion

In conclusion, we found that the implantation of MyoRings by using femtosecond technology in cases of keratoconus significantly reduced the spherocylindrical error. We demonstrated a reduction in the mean corneal keratometry and spherical power was more significant than cylindrical power reduction. As seen from the clinical data, this technique has the potential to correct significant myopic and astigmatic refractive errors. It appears that MyoRing implantation is a safe and effective procedure for the management of keratoconic cases.

Further studies with larger groups of patients, longer follow-up are needed to report more reliable outcomes with this implant.

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References

A study of the effect of dexamethasone on lipid profile and enzyme lactate dehydrogenase

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Abstract
Dexamethasone is a highly used glucocorticoid unfortunately prescribed too much. This drug is attached to its receptors in cytoplasm by going through the cell membrane, and enters the cell nucleus by drug-receptor complex, being ultimately responsible for systematic effects of corticosteroids. This study was conducted to explore the effect of dexamethasone on serum level of some biochemical parameters in adult male rats.

40 adult male rats were put into 4 experimental and control groups. The control group only received saline and the experimental group received dexamethasone of 0.4, 0.7, and 1 mg/ kg doses daily in the form of intraperitoneal injection of 1 mL/ day. After serum separation, the serum value of cholesterol, triglycerides (TG), low-density lipoprotein (LDL), high-density lipoprotein (HDL) and lactate dehydrogenase were measured and the results were analyzed by using SPSS and Dunnett software.

The test of lipid profile and lactate dehydrogenase was done by using the biochemistry kit and the groups were compared. In this study, significant changes in the concentration of the above hormones were not observed up to 0.7 mg/ kg dose. However, significant changes were seen in higher doses i.e. 1mg/ kg in the experimental group compared with the control group (P<0.05). The final result was that the injection of dexamethasone resulted in the increase of cholesterol and bad lipid and it could cause tissue damage by increasing lactate dehydrogenase.

Keywords: dexamethasone, lipid profile, lactate dehydrogenase, rat

Introduction
Corticosteroids refer to steroids that are produced in the cortical section of the adrenal gland. Due to the important role of glucocorticoids in mitigating the immune responses, a high number of drugs have been made based on this structural skeleton with similar chemical formulas that are called steroid or corticosteroid. Corticosteroid drugs include betamethasone, dexamethasone, hydrocortisone, triamcinolone, methylprednisolone, prednisone, clobetasol, beclomethasone, fludrocortisone, fluocinolone, fluticasone, etc. [1]. Dexamethasone ampoule is the most prescribed drug among injectable drugs in Iran. Dexamethasone belongs to the group of synthetic corticosteroids that has significant anti-inflammatory and anti-allergic effects and results in the pain of inflammatory processes, especially in joints. Also, dexamethasone results in the suppression of the immune system and these effects can often influence different systems of the body. Delaying the healing of wounds, affliction with diabetes, the effect on the balance of body fluids and electrolytes that results in retention of salt and water in the body, the effect on the distribution of lipids in the body and consequently the accumulation of lipids in specific parts of the body such as back of the neck, increase of hypertension, blood sugar and excessive hairs in different parts of the body such as face, especially in females, being among the other adverse effects of inappropriate and excessive use of this ampule [2]. It should be noted that systemic corticosteroids (dexamethasone) as an initial treatment for resolving simple and chronic allergies and the symptoms, could be controlled by drugs having less adverse effects, such as antihistamines. Dexamethasone can result in adverse effects and one should visit the doctor if the signs of adverse effects do not disappear or continue for a long time. Its side effects include irritability and stomach pains, vomiting, headache, insomnia, depression, anxiety, acne and pimple, increase of hair growth, irregular menstrual periods, weakening of the immune system, delay in wound healing, creation of complications such as hallucination and mental disorders and emergence of maniac attacks, the effect on the balance of body fluids and electrolytes that results in the retention of salt and water in the body, effect on the distribution of lipids in the body and consequently the accumulation of lipids in specific parts of the body such as back of the neck, increase of hypertension, blood sugar (hyperglycemia), diabetes and increase of blood lipids which are all known as strong factors in the occurrence of
cardiovascular diseases and strokes [3]. The decrease of bone density, osteoporosis, and higher dose of it results in tendon rupture or injury [4]. The increase of the pressure inside the eyeball and the occurrence of glaucoma especially in old people and also the occurrence of cataracts, reduction and weakening of mucosal layers of the gastrointestinal tract especially stomach, which results in the emergence and aggravation of peptic ulcers. Glucocorticoids rapidly spread in the circulatory system and cause the regulation of transcription of some genes when passing the cell membrane by attaching to cytoplasmic receptors. Glucocorticoids make the genes that have a major role in inflammation such as cytokines and inflammatory enzymes such as nitric oxide synthase, inactive [5]. NO has a dual conflicting biological activity which means that has both cellular toxicity effects and protective effects [6]. NO has inherently cellular toxicity effects and participates in the formation of a strong oxidant such as peroxi nitrite during a series of reactions with superoxide anion [7]. Dexamethasone is a highly used glucocorticoid unfortunately prescribed too much. This drug is attached to its receptors in cytoplasm by passing through cell membrane and enters the cell nucleus by the drug-receptor complex. By attaching to specific areas of DNA, this complex results in the stimulation of mRNA transcription and then the creation of enzymes that are ultimately responsible for systemic effects of corticosteroids. Dexamethasone applies its anti-inflammatory effects by preventing the accumulation of inflammatory cells in the inflammation area, phagocytosis inhibition and release of enzymes that are responsible for inflammation and inhibition of production and release of chemical mediators of inflammation [7]. The high level of triglycerides also increases the risk of metabolic syndrome. Cholesterol is a material made of lipid that belongs to a group of lipids called steroids. Carrier molecules made of protein called apoproteins are turned into lipoprotein when they are combined with cholesterol and triglycerides. The increase of its level increases the risk of cardiovascular diseases. LDL deposits cholesterol on artery walls, which in turn, results in the formation of a thick and hard material called plaque. Over time, this plaque becomes thicker and results in the narrowing of blood vessels or the plaque, being ruptured and separated from the artery wall, which results in blood clotting and blockage of the artery in the place of rupture or the clot may be carried to other parts of the body; this process being called atherosclerosis. Cholesterol exists in tissues and plasma in the form of free cholesterol or in the form of storage of it, which means attached to fatty acids or in a long chain in the form of cholesterol ester. Cholesterol is an amphipathic lipid and is an essential structural component of membranes and external layers of plasma lipoproteins. Cholesterol and ester cholesterol are carried to body tissues by low-density lipoprotein (LDL). During a process called reverse transfer, cholesterol is transferred to liver by high-density lipoprotein and is eliminated from the body there in the form of free cholesterol or after turning into bile acids. Hyperlipidemia is abnormal high level of blood lipid. Types of hyperlipidemia (types iv, iii, ii, I, and v) are defined based on the level of lipid in the blood and their higher levels than the normal level [8]. Therefore, considering the increase in the use of glucocorticoids, paying more attention to the adverse effects of these drugs is important and thus the effect of dexamethasone on lactate dehydrogenase and lipid profile was explored in this study.

Methods

Devices

Centrifuge device (eppendorf), AutoAnalyzer device. The biochemical tests were done by biochemical AutoAnalyzer BT plus 3000 made by the Italian company, Biotecnica that can do biochemical, immunology, serology, and drug level tests. Ketamine was used for anesthetizing rats. The laboratory kits triglycerides, cholesterol, LDL, HDL, and lactate dehydrogenase have been bought from Pars Azmoon Company that has a reference laboratory verification.

Materials

Adult male Wistar rats were used for the tests. 40 rats aged 8 weeks and weighting 250-350 g in for 10-membered groups (1 control group and 4 experimental groups) were bought from Pasteur Institute of Iran. The rats were kept in polypropylene cages whose floor was covered with sawdust and the cage had an appropriate environment for two weeks before the tests, so that they were accustomed to the environment in terms of adaptation, familiarity, and diet. All the animal tests were done according to the moral committee. The rats in each group were specified by some marks and they were fed intraperitoneally for 10 days.

Measuring temperature and humidity of the environment

Temperature and humidity were controlled in order to provide a favorable temperature and humidity in the environment and to maintain the temperature at 22 ± 1°C and humidity at 60%.

Taking blood from the rats and preparing serum

After 10 days of injection, blood was taken to perform biochemical tests. Serum was separated by using
a centrifuge device with 3000 RPM rotation for 10 minutes. In addition, it was given to AutoAnalyzer device to measure the concentration of LDH, TG, HDL, LDL and cholesterol and the concentrations of the enzymes were calculated based on the international unit per liter. This device can be used for biochemical and enzyme tests. This device has high effectiveness and can do 200 tests per hour.

Statistical analysis
The data obtained from AutoAnalyzer device was saved by using SPSS software and then it was transferred to EXCELL and necessary edits were performed. Then, its parameters (tissue damage and the activity of enzyme LDH) were extracted in the two methods of injection and contact and the data resulted from the ANOVA table was extracted from the SPSS programs and were recorded and used in SPSS. The results were expressed in the form of mean and standard deviation. Considering the normalness of data distribution, ANOVA tests with repeated measurements were used for the comparison of the results of enzyme in each group before and after the experiment. Moreover, ANOVA and Dunnett tests were used to compare the groups with each other in each period. In addition, the frequency table was delineated for tissues. The significance level was considered lower than 0.05.

Results
As it can be seen in Fig. 1, the lactate dehydrogenase level was increased in all the experimental groups compared with the control group, but this increase was significant in the group receiving 1 mg/kg.

As it can be seen in Fig. 2, serum's cholesterol level was increased in all the experimental groups compared with the control group, but this increase was significant in the group receiving 1 mg/kg.

As it can be seen in Fig. 3, the serum's HDL level was reduced in all the experimental groups compared with the control group, but this reduction was significant in the group receiving 1 mg/kg.

As it can be seen in Fig. 4, the serum's triglyceride level was increased in all the experimental groups compared with the control group, but this increase was significant in the group receiving 1 mg/kg.
As it can be seen in Fig. 5, the serum’s LDL level was increased in all the experimental groups compared with the control group, but this increase was significant in the group receiving 1 mg/ kg.

![Fig. 5 Comparison of the mean of the serum’s LDL in the experimental groups](image)

Discussion

In this study, the effect of dexamethasone in different doses resulted in the reduction of HDL and the increase of CT, LDL, TG, and LDH and the changes were significant in high doses, which indicated a glucocorticoid impact lipid profile and secretion of enzymes from body tissues. A study conducted in 2012, highlighted that the effect of the metabolic administration of glucocorticoid (dexamethasone) on plasma HDL and LDL and found out that dexamethasone results in low but significant increase of the body weight and increase of high-density lipoprotein and cholesterol but it did not have a significant impact on triglyceride and VLDL-apoB [9]; which was consistent with the results of the present study. Also in the present study, plasma LDL level was increased and the HDL level was decreased with the increase of the injective dose of dexamethasone. Glucocorticoids act as anti-inflammatory and immunosuppressant in patients with rheumatism and pulmonary diseases, which indicates that glucocorticoids result in the increase of HDL-cholesterol concentration [10]. As it was shown in Fig. 2 and 3, if dexamethasone is injected frequently, it can result in the increase of total cholesterol and HDL of plasma, and cholesterol is similar to other lipids and oils and is not soluble in water (blood), being transmitted in the blood with the help of a specific type of protein called lipoproteins and combination with them. After the absorption from intestines, cholesterol and triglycerides are packaged in a protein cover called chylomicron. In fact, the collection of triglycerides and cholesterol that are surrounded by Lipoprotein cover are called chylomicron, and 90 percent of it consists of triglycerides and only 10 percent of it consists of cholesterol. Carrier molecules formed of proteins, called Apo proteins, are turned into lipoproteins when they are combined with cholesterol and triglycerides which include LDL, HDL and VLDL [11]. The mechanism responsible for the increase of glucocorticoid is due to the increase of HDL and HDL-cholesterol but most probably it will result in the decrease of cholesterol ester transferase protein and increase of the secretion of Apo- A-1 (the main protein of HDL particles) from liver [12]. In a study that was conducted by Vrdoljak (2015), the effect of dexamethasone on lipids and lipoproteins of plasma was explored and the results indicated that triglyceride, cholesterol and HDL-cholesterol are increased and the LDL cholesterol concentration is decreased [13]. In addition, in the present study too, exactly the levels of triglyceride, cholesterol and LDL were increased and the level of the serum’s HDL was reduced, and, with the increase of dose, these changes were increased and they were statistically significant (P<0.05). LDL has been mentioned as a carrier of drug for specific places in different studies because LDL is incorporated in cells through the LDL receptor system [14]. In most studies, LDL acts as the carrier of anti-cancer drug to cancer cells because many cancer cells have more LDL receptors compared with natural cells. Asai et al. pointed out that in a laboratory model, dexamethasone prevents the incorporation of modified LDL in macrophages in vitro [15]. In a study by Mahendran (2005) on the effect of dexamethasone on lipoproteins, the results indicated that administration of dexamethasone results in the increase of the levels of triglycerides, cholesterol, and fatty acids in plasma and liver tissue. The level of phospholipids was increased in plasma but it was significantly reduced in liver tissue after the administration of dexamethasone in the experimental group compared with the control group. The activities of lecithin cholesterol transferase and liver lipoprotein lipase were reduced after the administration of dexamethasone. The levels of HDL-triglyceride and HDL-cholesterol did not change, while the levels of LDL and VLDL were significantly increased. The levels of lipids were maintained at the normal level [16]. In the present study too, dexamethasone resulted in significant changes in lipid profile. In a study that was conducted by Kumar (2001), the results indicated that dexamethasone results in the increase of cholesterol and triglyceride levels [17], which is consistent with the results of the present study. As it was shown in Fig. 2 and 4, in this study, the serum levels of cholesterol and triglyceride were increased. The increase of cholesterol can result in fatty liver and consequently the levels of beta hydroxysteroid butyrate, non-esterified fatty acids, the ratio of non-esterified fatty acids to cholesterol, total bilirubin, aspartate aminotransferase, lactate dehydrogenase and bile acids will be higher than the normal levels [18]. Also in this study, as dexamethasone increased the level of cholesterol in serum in rats, a higher level of lactate dehydrogenase was produced in serum. One of the tissues produced by lactate dehydrogenase is liver tissue and hyperlipidemia can cause serious damages to the liver tissue and the result in the secretion of liver enzymes...
In this study too, more lactate dehydrogenase entered the blood with the increase of cholesterol in 1 mg/kg dose.

Conclusion

The results of the present study indicated that the injection of dexamethasone results in the increase of cholesterol, LDL, triglyceride and reduction of HDL of blood serum. And, as LDL of plasma is the means by which cholesterol and ester cholesterol are carried to different tissues, during a process called reverse transfer, LDL free cholesterol of plasma is transferred to liver from tissues to liver and is eliminated from the body there in the form of free cholesterol or after turning into bile acids and with the increase of cholesterol synthesis, a serious damage occurring to the liver tissue and the results in the secretion of liver enzyme.

Authors Contribution

This work was carried out in collaboration between all authors and assistants.

Conflict of Interest

Authors declared that there is no conflict of interest.

References

Diagnostic accuracy of Cone Beam Computed Tomography, conventional and digital radiographs in detecting interproximal caries


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Abstract

Statement of the problem: Presently, different imaging modalities are available for the detection of proximal caries. Several studies in recent years have sought to determine the diagnostic accuracy of available modalities, but they have shown variable results.

Purpose: This study was performed to determine and compare the accuracy of cone beam computed tomography (CBCT), conventional radiographs and the indirect digital system in the detection of interproximal caries.

Materials and Method: In this experimental trial study, forty-two extracted non-cavitated, unrestored human molar and premolar teeth were mounted in the blocks with proximal surfaces in contact. Then they were evaluated by CBCT, conventional radiographs and the indirect digital system for the detection of interproximal caries. Four oral and maxillofacial radiologists used a 4-point scale to evaluate the images for the presence or absence of proximal caries. Caries depth was specified by histological examination. The collected data were assessed by SPSS software by means of Weighted Kappa and Friedman test.

Results: Statistics illustrated that the accuracy of the indirect digital system was slightly better than conventional systems. The accuracy of the indirect digital system was better than cone beam system and this difference was statistically significant.

Conclusion: The digital system was superior to CBCT in the detection of proximal caries. The conventional radiography fell in between the two other systems without statistically significant difference in detecting caries. Thus, CBCT is not suggested in order to detect proximal caries because of the higher radiation dose.

Keywords: Cone Beam CT, dental caries, diagnosis, digital, radiography

Introduction

Detection of caries in the proximal surfaces of teeth has always been challenging [1]. Dental clinicians use visual examination and intraoral radiography to diagnose caries [2]. Conventional intraoral film radiography is a confirmed method for the detection of proximal caries that cannot be easily identified by visual inspection [3]. An alternative method is digital intraoral radiography [4,5]. Digital and conventional radiography has similar accuracy for the detection of caries. But, they both lack in diagnostic accuracy for the identification of incipient proximal caries [6,7]. Intraoral radiographs are a 2-dimensional (2D) imaging method that records 3-dimensional (3D) structures. A number of studies have assessed the use of 3D imaging modalities to avoid the overlap of 3D anatomic structures [8]. The cone beam computed tomography (CBCT) technique can be applied in several dental fields such as implant treatment, craniofacial anomalies, endodontics, orthodontics, periodontology, as well as other dental disciplines [9].

It has been demonstrated that without radiographic assessment, 25-42% of proximal caries may not be detected by clinical examination [10,11]. Conventional intraoral radiographs and photo stimulable phosphor (PSP) plates are the most commonly used image receptors [12,13]. Cone beam computed tomography (CBCT) is a newly developed technique that provides three-dimensional data at a lower radiation dose than the conventional CT [14]. The application of CBCT in dental practice has some benefits compared to conventional imaging modalities, such as higher image accuracy (in endodontic [15] and periodontic [16,17] application), fewer artifacts and higher cost-effectiveness [18].
The aim of this study was to consider the differences in the diagnostic accuracy of different modalities and contradictions in previous surveys, the present study surveyed the in-vitro diagnostic ability of radiographs, PSP sensors and CBCT in the detection of proximal caries in posterior teeth.

Materials and Method

The experimental trial study was performed on 42 non-cavitated extracted human premolar and molar teeth. The clinical appearances of the tooth surfaces ranged from sound to discoloured. Surfaces with fillings were excluded. The teeth were stored in normal saline solution. The study plan was approved by the Ethical Committee of Shahid Beheshti University Dental School. Four teeth were mounted in a row with the proximal surfaces in contact. Each row consisted of three test teeth and one non-test tooth in silicone blocks. The proximal caries were detected by using radiographs, PSP and CBCT images.

The samples were radiographed by two intraoral modalities: 1) Digora-fmx with blue plates [Sordex, Helsinki, Finland] and 2) Kodak (Espeed) Insight film (size2) [Eastman Kodak Company, Rochester, NY, USA]. The digital images (Fig. 1) were taken at 70 kvp, 8 mA but the exposure time was reduced to 0.08 s. The focus-tooth and tooth-receptor distances were 32 and 2 cm respectively. The software used for processing PSPs was Digora for windows 2.8. The conventional images (Fig. 2) were exposed with an X-ray unit operated at 70 kvp, 8 mA and exposure time of 0.16 s. The focus-tooth distance was 32 cm and the tooth-receptor distance was 2 cm. Radiographs were processed after exposure, by using an automatic processing machine [Gendex, Clarimat, Milwaukee, WI, USA] and chemicals (X-ray Iran Company, Tehran, Iran) based on the manufacturer’s instruction.

The image of the teeth was also recorded by using CBCT system (Fig. 3) Newtom VGI [Quantitative Radiology, Verna, Italy] in selected FOV 6×6cm, high resolution at a fixed 110 kvp setting and auto-adjusted milliamperes. The blocks were scanned for 36 s.

In the use of intraoral modalities, a 12 mm acrylic plate was applied as fake soft tissue [9] between the tube and the mounted tooth. During the CBCT exposures, a water phantom [3] was placed around the blocks to simulate soft tissue.

The images were evaluated separately by four expert oral radiologists. All the images were analyzed twice. The use of enhancement facilities to adjust contrast, brightness, and magnification was allowed. Parasagittal slices were reconstructed with 0.1 mm steps and 0.1 mm slice thickness in CBCT images for caries detection. Additionally, the observers could assess CBCT images in the axial, coronal or sagittal sections, in which the lesion was best discerned.

The observers recorded caries by using a 4-point confidence rating scale:
0: Definitely no caries
1: Enamel caries (radiolucency in enamel)
2: Dentine caries (radiolucency in dentine)
3: Deep dentine caries (radiolucency extending to pulp)

The teeth were sectioned by Grand section unit [a Buehler Isomet low speed saw, Germany] in the mesiodistal direction into 0.1 mm thick sections. The sections were fixed on a glass slide. An experienced maxillofacial pathologist inspected the tooth sections by a
light microscope (Eclipse E400, Nikon, Japan) and classified each tooth surface into one of four categories:
0: No defects in the proximal surface
1: Proximal defects in enamel
2: Proximal defects in the outer half of the dentine
3: Proximal defects in the inner half of the dentine

The differences between the observers were assessed with Friedman test and differences in sensitivity and specificity were analyzed by using the Weighted Kappa test. The SPSS v.16 software was used in statistical analysis.

Results

The histological examination revealed that out of 84 proximal surfaces, 54 (64%) were sound, 11 (13%) had enamel caries, 15 (18%) had caries in the outer half of the dentin and 4 (5%) had dentine caries, reaching the inner half of the dentin. Four observers independently compared the caries diagnostic accuracy of three modalities [CBCT, digital radiography (PSP) and film radiography]. Chart 1 and 2 show the diagnostic accuracy of each method for observers on mesial and distal surfaces, respectively.

### Table 1. Conventional Technique parameters

<table>
<thead>
<tr>
<th>Caries Lesions</th>
<th>Golden Standard</th>
<th>Radiolucency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>None</td>
<td>In enamel</td>
</tr>
<tr>
<td>None</td>
<td>95.4% (206)</td>
<td>1.9% (4)</td>
</tr>
<tr>
<td>In enamel</td>
<td>61.4% (27)</td>
<td>31.8% (14)</td>
</tr>
<tr>
<td>In the inner half of dentin</td>
<td>30.8% (16)</td>
<td>9.67% (5)</td>
</tr>
<tr>
<td>In the outer half of dentin</td>
<td>4.2% (1)</td>
<td>0% (0)</td>
</tr>
<tr>
<td>Total</td>
<td>74.4% (250)</td>
<td>6.8% (23)</td>
</tr>
</tbody>
</table>

There was no statistically significant difference among observers but the results showed differences among the different methods of caries detection. P<0.05 was considered statistically significant.
### Table 2. PSP Technique parameters

<table>
<thead>
<tr>
<th>PSP</th>
<th>Radiolucenty</th>
<th>None</th>
<th>In enamel</th>
<th>In the inner half of dentin</th>
<th>In the outer half of dentin</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Golden Standard</td>
<td>None</td>
<td>94.9% (205)</td>
<td>4.6% (10)</td>
<td>0.5% (1)</td>
<td>0% (0)</td>
<td>100% (216)</td>
</tr>
<tr>
<td>Caries lesions</td>
<td>In enamel</td>
<td>40.9% (18)</td>
<td>56.8% (25)</td>
<td>2.3% (1)</td>
<td>0% (0)</td>
<td>100% (44)</td>
</tr>
<tr>
<td></td>
<td>In the inner half of dentin</td>
<td>9.6% (5)</td>
<td>28.8% (15)</td>
<td>59.6% (31)</td>
<td>1.9% (1)</td>
<td>100% (52)</td>
</tr>
<tr>
<td></td>
<td>In the outer half of dentin</td>
<td>0% (0)</td>
<td>0% (0)</td>
<td>37.5% (9)</td>
<td>62.5% (15)</td>
<td>100% (24)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>67.9% (228)</td>
<td>14.9% (50)</td>
<td>12.5% (42)</td>
<td>4.8% (16)</td>
<td>100% (336)</td>
</tr>
</tbody>
</table>

PSP: Photostimulable Phosphor Plate

### Table 3. CBCT Technique parameters

<table>
<thead>
<tr>
<th>CBCT</th>
<th>Radiolucenty</th>
<th>None</th>
<th>In enamel</th>
<th>In the inner half of dentin</th>
<th>In the outer half of dentin</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Golden Standard</td>
<td>None</td>
<td>83.8% (181)</td>
<td>7.9% (17)</td>
<td>8.3% (18)</td>
<td>0% (0)</td>
<td>100% (216)</td>
</tr>
<tr>
<td>Caries lesions</td>
<td>In enamel</td>
<td>58.1% (25)</td>
<td>30.2% (13)</td>
<td>11.7% (6)</td>
<td>0% (0)</td>
<td>100% (44)</td>
</tr>
<tr>
<td></td>
<td>In the inner half of dentin</td>
<td>17.5% (9)</td>
<td>17.5% (9)</td>
<td>61% (32)</td>
<td>4% (2)</td>
<td>100% (52)</td>
</tr>
<tr>
<td></td>
<td>In the outer half of dentin</td>
<td>4.2% (1)</td>
<td>16.7% (4)</td>
<td>45.8% (11)</td>
<td>33.3% (8)</td>
<td>100% (24)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>64.2% (216)</td>
<td>13% (43)</td>
<td>19.8% (66)</td>
<td>3% (10)</td>
<td>100% (336)</td>
</tr>
</tbody>
</table>

CBCT: Cone Beam Computed Tomography

### Discussion

This study was performed on non-cavitated teeth to determine and compare the accuracy of cone beam computed tomography, conventional radiograph and the indirect digital system in detecting interproximal caries. CBCT is a newly developed dental imaging technique with unclear diagnostic potential for some tasks. This new imaging modality may be appealing to clinicians for caries detection purposes. In order to confirm the accuracy of a new diagnostic modality, it has to be tested and compared with the available well-documented imaging systems. In the present in vitro study, proximal caries detection accuracy was evaluated by one of the well-known CBCT imaging systems. Additionally, radiographs and the PSP were included in this study as common detectors for the determination of the depth of proximal caries.

Our study was performed on non-cavitated teeth with small clinical demineralization. The sensitivity values for the detection of incipient enamel lesions in proximal surfaces were 56.8%, 31.8% and 30.2% for PSP, conventional radiographs and CBCT modalities, respectively. Considering the difficulty in detecting incipient enamel defects, conventional radiographs and CBCT were both similar in accuracy while their accuracy was less than that of a PSP. The use of image enhancement facilities may justify the higher accuracy of digital systems.

Because of the simplicity of determining defects in the outer half of the dentin, all surveyed techniques showed the same results. The sensitivity value of PSP in detecting radioluency in the inner half of dentin was 62.5%; whereas this rate was 29.2% and 33.3% for the radiographs and CBCT, respectively. The higher sensitivity of digital systems versus radiographs was attributed to using extra adjustment of brightness and contrast. CBCT images have a lower spatial resolution [19], which results in lower diagnostic accuracy.

Based on the results of the current study, no statistically significant difference in non-cavitated proximal caries detection accuracy was found between the PSP and radiographs (p<0.05) or CBCT and radiographs (p>0.05). Nevertheless, a statistically significant difference in the diagnostic accuracy between CBCT and PSP (p<0.05) was found. The results were in agreement with earlier studies comparing proximal caries detection in
conventional radiographs, digital, and CBCT images [20-22]. The radiographs, digital, and CBCT imaging systems used in those studies were similar to the ones investigated herein.

Although some studies have found that the CBCT is superior for the diagnosis of dentin caries [23,24], it should be kept in mind that CBCT images are very accurate in detecting the presence of cavity in a proximal tooth surface [25]. This study found no advantage of CBCT over radiographs or PSP for the detection of caries. Based on Akdeniz et al. study, some types of CBCT systems such as Accuitomo are useful tools for the diagnosis and monitoring of proximal caries [23]. In contrast to Akdeniz et al. study, our study found no differences between CBCT and conventional intraoral radiographs and even Newton CBCT system had a significantly lower diagnostic accuracy than the PSP. The differences in these studies may be due to the type of factory devices.

Studies have reported that the CBCT had a higher radiation dose compared to a typical intraoral radiograph [26]. Therefore, taking a CBCT only for the detection of proximal caries is not recommended.

Other studies have demonstrated that the detection accuracy of proximal caries in CBCT, digital radiography and conventional radiography are alike [3,27,28]. Differences between these studies may be explained by a number of factors. Firstly, different groups of observers were used (Zhi-ling Zhang et al. used students as observers [3]). Secondly, the observers in the current study used the image enhancement facilities as they pleased and thirdly, the CBCT systems used in these studies were not the same.

Fewer false positive diagnoses occurred with the radiographs and Digora-fmx (4.7% and 5.1%, respectively) than with the CBCT (16.2%). No significant differences were found between radiographs and PSP. Based on these results, digital intraoral techniques are recommended over radiographs because of their lower levels of radiation dose.

A number of studies have assessed the diagnostic potential of CBCT systems. Menegalet al. [29,30] used the Accuitomo CBCT system to evaluate periodontal and peri-implant defects in comparison with intraoral radiography, panoramic radiography and CT. Furthermore, Misch et al. [31] assessed interproximal periodontal defects by using the i-CAT CBCT, intraoral F-speed film and CT and demonstrated that CBCT was better than the other systems.

Considering these results, the Newton CBCT system has a lower diagnostic accuracy than the intraoral modalities for caries detection. Due to high patient dose, it was not reasonable to do this study on human samples. Restorated teeth were excluded because of metal artifacts result from metallic restoration that may compromise image quality and diagnostic accuracy.

Conclusion

In this study, undertaken to compare the diagnostic accuracy of CBCT, conventional radiography and PSP for the detection of proximal caries, differences among these modalities were insignificant with no advantages of CBCT imaging. Thus, CBCT is not suggested in order to detect proximal caries because of the higher radiation dose.

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Comparison of the diagnostic value of CBCT and Digital Panoramic Radiography with surgical findings to determine the proximity of an impacted third mandibular molar to the inferior alveolar nerve canal

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Abstract
Background: This study evaluated and determined the proximity of an impacted third mandibular molar to the inferior alveolar nerve canal by using CBCT and digital panoramic radiography.

Materials and Methods: This descriptive-analytic study used CBCT and panoramic radiographs for 60 subjects (28 men, 32 women). Subjects selected showed a close proximity of the third mandibular molar to the inferior nerve canal on panoramic radiographs; these subjects then received CBCT radiographs. The CBCT findings for the proximity of the third mandibular molar to inferior nerve canal used the results of surgical findings as the standard of comparison.

Results: Eight cases showed positive surgical findings indicating proximity of the third molar and the mandibular nerve canal. Only 13.3% of the cases in which panoramic views showed proximity of the third mandibular molar and the inferior alveolar canal were confirmed during surgery. The result for CBCT radiographic diagnosis was 95%.

Conclusion: It can be concluded that CBCT is preferred over panoramic radiography to determine the proximity of the impacted third mandibular molar to the inferior alveolar nerve canal. Narrowing of the mandibular canal or root canal, disconnection of root borders in panoramic radiography, and the inferior-lingual proximity of the tooth to the root in CBCT strongly indicated the close proximity of the impacted third mandibular molar to the inferior alveolar nerve canal.

Keywords: digital radiography, panoramic radiography, CBCT, mandibular canal, mandibular molar

Introduction

The removal of an impacted third mandibular molar is a common minor surgery in the maxillofacial region. Like other surgeries, this type can have the side effect of malfunction of the inferior alveolar nerve. It is necessary to precisely predict the proximity of the third molar to the inferior alveolar nerve [1,2]. Although panoramic imaging offers comprehensive coverage and easy access, identifying the exact proximity of the impacted third mandibular molar to the inferior alveolar canal in patients is not possible; hence, it is essential to augment diagnosis using cone beam computed tomography (CBCT) [3,4].

One side effect of impacted third molar tooth surgery is malfunction of the inferior alveolar nerve [5]. Such damage may cause paresthesia, hypoesthesia and anesthesia of the lower lip. Its prevalence has been reported to be 4% to 8%; in less than 1% of cases, patients experience permanent numbness in that area [6-9]. This occurs because the surgery in the area around the impacted molar root and the inferior alveolar canal results in exposure of or damage to the canal [10].

The close proximity of the impacted third molar to inferior alveolar nerve increases the danger of numbness up to 30% and may result in psychological and social disorders for the patients [11,12]. This is also the cause of one of the most common complaints against maxillofacial surgeons in the coroner’s court and increases belief by the public that surgical negligence has occurred during surgery [3]. An extensive survey of the proximity of the impacted third mandible molar to the inferior alveolar nerve is necessary before surgery. Panoramic radiography is the most common equipment used for pre-surgery evaluation of impacted third molars (Fig. 1).

Fig. 1 Panoramic radiograph
Although this technique has gained prominence in third molar surgeries because it involves a low dose of radiation, comprehensive coverage, and ease of interpretation and access, it has drawbacks. These include low sensitivity, 2D views, inability to distinguish bone thickness, distortion of dimensions and magnification of both the perpendicular and horizontal dimensions, and creation of ghost images on the reverse side. Sensitivity values of 24% to 64% and specificity values of 74% to 98% have been reported for panoramic radiography [3-5]. This technique is gradually being replaced by CBCT, which allows 3D views of the anatomy with the least distortion at different angles [11]. The advantages of CBCT over CT include a decrease in the radiation surface, high-quality images, low scanning period, decrease in radiation dosage to patient, and the decrease in metal artifacts in images [2].

Studies show that nerve damage is the most common side effect of surgery for the removal of the third molar (4.4% to 8.1%). Paresthesias reported in 1.3% to 5.3% of cases because of the proximity of the impacted tooth to nerves [3].

Atsuko et al. surveyed the positions of the lower jaw molars and the mandible canal by using CBCT. They concluded that data on the distance between the canal and the tooth provided by CBCT are effective for the evaluation of potential damage to the inferior alveolar nerve. The high resolution and low radiation dosage allows the use of these images for third mandibular molars. CBCT images in specific and standard conditions and the evaluation of a sufficient number of samples are listed as the advantages in the study [12].

Chu et al. studied the position of the mandibular canal relative to an impacted third molar of the lower jaw by using CBCT. Their results were based on panoramic evaluations and indicated the increased prevalence of proximity of the mandibular canal to roots of third molars in cases showing deep latency, narrow mandible canals, and samples showing white line radiopacity in the canal. They reported that the use of CBCT made it possible to carefully specify the position of the mandible canal and the root of the tooth.

The present study compared the accuracy of panoramic radiography and CBCT with the surgical findings specifying the position of the impacted third mandibular molars to the inferior alveolar nerve.

Materials and Methods

This descriptive-experimental study was carried out by using a cross-sectional method. The subjects were selected from patients awaiting surgery for removal of their third molars in the Department of Maxillofacial Surgery of the Dental School of Shahid Sadoughi University of Medical Sciences in Yazd, Iran. It is common to prescribe panoramic radiography for patients requiring impacted third mandibular molar surgery. All subjects chosen were patients at the same radiology center to provide a homogeneous sample. The panoramic radiographies were provided by PlanmecaProMax (Helsinki, Finland) and were carried out under similar conditions (80 Kvp, 12 mA, 18 s). The 60 patients selected received panoramic radiographies that showed the existence of one or more signs of proximity of the root of the impacted tooth to the inferior alveolar canal. These signs were classified in terms of their sensitivity as:

1. Darkening of the tooth root
2. Narrowing of the tooth root
3. Interruption of the white cortical line of the inferior alveolar canal
4. Diversion or bending of the inferior alveolar canal
5. Dark and bifid root apex
6. Island-shaped apex
7. Deflection of the root
8. Narrowing of the inferior alveolar canal

Patients who showed a gap between the tooth root and canal, for whom the root of the impacted tooth was not fully formed or who had lesions at the end of the apex were excluded from the study. Patients who had one or more radiographic signs were selected for the study and were sent to obtain CBCTs.

Before beginning, the reason behind the study and the advantages and disadvantages of the procedure were explained to the subjects and written informed consent forms were obtained from each. All subjects were scanned to observe and survey the condition of the tooth and inferior alveolar canal in 3D format. The 3D scans were taken by using CBCT (PromaxPlanmeca: Finland, Helsinki) under identical conditions for exposure and resolution (80Kvp, 12 mA, 17 s). An observer surveyed the 3D radiographies by using 1 mm cuts of the image for axial, cross-sectional, and panoramic views. The criteria used to evaluate the CBCT radiographies are as it follows (Fig. 2):

- Lingual position of root to canal
- Buccal position of root to canal
- Inter-radicular position of root to canal
- Inferior position of root to canal

![Fig. 2 Schematic of CBCT assessment of proximity of impacted third mandibular molars to inferior alveolar canal](image-url)
panoramic radiography and CBCT separately and at different times, the radiologist recorded his findings about the proximity of the tooth and nerve canal in the checklists (7 cases for panoramic radiography and 4 cases for CBCT). The radiologist was unable to consult with or compare his responses for the panoramic checklist while he was reviewing the CBCT images. The patients were examined during surgery for signs of nerve involvement, bleeding, nerve exposure, and postoperative paresthesia.

The surgeon completed his checklists by using the radiological results and from personal observation during surgery. The surgeon made the following observations during surgery:

1. Close proximity of root and nerve were observed as evidenced by a curve in the root or a nerve bundle near the root
2. No proximity of root to canal
3. Uncertainty about exposed area, which was obscured by bleeding

The present study compared the positive predictive value of panoramic radiography and CBCT and the diagnostic value of CBCT in specifying the proximity of the impacted third mandibular molar to the inferior alveolar nerve. The results of surgery were then compared with the prior radiographic results. The data was compiled in SPSS 17 and analyzed by using the chi-square, Fisher’s exact, and Kappa tests.

**Results**

A total of 28 men and 32 women took part in this study. Table 1 shows the results of the Fisher’s exact test for the relation of PPV by gender.

Table 1. Frequency distribution of surgical findings by gender

<table>
<thead>
<tr>
<th>Surgical Findings Gender</th>
<th>+</th>
<th>Percentage</th>
<th>-</th>
<th>Percentage</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>5</td>
<td>17.9</td>
<td>23</td>
<td>82.1</td>
<td>28</td>
<td>100</td>
</tr>
<tr>
<td>Female</td>
<td>3</td>
<td>9.4</td>
<td>29</td>
<td>90.6</td>
<td>32</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>8</td>
<td>13.3</td>
<td>52</td>
<td>86.7</td>
<td>60</td>
<td>100</td>
</tr>
</tbody>
</table>

P-value = 0.454

The PPV for panoramic radiography was 13.3% compared to the surgical results. This showed that surgery confirmed only 13.3% of the possible proximity of the impacted third molars to the inferior alveolar canal of the lower jaw as assessed while using panoramic radiography. The results showed that the diagnostic value of CBCT correlated much more highly with the results of surgery for diagnosing possible proximity of the impacted third molar tooth to the inferior alveolar canal of the lower jaw of subjects who had positive panoramic results (Table 2).

Table 2. Frequency distribution of surgical findings by side involved

<table>
<thead>
<tr>
<th>Surgical Findings</th>
<th>The side involved</th>
<th>+</th>
<th>Percentage</th>
<th>-</th>
<th>Percentage</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right side</td>
<td>6</td>
<td>14.6</td>
<td>35</td>
<td>85.4</td>
<td>41</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Left side</td>
<td>2</td>
<td>10.5</td>
<td>17</td>
<td>89.5</td>
<td>19</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>8</td>
<td>13.3</td>
<td>52</td>
<td>86.7</td>
<td>60</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

The accuracy of CBCT was 100%, which shows the excellent ability of this technique for diagnosing positive cases (false + real positive). The ability of CBCT of specifying and diagnosing negative cases was 94% (false positive + real negative). The PPT for this technique was 72%, indicating a high positive predictive value. It implies that 72% of 100 cases diagnosed as positive by this technique were real positive by using the results of surgical findings as the standard of comparison. This factor is significantly better than for panoramic radiography.
radiography. The PPV was 3.3% for panoramic radiography, which is outstandingly low and unreliable (real positive/ real positive + false positive). The negative predictive value of CBCT was 100%, showing that the NPV of this technique is reliable. All cases were congruous with the results of surgical findings as the standard of comparison (real negative/ real negative + false negative).

The accuracy of the study was 95%; in 95% of cases, the surgical results were congruous with CBCT results. The diagnostic value of CBCT radiography was evaluated by using this index. The agreement of CBCT results with the surgical results was evaluated at a Kappa of 0.813, which is significant at $p = 0.001$. This suggests that the results of CBCT tests were in agreement with the surgical results for those patients having positive panoramic radiographies (Table 3).

### Table 3. Diagnostic value of radiographic findings of CBCT

<table>
<thead>
<tr>
<th>Surgical Findings</th>
<th>CBCT findings</th>
<th>Number</th>
<th>Percentage</th>
<th>Number</th>
<th>Percentage</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>+</td>
<td>8</td>
<td>13.3</td>
<td>3</td>
<td>5</td>
<td>11</td>
<td>18.3</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>0.00</td>
<td>0.00</td>
<td>49</td>
<td>81.7</td>
<td>49</td>
<td>81.7</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>8</td>
<td>13.3</td>
<td>52</td>
<td>86.7</td>
<td>60</td>
<td>100</td>
</tr>
<tr>
<td>P-value</td>
<td></td>
<td>0.000</td>
<td>Measure of Agreement Kappa</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Seven factors used in previous studies were employed to evaluate the panoramic radiography to determine the proximity of an impacted third molar to the inferior alveolar canal. Only 3 out of 7 factors showed a significant agreement with the results of surgery. These factors were deflection and curvature of the root, dark bifid root apex near the nerve, and an island-shaped apex; they showed a significant agreement with the results of surgical findings as the standard of comparison at $p = 0.022$, $p = 0.027$ and $p = 0.007$, respectively.

When these 3 factors were surveyed by using panoramic radiography, the detection of the proximity of impacted third molars to the inferior alveolar canal of the lower jaw increased significantly. The analysis indicated that the agreement between the factors and the surgical results was not significant. The frequency distributions of the 3 factors are shown in Table 4. The first factor, dark bifid root apex, had the highest frequency. The lack of cortical borders of the alveolar canal, narrow nerve canal, and root apex deflection were not observed in panoramic radiography (Table 4).

### Table 4. Frequency distribution of determining factors in panoramic radiography

<table>
<thead>
<tr>
<th>Surgical findings</th>
<th>Panoramic findings</th>
<th>Number</th>
<th>Percentage</th>
<th>Number</th>
<th>Percentage</th>
<th>Number</th>
<th>Percentage</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interruption of white line of the mand. canal wall</td>
<td>5</td>
<td>62.5</td>
<td>30</td>
<td>57.7</td>
<td>35</td>
<td>58.3</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>Darkening of the root</td>
<td>1</td>
<td>12.5</td>
<td>18</td>
<td>34.6</td>
<td>19</td>
<td>31.7</td>
<td>0.416</td>
<td></td>
</tr>
<tr>
<td>Diversion of the mand. canal</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Narrowing of the mand. canal</td>
<td>7</td>
<td>87.5</td>
<td>18</td>
<td>34.6</td>
<td>25</td>
<td>41.7</td>
<td>0.007</td>
<td></td>
</tr>
<tr>
<td>Narrowing of the roots</td>
<td>0</td>
<td>0</td>
<td>22</td>
<td>42.3</td>
<td>22</td>
<td>36.7</td>
<td>0.022</td>
<td></td>
</tr>
<tr>
<td>Deflection of the roots</td>
<td>3</td>
<td>37.5</td>
<td>3</td>
<td>5.8</td>
<td>6</td>
<td>10</td>
<td>0.027</td>
<td></td>
</tr>
<tr>
<td>Fisher’s Exact Test</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Four factors were used to evaluate CBCT: lingual, buccal, intra-radicular, and inferior positions of the root relative to the canal. The proximity of the impacted third mandibular molar to the inferior alveolar canal increased only when observing the inferior and lingual factors simultaneously and was statistically significant at $p = 0.000$ (Table 5).

### Table 5. Frequency distribution of determining factors in CBCT radiography

<table>
<thead>
<tr>
<th>Surgical findings</th>
<th>CBCT</th>
<th>Number</th>
<th>Percentage</th>
<th>Number</th>
<th>Percentage</th>
<th>Number</th>
<th>Percentage</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>7</td>
<td>87.5</td>
<td>26</td>
<td>50</td>
<td>33</td>
<td>55</td>
<td>0.063</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>19.2</td>
<td>10</td>
<td>16.7</td>
<td>0.330</td>
</tr>
</tbody>
</table>
Discussion

It is necessary for a surgeon to use radiography to determine possible difficulties arising during surgery and prepare for them before beginning surgery for an impacted third molar. There exists the possibility of damage to the sinus of the upper jaw or alveolar canal of the lower jaw during impacted tooth surgery [13]. Although several studies have surveyed the accuracy of panoramic and tomographic radiography, variables related to the risk of damage to the alveolar nerve have not been comprehensively studied [14].

The present study evaluated the diagnosis of close proximity of the mandibular canal to the third impacted mandible molar by panoramic radiography using CBCT images. Variables related to increased risk of two-structure relatedness were identified [15]. Disorders of the inferior alveolar nerve result from damage to sensory tissue; if the tooth and mandible canal are in close proximity, the risk increases. This lesion may be temporary, but could become permanent if scar tissue develops after surgery. The size of the patient dose in CBCT is lower than for a CT scan [16]. Studies have shown that CBCT is a suitable device to diagnose the proximity of the mandibular canal to prevent damage to it and its neurovascular bundle. Its diverse advantages recommend it for application in tooth surgery.

Pawelzik et al. compared panoramic radiography and volumetric CT to study the impacted third mandible molars before surgery. They scanned 10 patients with impacted third mandibular molars by using panoramic radiograph and found a close proximity of the tooth to the inferior alveolar nerve. Five oral surgeons analyzed a number of anatomic factors. In 90% of the cases, volumetric CT (VCT) images facilitated the diagnosis of the proximity of the impacted third molar to other anatomical features. In 70% of the cases, the proximity of the tooth apex to the nerve could be diagnosed by using VCT [17]. It has been reported that panoramic radiography and VCT are not adequate for diagnosis on their own and should be used together. The authors reported that, if an experienced radiologist is available to interpret the panoramic radiography, VCT is not necessary [18-20].

The present study revealed that panoramic radiography failed to correctly diagnose the relation between these two structures on its own. The effect of multiple observers for radiographic accuracy was eliminated by using only one observer and the reliability of the study increased. Several studies have found that the factors used in panoramic radiography are better related to the proximity of the alveolar nerve to the impacted third molar of the lower jaw. Albert et al. compared panoramic radiography with conventional tomography to study the proximity of the impacted third molar and the mandibular canal. They analyzed risk factors in the determination of close proximity of the tooth to the nerve and determined the topography of nerve to the mesial and distal roots. Their results showed that the darkening of the root was the most common factor isolated in panoramic radiography; in 13 out of 14 patients showing this sign, the third molar was in close proximity to the nerve. In 4 out of 5 patients showing an island-shaped apex, the third molar was in close proximity to the nerve. A dark bifid root apex and deflection of the root apex did not indicate a close proximity of the tooth root to the mandibular nerve. The performance of tomography versus panoramic radiography was not discussed [21].

Tantanapornkul et al. compared panoramic radiography and CBCT to evaluate the topographic proximity of an impacted third molar tooth to the mandibular canal. They considered 4 factors for the proximity of the nerve to the tooth: lack of continuity of mandibular canal; root darkening; mandibular canal deflection; and narrowing of the root. The existence or nonexistence of a direct relationship between root and nerve were the criteria for CBCT. After the analysis of the radiographs, patients underwent surgery and the results determined during surgery were recorded. After surgery, patients were examined for the existence of paresthesia. The results revealed that every factor for panoramic radiography was related to the exposure of the nerve; hence, these factors effectively predicted the risk of damage to the nerve. The lack of continuity of the mandibular canal was introduced as the most important diagnostic factor. Specificity was 93% and sensitivity was 77% for CBCT, 70%, and 63% for panoramic radiography, respectively. This showed that CBCT outperformed panoramic radiography [22].

The frequency of 7 factors and their significance or non-significance was calculated by comparison with the results of surgery. Three factors were found to have a significant relationship with the results of surgery. Results showed that 3 out of 7 evaluations of panoramic radiography factors (diversion or bent inferior alveolar canal, island-shaped apex, and dark bifid root apex) had a significant relationship with results of surgery as the standard. These were significant at p = 0.022, p = 0.027, and p = 0.007, respectively.

When these factors were found in panoramic radiographs, the possibility of the close proximity of the impacted third molar tooth of the lower jaw to the inferior alveolar canal increased significantly. There were no significant relationships found between radiographs of the interruption of the white cortical line of inferior alveolar, root deflection, and narrowing of the inferior alveolar canal. Studies have considered factors such as different numbers of observers, their specialties, the method of scoring of data, and results of surgery results in their research methods. The
exposure during surgery and the surgeon assessment were considered the criteria for evaluation. In other cases, paresthesia was considered for the proximity of the two structures [23-29]. Valmaseda-Castellón et al. showed that inferior alveolar nerve damage might ensue after lower third molar surgical extraction [24].

Tantanapomkul et al. surveyed the results of CBCT and panoramic radiography to evaluate the proximity of the mandibular canal to an impacted third molar. Patients with impacted third molars of the lower jaw were scanned by panoramic radiography prior to surgery. The surgeons were asked to record all tooth extraction details and neurovascular exposure during tooth extraction. Patients for whom there was doubt about neurovascular exposure were excluded from the study. Seven days after surgery, the side effects of third molar surgery of patients were recorded. Ten patients showed the side effects; patients with exposed neurovascular bundles showed significantly higher side effects compared to other patients. The sensitivity of CBCT was 93%, which was significantly higher than for those receiving only panoramic radiography. It was concluded that the CBCT was more effective in predicting neurovascular exposure after surgery for an impacted third molar than panoramic radiography. Moreover, its application under clinical conditions to evaluate impacted third molar pre-surgery had several advantages. Since identifying neurovascular exposure was done by the surgeon during surgery, the possibility exists that some areas were overlooked and these results showed the low specificity of images [21]. This was a limitation of the research. The present study employed observers, which had several advantages.

Gaeminia et al. evaluated the proximity of impacted third molars to the mandibular canal by using CBCT and panoramic radiography. Their results revealed no significant relation between exposed IAN and nervous disorders after surgery by gender, place of surgery or third molar angle. They found no significant difference between these two techniques for the prediction of the risk of nerve exposure; however, the lingual position of the mandibular canal was significantly related to IAN nerve damage. Three cases using panoramic radiography were significantly related to IAN nerve damage. CBCT sensitivity was 96% and specificity was 23% [18-22]; hence, they found that the diagnostic accuracy of panoramic radiography and CBCT were the same. The benefits of this study were the random viewing of panoramic radiographic images and CBCT, internal agreement of viewers for both techniques, and evaluation by one observer. The sensitivity and specificity of both CBCT and panoramic radiography have been reported differently in various studies; for example, a sensitivity of 96% and specificity of 27% have been reported in a similar study.

In the present study, the sensitivity of CBCT was 100%, which indicates its effectiveness in diagnosing positive cases. Its specificity for diagnosing and identifying negative cases was 94%, which was lower than its sensitivity.

Conclusion

This study confirmed that CBCT is the most accurate method of radiography for the determination of the proximity of impacted third molars of the lower jaw and the inferior alveolar canal. The results indicated that 3 of 7 factors used to evaluate panoramic radiography (diversion or bending of the inferior alveolar canal, dark bifid root apex) significantly agreed with the surgical results used as the standard. The CBCT diagnostic value was 95% in this study, indicating that, in 95% of cases, the results of surgery were the same as the predictions from CBCT. The results of CBCT evaluation increased for simultaneous observation of the inferior-lingual relation to confirm the proximity of the impacted third molar of the lower jaw to the alveolar canal.

Conflict of interest

The authors declare that they have no conflict of interest.

References


Correlation between adequate nursing staff and the hospital performance: Case Study in Tehran University of Medical Sciences Hospitals


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Abstract

Background: As the largest group among different groups of hospital workforce, nurses play a crucial role in the success of the hospital activities and the promotion of community health.

Objectives: This study aimed to find the correlation between the shortage of nursing workforce and hospitals performance of Tehran’s Medical Sciences University.

Materials and Methods: This research was a cross-sectional descriptive study, which was performed in selected educational hospitals affiliated to Tehran University of Medical Sciences during the year 2010. While using three researcher-made forms, data was collected from all clinical, para-clinical, financial, administrative and support departments of hospitals. Data was analyzed according to the standards of Iran’s Ministry of Health and Medical Education by using Excel software. Pabon Lasso model was applied for performance measurement during the year 2010. The combination of 3 indicators was used to determine the length of stay, bed occupancy rate and bed turnover.

Results: The results showed that the nursing staffs in the 18 wards (66.67%) were in lower levels than the standards, only one ward (3.7%) matched the standards, and the rest of the wards (29.62%) were in higher levels than the standards. Both hospitals were near the value 4 in the Pabon Lasso model. The correlation analysis between the nursing shortage and performance showed a significant relationship (P<0.05).

Conclusion: Generally, the studied hospitals were faced with a lack of nursing work force and the distribution of work force was not appropriate. A proper planning and management of work force in accordance with the lack of personnel compensated and achieved the standards required for the hospital’s nursing work force and this would lead to an increase in the efficiency of the hospitals’ activities and could provide satisfaction for the nursing staff.

Keywords: estimation, nursing staff, hospital, personnel standards, Pabon Lasso

Introduction

Attitudes toward the work force and human resources have changed along with the wonderful changes we witness in today’s word and also along with the information blast, globalization and similar cases, as they were considered the main factors that cause these changes. At present, none of the managers has an instrumental attitude toward human resources, employees are valuable assets of an organization, and so many scholars have been trying to find an effective method to create and keep these assets [1]. The Nobel prize winner, Simon Kuznets, reasoned that a true asset of most developed countries is not the fact that they have access to great physical and material assets but the collection of concentrated knowledge which is a result of experimental knowledge and discoveries resulted by this experimental science and knowledge, of course the capacity and presented educations are also considered important factors in the effective application of this science [2]. Undoubtedly, there were hospital criteria and standards applied along with the proper management, which led to the efficiency and effectiveness of the hospital services. Meanwhile, the work force is the first and most important section, creating the hospital as an organization. The importance of the work force in presenting hospital
services is undeniable and without proper and educated work force, hospital activities will be deranged. In fact, a proper combination of doctors with required specialties, nurses, technicians, nurse aids, have a major and critical role in the proper working routine of the hospital and the presentation of hospital services [3]. The various models and methods were presented to predict the work force at the universal level and to be based on various time periods. Goodman and Viant have presented the effective factors on developing these methods and models and also the application limits of each one on the long term planning of work force during the past 100 years [4]. Work force was considered one of the most important resources and assets of the hospital and its shortage or surplus could affect the quality of services provided to the patients. Most problems in hospitals were the result of shortage in work force or improper distribution of work force [5,6]. Based on the results presented in a research by Arab & et al. during 2010, studied hospitals faced a work force shortage and did not have a correct management and planning of work force. Also, there were various researches on the nurses’ dissatisfaction with the hospital, which was mentioned, and its major reason was the shortage in the number of nurses [7,8]. It was essential to explain that the medical staff made up more than 70 percent of the hospital’s work force and, considering the current expenses of the hospital, they devoted 65 to 70 percent of these expenses to themselves. The most important issue was that based on the reports of the Ministry of Health, the bed occupancy coefficient in Iran’s hospitals not exceeding around 60, just about the active beds [9]. The final aim of the human resources activities was to provide a proper number of competence employees to satisfy inpatients in hospitals. Hospitals required a certain number of competent individuals to ensure it would accomplish its mission and satisfy patients’ needs. In this sense, work force was determined by considering the personnel's working volume. This method used the determined working volume for the hospital’s personnel. This index included the number of inpatients divided on number of surgeries, number of births, number of inpatients, number of outpatient clinics, personnel education, visit in the house, etc. For each of mentioned indexes, standard activities were defined. These standards were represented by the rate of time spent for each of these activities [10]. Planning the work force predicted the organizations’ future supply and regular demanding for employees. By guaranteeing the number and type of required employees, the human resource unit can better predict absorption, selection, education, career planning and other activities. If the organization is not supplied by a proper number and type of work force, the planning might fail. Executive managers recognized that the main success key in planning is human resource because competent employees ease the successful execution of plans [11]. The main goal of the present research was to estimate the required work force of hospitals based on the pattern suggested by the Ministry of Health. The present research was a step toward adjusting with the Hospitals’ personnel standards and by doing so, shortages and surpluses of required work force in Tehran Medical University’s hospitals would become clear and would also determine what type of career suffers from these shortages and surpluses and finally it would also be determined the way this information is combined with hospital performance.

Materials and methods

The present research is of health system studies type and it was performed in descriptive–analytical method. The studied society in the present research includes all sections and units with nursing group personnel (nurse, nurse’s aide, nurse’s aide assistant) in 2 hospitals. Choosing these two hospitals was due to the access to data regarding the nursing level in all wards.

Data were gathered by means of researcher built questionnaires that were designed by means of previous researches. The present research used three types of forms to gather data, as it follows: 1 related to authorities of selected clinical condition, the work force of these sections was determined by these means. 2: related to medical records section, which was used to determine a percentage of sections of bed occupation, number of active beds and the median of the patients’ stay in clinical sections and 3 used to determine the condition of the existing work force and also to study personnel structure designed by the hospitals’ staff department director. After gathering the required data, shortages and surpluses of nursing work force of studied hospitals was determined based on career types in various sections of the hospital and the required nursing work force was evaluated.

In order to assess the performance of hospitals, Pabon Lasso model combing 3 indicators was used: length of stay, bed occupancy rate, and bed turnover rate defining which hospitals were in a certain region of efficiency. Pabon Lasso model divided hospital performance into 4 areas: area one - hospitals with low bed occupancy rate and bed turnover, area two - hospitals with low bed occupancy rate and high bed turnover, area three - hospitals with high bed occupancy rate and bed turnover and finally, area four - hospitals with high bed occupancy rate and low bed turnover. Due to ethical issues, the name of the hospital was not mentioned. Data were analyzed by means of Excel software, descriptive statistic indexes and standards handbook suggested by the Ministry of Health.

Findings

Bed occupancy rate, length of stay and bed turnover of 2 hospitals could be seen in Table 1. According to Pabon Lasso model, both hospitals were placed in region 4 of efficiency, which had a high bed occupancy rate and low bed turnover, which showed that these hospitals admitted patients with more complicated conditions and an increase in the average length of stay, which led to an increase in cost and need for more personnel.
Both studied hospitals were public and educational-medical centers. The total number of the existing nursing work force and required number were determined based on the pattern suggested by the Ministry of Health for hospitals and the results were presented in Table 2.

There were 392 nursing organizational posts in Hospital B. Based on the standards of the Ministry of Health, this hospital should have had 794 organizational posts related to nursing staff. Among 16 sections studied in Hospital B, four sections had a nursing surplus based on the pattern suggested by the Ministry of Health and the other suffered a shortage in the nursing work force. Based on this pattern, the maximum shortage existed in ICU (36) and the minimum shortage existed in the newborns section (1). Generally, the distance or difference of the existing condition from the model suggested by the Ministry of Health was of 139 individuals (Table 2). 346 working careers existed in Hospital A, which should have had 356 nurses, based on the standards of the Ministry of Health. Among 11 studied sections, 4 had a nursing surplus based on the pattern suggested by the Ministry of Health, a section was proper based on the pattern and the rest suffered a staff shortage. Based on model suggested by the Ministry of Health the maximum shortage was observed on the orthopedic section (10) and the minimum shortage was observed in the nursing office which was adjusted based on the model. The highest surplus was also observed in the internal section (-1) and the minimum surplus was observed in the general surgeries (-1). Generally, the existing difference of the current condition from the model suggested by the Ministry of Health was of 30 individuals (Table 2).

The correlation analysis showed that there was a significant relationship between the nursing staff shortage and the region of efficiency (r = 0.82, P<0.05).

### Table 1. Efficiency region of hospitals according to Bed occupancy rate, length of stay and bed turnover

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Bed occupancy rate</th>
<th>Length of stay</th>
<th>Bed turnover</th>
<th>Region of efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>87.11</td>
<td>6.65</td>
<td>32.76</td>
<td>4</td>
</tr>
<tr>
<td>B</td>
<td>88.36</td>
<td>6.73</td>
<td>44.13</td>
<td>4</td>
</tr>
</tbody>
</table>

### Table 2. Condition of studied hospitals’ work force based on the model suggested by the Ministry of Health

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Section</th>
<th>Bed occupation coefficient</th>
<th>Active bed number</th>
<th>Existing nursing work force</th>
<th>Nurses based on model suggested by the Ministry of Health</th>
<th>Difference of existing condition with the condition suggested by the Ministry of Health</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital A</td>
<td>Kidney and urethra surgery</td>
<td>2.76</td>
<td>18</td>
<td>24</td>
<td>17</td>
<td>-7</td>
</tr>
<tr>
<td></td>
<td>Orthopedic</td>
<td></td>
<td>42</td>
<td>42</td>
<td>38</td>
<td>10</td>
</tr>
<tr>
<td>Hospital B</td>
<td>CCU</td>
<td>1.75</td>
<td>15</td>
<td>12</td>
<td>10</td>
<td>-1</td>
</tr>
<tr>
<td></td>
<td>ICU</td>
<td></td>
<td>8.76</td>
<td>31</td>
<td>36</td>
<td>30</td>
</tr>
<tr>
<td>NICU</td>
<td>82</td>
<td>6</td>
<td>15</td>
<td>20</td>
<td>5.12</td>
<td></td>
</tr>
<tr>
<td>------</td>
<td>----</td>
<td>---</td>
<td>----</td>
<td>----</td>
<td>------</td>
<td></td>
</tr>
<tr>
<td>Newborns</td>
<td>24</td>
<td>21</td>
<td>13</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orthopedic</td>
<td>98</td>
<td>24</td>
<td>21</td>
<td>13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nerves, internal</td>
<td>75</td>
<td>8</td>
<td>27</td>
<td>42</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>General surgery</td>
<td>71</td>
<td>4</td>
<td>40</td>
<td>36</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>CCU</td>
<td>65</td>
<td>9</td>
<td>23</td>
<td>35</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>ICU</td>
<td>73</td>
<td>2</td>
<td>18</td>
<td>49</td>
<td>57</td>
<td></td>
</tr>
<tr>
<td>Emergency</td>
<td>80</td>
<td>8</td>
<td>33</td>
<td>45</td>
<td>52</td>
<td></td>
</tr>
<tr>
<td>Kidney transplant</td>
<td>59</td>
<td>4</td>
<td>7</td>
<td>10</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>General surgery</td>
<td>84</td>
<td>1</td>
<td>66</td>
<td>60</td>
<td>59</td>
<td></td>
</tr>
<tr>
<td>Lung</td>
<td>68</td>
<td>7</td>
<td>30</td>
<td>20</td>
<td>44</td>
<td></td>
</tr>
<tr>
<td>Cardio surgery</td>
<td>87</td>
<td>1</td>
<td>40</td>
<td>43</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Brain and bone transplant</td>
<td>85</td>
<td>3</td>
<td>34</td>
<td>63</td>
<td>74</td>
<td></td>
</tr>
<tr>
<td>Nursing office</td>
<td>-9</td>
<td>74</td>
<td>63</td>
<td>34</td>
<td>3.85</td>
<td></td>
</tr>
<tr>
<td>total</td>
<td>-4</td>
<td>30</td>
<td>34</td>
<td>24</td>
<td>6.94</td>
<td></td>
</tr>
<tr>
<td>Internal hematology</td>
<td>94</td>
<td>6</td>
<td>24</td>
<td>30</td>
<td>351</td>
<td></td>
</tr>
<tr>
<td>Brain and neurology</td>
<td>26</td>
<td>44</td>
<td>17</td>
<td>44</td>
<td>3.81</td>
<td></td>
</tr>
<tr>
<td>Women and birth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Discussion and conclusion

People working in medical careers are considered among the most important group of work force presenting medical and healthcare services. Unique characteristics of the medical group jobs, such as the effect on health, which is one of the most vital aspects of mankind’s life, makes it essential to pay attention to planning to considering the future in this area. Consideration and paying attention to work force planning in the healthcare area is important from two points of view. First, the work force is considered one of the essential and basic factors in the effective service providing; second, a great part of the healthcare section financial resources is used to pay wages of this work force [12]. Now, third world countries devote around 60 to 80 percent of their healthcare and medication share to their hospitals while this percent is around 38 percent for hospitals in developed countries and the rest is devoted to non-hospital medical and healthcare services. Due to this, it is very important to calculate hospital staff expenses in these countries [13]. Based on the results from evaluations in studied hospitals and comparing them with the current condition, we realized that the nursing work force distribution is not balanced in various sections of the hospital and it does not follow the standards. Among 16 sections of Hospital B, 12 sections had less work force in comparison to the model suggested by the Ministry of Health and 4 had a higher level than suggested by the Ministry of Health. This is while the work force distribution in the sections of Hospital A was different in a manner that in comparison to the model suggested by the Ministry of Health, 4 sections had less work force, 6 sections had more work force and finally one section was adjusted based on the model suggested by the Ministry of Health. Studying the condition of nursing work force in the present study and comparing it with the existing researches indicated a shortage of the nursing work force in the studied hospitals.

The results presented by Akbari & et al. researches showed that among 92 hospital sections studied in Lorestan Medical University hospitals, only 18 sections were adjusted based on the model presented by the Ministry of Health and 16 sections were better than the suggested standards and the rest of 58% of the sample society were far from the existing measures and standards [3]. In Mostafaiye's study about hospitals of Medical University of Tehran, he found out that 65.1% of the sections had a shortage, 5.31% had a surplus, and 9.57% had an exact right number of nurses, based on the standards of the Ministry of Health [14]. In the ICUs, responsible for taking care of patients in a sensitive condition both in the hospitals shortage of nursing work force was observed. Abrishamkar also showed that the ICUs faced a shortage of the nursing staff and lacked a correct and proper management of work force [15]. The nursing office was one of the units in which the quality and quantity of the work force’s number was very important because it was responsible for monitoring and controlling the Hospital confining sections’ activities. In our hospitals studies, no shortage was observed in the required number of work force in the nursing office based on the model suggested by the Ministry of Health, it was to say that there were 8 surplus employees in the nursing staff of Hospital B in comparison with the model presented by the Ministry of Health. Hospital A had the exact number of the nursing staff in comparison with the model suggested by the Ministry of Health and there was no shortage in the nursing office, which could be considered as one of strength points of this hospital. Results of this study showed that studied hospitals faced a shortage of the nursing staff and the maximum shortage was related to Hospital B with 139 individual’s shortage. The planning regarding the making up of this personnel shortage and reaching the personnel standard level in all hospital sections and presenting the required educations to every sectors director or manager in relation to proper and correct management and planning of work force of the sections will increase the efficiency and effectiveness of hospital activities [16]. Results of Bahadori study in Iran also showed that 89.5% of hospital beds encounter with low nursing personnel, which is in agreement with our study [17]. Based on statistical reports about hospitals covered by the Ministry of Health, treatment and medical educations were developed; the bed occupation coefficient in Iran’s hospitals did not exceed 60 active beds. It is obvious that this rate is less than 50 percent regarding the hospital’s permanent beds. This way, the enormous expenditure that human resources spends to
manage hospitals and other healthcare-medical centers requires a great and increasing attention [13]. A comparative study about the work force index and proportion of its distribution in Hospital A, which was done for the Ministry of Health, the treatment and Medical Education by Sedghiani showed the fact that in the developed countries’ hospitals, despite the use of advanced technology, which led to a decrease in the work force, based on hospitals condition of being educational, non-educational and singular expert, generally 3 or 4 work force were considered.

The results of the present study showed that there is a significant relationship between the efficiency area of the hospitals and condition of nursing staff in both hospitals. Both hospitals had a high bed occupancy rate with low bed turnover, which needed more personnel in order to consider the best patient treatment and follow up while none of these hospitals had a good condition regarding the nursing staffs. According to results of Mark’s study, 60% of the unit of service provision was in a lower efficiency level, which needed a reduction of the hours of working of nurses and this led to an adequate number of the nursing staff [18]. Sovie also implied that the outcomes of the hospitals depend on the nursing working hours, which showed the importance of number and hours of nurse staffs on hospital performance [19]. Everhart’s study also showed a positive relationship between the number of the nursing staffs and the financial performance of hospitals [20]. What should be reminded is that this number of work force is not determined based on guessing but based on the evaluating work force and time consumption of services methods. The most important point is that now, the Ministry of Health’s hospitals only hold common standards to determine the number and design the work force has and the personnel standards of the Ministry of Health. Generally, in all hospitals of the country, especially hospitals in which the bed’s capacity was not properly used and the median of hospital bed occupancy was low, such as the studied hospitals, managing the hospitals use of less work force and usually with improper design was applied, which led to an irreparable damage to the body of the country’s health system and so many facilities and capacities of the hospitals, so, the great investments on them were left untouched.

References

Protective effect of Jaft against carbendazim induced biochemical changes in male Wistar rats

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Abstract

Introduction: Pesticides are an important tool for crop protection and control of different pests and insects. The present research was carried out to evaluate the protective role of Jaft extract against oxidative stress and biochemical changes due to short-term exposure to carbendazim in male Wistar rats. Fresh fruits of quercus brantii were dried and the internal layer (Jaft) was collected for a hydroalcoholic extract by a maceration method at room temperature. For the experimental study, twenty-four adult male rats (Wistar albino rats weighing 150-200 g) were randomized into three groups of eight. Group I served as a vehicle treated group, received corn oil additionally to their food, while the animals in group II received 0.1 ml carbendazim (50mg/ kg in corn oil) by oral route for nine days. Rats in group III received Jaft (500 mg/ kg by oral route + in carbendazim for 9 days. Blood samples were obtained by heart puncture to determine aspartate aminotransferase (AST), alanine aminotransferase (ALT), alkaline phosphatase (ALP), blood urea nitrogen (BUN) and creatinine; by using auto-analyzer in serum.Kidneys and liver were isolated from rats and prepared for tissues homogenization of biochemical parameters such as MDA and GSH levels.

Result: The serum content of AST, ALT, ALP, BUN and creatinine were significantly elevated by in carbendazim treatment (group II) compared to the negative group (p<0.01).The liver enzymes activities, BUN and creatinine were significantly reduced in rats (p<0.05) when Jaft was received in a short period of time (group III). Hepatic and renal MDA and GSH levels in group (II) were significantly (p<0.05) increased and reduced respectively. The MDA and GSH levels’ content were significantly normalized in rats (p<0.05) when Jaft was received by group III.

Conclusions: According to the present data, Jaft can neutralize carbendazim induced oxidative stress and recover the abnormal pathological injuries in male Wistar rats.

Introduction

Today, pesticides are an important tool for crop protection and control of different pests and insects. Carbendazim (methyl-2-benzimidazole carbamate) with systemic broad-spectrum is a fungicide agent that is widely used in gardening and agricultural disease control program. It is also used as preservative in paint, textile, paper, leather and fruit crop industry [1].

Carbendazim is an end product of benomyl, the most extensive ecological pollutant related to human and animal reproductive health. Carbendazim is a toxic substance according to the World Health Organization classification, which is broadly used as a fungicide agent [2]. It acts on tubulin via interferes in microtubule development and meiotic cell division [2]. Man may be exposed to carbendazim either through environmental contamination or through occupational exposures. Several diseases such as hypertension, eyes, nose and throat irritation and headache were reported due to occupational exposure [3,4]. Carbendazim and its metabolite benomyl have been known to induce testicular toxicity via immature spermatids [5] and inhibition of microtubule assembly.

Also, in mammals exposure with carbendazim is associated with disturbances in liver function, hematopoiesis and reproduction system [6].

According to some research results, carbendazim can induce damages to thyroid, parathyroid, adrenal glands and some hormone content in rats [7]. It is expected that the Jaft extract may become a new substance in the near future, to control inflammatory disease and oxidative stress pathogenesis in man and animals. Hence, the present research was carried out to evaluate the protective effect of Jaft extract against oxidative stress and biochemical changes due to short-term exposure to carbendazim in male Wistar rats.

Materials and methods

Preparation of extract

Fresh fruits of quercus brantii were collected form Yasuj Iran. The fruits were dried and an internal
layer of the fruit (Jaft) was collected. The extraction of Jaft was carried out at room temperature for 2 days by maceration method, and ethanol 70% was used as a solvent. The plant extract was filtered by using whatman No. 1 filter paper and concentrated by rotary evaporator (BUCHI, Switzerland) at 40°C. The crude extract was stored in fridge for further study.

Twenty four Adult male Wistar albino rats weighing 150-200 g were obtained from our rat colony.

The animals were maintained in a 12-hour light/dark cycle, at a temperature of 20°C ± 2°C, with a humidity of 50% ± 10%. Animals were fed according to the standard rodent food pellets and drinking water ad libitum for the entire test period. The experimental protocol was carried out according to the national guidelines on the proper care and use of animals in laboratory research which was approved by the local ethics committee. Animals were divided into three groups of eight each.

Group I served as vehicle treated group, receiving corn oil additionally to their food, while animals in group II received 0.1 ml carbendazim (98.3% pure) (50mg/ kg in corn oil) orally for nine days. Rats in group III received Jaft (500 mg/ kg by oral route + carbendazim for 9 days. All the animals in all groups were fasted overnight and scarified [2].

Blood samples were obtained by heart puncture under light ether anesthesia in order to determine the aspartate aminotransferase (AST), alanine aminotransferase (ALT), alkaline phosphatase (ALP), blood urea nitrogen (BUN) and creatinine by using the auto-analyzer in serum. The serum was centrifuged at 3000 g for 10 min. Kidneys and livers were isolated from each rat and prepared for tissues homogenization of biochemical parameters such as MDA and GSH levels. The MDA level was determined based on the thiobarbituric acid [8]. GSH content was estimated by dithionitrobenzoic acid method described by Ellman [9].

Statistical analysis

The statistical analysis was carried out by using the one-way analysis of variance (ANOVA). The values are expressed as mean ± standard Deviation (SD). A value of \( p < 0.05 \) and \( p < 0.05 \) was considered statistically significant.

Results

The serum activities of AST, (ALT) and ALP were significantly elevated by in carbendazim treatment (group II) compared to the negative group \( (p<0.01) \). The liver enzyme activities were significantly reduced in rats \( (p<0.05) \) when Jaft was received in a short time (group III) (Fig. 1-3).

Blood urea nitrogen (BUN) and creatinine were significantly \( (p<0.05) \) elevated due to carbendazim treatment (group II) while their levels in group III were comparable to corresponding to the values in the control group (Fig. 4,5).

As a lipid peroxidation marker in hepatic and renal tissues, MDA were significantly \( (p<0.05) \) increased after a short-duration exposure to carbendazim (group II). The MDA contents were significantly reduced in rats \( (p<0.05) \) when Jaft was received in short time (group III) (Table 1).

In carbendazim exposure (group II) glutathione (GSH) was significantly reduced \( (p<0.001) \) in the hepatic and renal tissues compared to the negative control however, the elevation of the GSH content was reported in the Jaft treated rats (group III) (Table 2).

<table>
<thead>
<tr>
<th>Activity(UL)</th>
<th>Negative control</th>
<th>Carbendazim group</th>
<th>Jaft group</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>20</td>
<td>40</td>
<td></td>
</tr>
</tbody>
</table>

Fig. 1 The effects of Jaft extract on serum alanine aminotransferase (ALT) enzyme activity in Carbendazim induced biochemical changes in male Wistar rats

(I): Negative control received corn oil; (II): received carbendazim 50 mg/ kg for 9 days; (III): received carbendazim 50 mg/ kg + Jaft extract 500 mg/ kg treated for 9 days.

Statistically significant difference versus negative group \( (P < 0.01) \). Values are mean ± SD from 8 rats in each group.

<table>
<thead>
<tr>
<th>Activity(UL)</th>
<th>Negative control</th>
<th>Carbendazim group</th>
<th>Jaft group</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>20</td>
<td>40</td>
<td></td>
</tr>
</tbody>
</table>

Fig. 2 The effects of Jaft extract on serum aspartate aminotransferase (AST) enzyme activity in Carbendazim induced biochemical changes in male Wistar rats

(I): Negative control received corn oil; (II): received carbendazim 50 mg/ kg for 9 days; (III): received carbendazim 50 mg/ kg + Jaft extract 500 mg/ kg treated for 9 days.
for 9 days. Values are mean ± SD from 8 rats in each group.

*aStatistically significant difference versus negative group (P < 0.01).

*bStatistically significant difference versus Carbendazim group (P < 0.05).

(I): Negative control received corn oil; (II): received carbendazim 50 mg/kg for 9 days; (III): received carbendazim 50 mg/kg + Jaft extract 500 mg/kg treated for 9 days. Values are mean ± SD from 8 rats in each group.

*cStatistically significant difference versus negative group (P < 0.05).

Table 1. The effects of Jaft extract on hepatic MDA and GSH contents in Carbendazim induced biochemical changes in male Wistar rats

<table>
<thead>
<tr>
<th>Groups</th>
<th>MDA (nmol/g tissue)</th>
<th>GSH (nmol/g tissue)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative control</td>
<td>61 ± 12.4</td>
<td>9.14 ± 1</td>
</tr>
<tr>
<td>Carbendazim group</td>
<td>105 ± 11.6</td>
<td>6.12 ± 0.57</td>
</tr>
<tr>
<td>Jaft group</td>
<td>88 ± 13b</td>
<td>7.4 ± 0.49b</td>
</tr>
</tbody>
</table>

Jaft: internal layer of oak fruits, MDA: Malondialdehyde, GSH: reduced glutathione. Values are mean ± SD from 8 rats in each group.

*aStatistically significant difference versus negative group (P < 0.001).

*bStatistically significant difference versus group Carbendazim (P < 0.05).

Table 2. The effects of Jaft extract on renal MDA and GSH contents in Carbendazim induced biochemical changes in male Wistar rats

<table>
<thead>
<tr>
<th>Groups</th>
<th>MDA (nmol/g tissue)</th>
<th>GSH (nmol/g tissue)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative control</td>
<td>61 ± 8.9</td>
<td>9.12 ± 1.1</td>
</tr>
<tr>
<td>Carbendazim group</td>
<td>98 ± 7.7a</td>
<td>5.4 ± 0.44a</td>
</tr>
<tr>
<td>Jaft group</td>
<td>76 ± 9.1b</td>
<td>7.2 ± 0.49b</td>
</tr>
</tbody>
</table>

Jaft: internal layer of oak fruits, MDA: Malondialdehyde, GSH: reduced glutathione. Values are mean ± SD from 8 rats in each group.
Carbendazim (P < 0.05). (P < 0.001).

Selmanoglu disturbance in renal function (BUN and creatinine concentration was reported due to the exposure. Early signs of hepatocytes injuries due to carbendazim ALT, AST and ALP activities in Carbendazim exposure.

Generally, the increase in creatinine content occurs with renal failure. The concomitant administration of the Jaft extract was successful in reversing the elevated levels of ALT, AST, ALP, BUN and creatinine, but the more efficacy might be possible with continued Jaft extract treatment.

The administration of carbendazim caused an elevation in lipid peroxidation content in blood which could be attributed to the generation of free radicals. The present findings match with the results of Eun Young and Ju-chan, Muthuviveganandavel et al., Saber et al., Saber and Somaya, who reported that carbendazim induced hepatotoxicity.

According to Sakre et al., mancozeb fungicide in albino rats caused a significant decrease in the tissue superoxide dismutase as an antioxidant enzyme and an increase in lipid peroxidation. The excessive peroxidation of membrane lipids disrupts the bilayer arrangement, decreases membrane fluidity, increases membrane permeability, and modifies membrane bound proteins.

Discussion

In the present research, a significant increase in ALT, AST and ALP activities in Carbendazim exposure (group II) were reported and this finding was similar with the results of many researchers.

Elevation of liver enzyme markers suggested early signs of hepatocytes injuries due to carbendazim exposure.

In the current study, a significant increase in BUN and creatinine concentration was reported due to the disturbance in renal function (p > 0.05). Similarly, Selmanoglu et al. observed increased levels of creatinine, cholesterol, and albumin in male rats treated with carbendazim.

The administration of carbendazim caused an elevation in lipid peroxidation content in blood which could be attributed to the generation of free radicals. The present findings match with the results of Eun Young and Ju-chan, Muthuviveganandavel et al., Saber et al., Saber and Somaya, who reported that carbendazim induced hepatotoxicity.

According to Sakre et al., mancozeb fungicide in albino rats caused a significant decrease in the tissue superoxide dismutase as an antioxidant enzyme and an increase in lipid peroxidation. The excessive peroxidation of membrane lipids disrupts the bilayer arrangement, decreases membrane fluidity, increases membrane permeability, and modifies membrane bound proteins.

The increase in lipid peroxidation indicates the production of oxidative stress, which is an imbalance between the production of free radicals and the body defense system. In the present study, lipid peroxidation levels were significantly lower in the Jaft treated groups compared to negative control, thus, the Jaft extract may exert antioxidant activities and protect the tissues from lipid peroxidation. Antioxidant activity of Jaft was reported in our laboratory.

The oxidative damage of carbendazim on blood was indicated in our study by the higher levels of MDA; a product of lipid peroxidation, together with lower content of GSH activity in blood treated with carbendazim compared to normal control.

GSH is the most important non-protein sulphydryl antioxidant in the cell. In the estimation of oxidative stress, glutathione concentration (GSH) is a good marker. Similar to the current study, blood GSH concentration was significantly decreased which could be due to an increased utilization by Glutathione peroxidase.

Glutathione is a tripeptide, which is concentrated in erythrocytes. Glutathione has different functions including the regulation of the cell cycle and gene expression and play a part in xenobiotics and eicosanoides metabolism. The increase in lipid peroxidation in carbendazim treated rats, beside the decrease in GSH concentration is suggestive of oxidative stress. This finding is parallel to many researchers. Banks and Soliman showed that benomyl significantly increases the lipid peroxidation and reduced blood GSH in rats.

Conclusions

In the current work, the increase of reduced GSH activity was reported in the Jaft treated rats. It could be that Jaft can diminish free radical and lipid peroxidation damages and improved the capacity of antioxidant enzymes.

References


The effect of aerobic exercise and electrical stimulation on weight loss and reduction of body fat

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Abstract

Goals: Study and comparison between the effects of walking and the electrical stimulation on weight loss and reduction of body fat.

Methodology: The samples were elected among the volunteer healthy females (20-40 years) with an index rate (20 ≤ BMI ≤ 30) provided that they had no regular active exercise activity and they were classified randomly into two groups in this quasi-experimental research. The electrical stimulation was used for one group in 4 sessions per week for 8 weeks and the period of 40-60 min per session on abdominal muscles. The plan of the group with aerobic exercise included 40-60 min walking with an intensity of the stored heart rate (50-70%) within the similar period. The parameters of BMI, rate of body fact, and LBM were measured at the beginning and at end of study on weight. The given data were analyzed by means of t-independent and correlation t-test at level (p ≤ 0.05).

Findings: Weight, Body Mass Index (BMI), and body fat percentage were significantly reduced and also the LBM parameter was increased in both groups.

Conclusion: Walking and electrical stimulation similarly caused to decrease in weight, BMI, body fat percentage, and increase in lean body mass index (LBM).

Keywords: electrical stimulation, walking, Body Mass Index (BMI), body fat

Introduction

Today, obesity is one of the most epidemic health problems in the world and its incidence is going to increase [5,15]. The recent findings signify that inappropriate lifestyle and lesser daily activity cause an increase in the prevalence of obesity and particularly the abdominal fatness [24].

According to a report of the World Health Organization (WHO) in 2005, about 1.6 milliard adults were overweight and it was anticipated that by 2015 this population were 2.3 milliard peoples with overweight and 700 million obese persons [22].

Likewise, based on another report, more than 60% of males and 50% of females in the world, except for South and East Asia, were overweight and fat. This frequency rate was estimated about obesity with a rate of 30 ≤ BM of 7% in eastern Asia and up to 36% in Canada for both female and male genders, and also 38-40% of females in Central Asia, North Africa, and South Africa [13].

Epidemics of obesity in Developing Countries like Iran have been also accompanied by a growing trend due to the rising level of welfare for people in two recent decades [17]. Pishdad (1996) reported a higher rate of prevalence of obesity and especially overweight and a lesser level of physical activity in Iranian males. Similarly, Azadbakht et al. (2005) mentioned the rate of prevalence of public obesity as 29% in 4’164 males in Tehran city.

It has been known until today that obesity is an independent risk factor in chronic diseases and may increase the risk of premature mortality [12,14] so that the risk of reduced lifetime in obese people is 40% higher than of the other persons and this rate reaches to 70% in a person with excessive obesity [9]. At the same time, it was characterized that the rising risk of suffering from regenerative and chronic diseases is accompanied by obesity so that the diseases of hypertension, blood fat, artherosclerosis of walls in coronary vessels, arthritis, and also joints contractures and obstructive pulmonary diseases are directly related to obesity, and the obese people suffer from various deficiencies in metabolism of carbohydrates and they gradually suffer from diabetes type-II [18,27].

While the fat may be accumulated in any point of body, the related risks depend on the region in which the fat has been accumulated [25], so that according to the viewpoint of researchers, the over-storing of fat in the abdominal point may threaten the health and importance
of the study in this subject being revealed, when we know that abdominal obesity is much more risky than the accumulation of lipids in the other points of the body; there is a close relationship among the rate of abdominal fat and the various diseases and it is followed by premature mortality [12,14-16,19,26].

The existing significant relationship among the rate of waist circumference and cardiovascular risk factors and diabetes suggests the fact that the obesity in the central part of body (abdomen) is assumed as an independent risk factor in cardiovascular diseases [3,5,8,10]. Thus, recently, the central obesity has been utilized as an important predictor for the risk of suffering from cardiovascular diseases [13].

The epidemics of abdominal obesity have been in turn noticeable during recent years so that the rate of abdominal obesity has been reported to be of 29% in males and 48% among females. Nonetheless, this statistical rate among Caucasian people is of 56% and 71% for males and females, respectively [13].

Therefore, the scientists have employed several methods in their pursuit to find an appropriate technique to reduce fat and particularly abdominal lipid in this field including massage, low-calories diet, drug and hormonal methods, slimming belts, acupuncture, and liposuction surgery, etc., where each of them has been followed by side effects and or they were not cost-effective [3]. Hence, finding a simple, cheap, and secure method to reduce body fat has been and is an ideal for many researchers.

Sport activities and exercises are deemed as one of the paramount techniques [21], which have been drawn attention to by many researchers.

However, the type of exercise and the intensity may make us achieve this goal, which has made the researcher examine various dimensions of the exercise and their effect on the reduction of fat, especially body fat.

It seems that the endurance and aerobic exercises can achieve a better position than the other exercises in this regard.

The endurance exercise increase the maximum consumed oxygen (Vol. 2 Max) and also improve the capability of skeletal muscles to produce energy via the aerobic system [1]. The endurance exercises also reduce weight and increase the aerobic potential [2].

Today, the Neural-Muscular Electric Stimulation (NMES) is also proposed as another effective technique to reduce the lipid volume (skin fold) especially in the topical form, to the extent that the body fitness institutes have tried to utilize electrical currents as a model for the quick building of body fitness and the creation of an appropriate style without benefitting from an active exercise plan for the persons who lack the adequate time for doing exercise plans [23].

In the present study, which was carried out on healthy females of an age range (20-40 years), the effect of two methods of electrical stimulation and aerobic exercise on the reduction of abdominal fat was examined and their impacts were compared to each other. Given this fact, the effect of aerobic exercise and electrical stimulation on reduced body fat has been separately studied in the previous investigations; therefore, the present research has been conducted in order to compare the effect of these two methods on the reduction of abdominal fat.

**Materials and methods**

The research population in this investigation consisted of 60 qualified volunteers, who have participated in this investigation. The invitation notice was published in Milad (Birth) Weekly in Lar Town to participate in this research. The qualifications for entering this study included age (20-40 years); rate 20≤BMI≤30, lack of any certain disease like cardiovascular, diabetes, thyroid hypo- and hyperactivity diseases, metabolic and hormonal disorders; not using certain drugs, lack of certain nutrient diet, not smoking, lack of regular exercises during the past 6 months, without a history of pregnancy more than two times and also premature childbirth before 6 months. The condition for the exclusion from this test was the absence in one exercise session as well as the lack of their interest in resuming the participation in the test.

60 participants enrolled in this test by receiving this invitation notice so the height and weight of all of them were measured and their BMI was calculated. 45 participants with the BMI rate (20-30) were chosen and the rest 15 persons were excluded because of a higher rate of BMI. A briefing session was held for the elected participants and all these persons were informed about the research goals and conditions. 5 persons have declared their rejection regarding the participation in this study after being aware of the research conditions and the rest 40 participants were randomly classified into two Electrical Stimulation Group (ESG) and Aerobic Group AG (20 members per group). During the execution of the test, 2 persons from the ESG group and 1 person from the AG group were excluded from this test because of their absence in these sessions.

**Measurement tools**

OMRON standard scale (Germany made) with the accuracy rate of 0.1 kg per a kilogram was utilized to measure weight and it was calibrated with one-kilogram weight every 10-time weighting. The subcutaneous lipoma (fat) was measured by skin-fold calipers (Ponderal Model, Germany made). Crino reported the iteration and evaluation of the fat skin-fold in several points of the body as 0.95 by this device and its measurement error being of 0.8-1 mm. The subcutaneous lipoma was measured by skin-fold calipers (Ponderal Model, Germany made) in
standing mode in 7 points of the body of participants including one inch distant from the right side of the navel (umbilical cord) vertically, in the point of the ilium crest, a little forward and above it obliquely, the midpoint between the patella and the skin-fold of groin vertically, the sub scapular area obliquely, just under the lower angle of the shoulder with an angle of 45° with respect to the horizontal axis toward the central line, behind the arm, vertically, at the midpoint between the bone prominence (acromion) and the elbow lump under the condition that the hand is placed open and easily beside the body, the thoracic area (chest) obliquely in a point at a distance of one-third of the line in the anterior armpit and tip of chest and in the armpit area, vertically, on the middle line of the armpit, at the level of the chest tip. The measurement was started from the right side of body after marking the given area with a black magic pen, this being done twice for a higher accuracy and if there was more than one-millimeter difference among the two measurements, so, the measurement was done for the third time and the mean of the two closer sizes was recorded as subcutaneous lipoma index. The fat measurement test was not done twice immediately so that the skin-fold did not exit its natural mode.

Also height was measured by means of Seca height scale with 1-mm precision rate that was affected by minimum ambient impacts. Therefore, it can be implied that this tool could enjoy the needed reliability.

In order to measure BMI, the weight (Kg) to square height (m) ratio formula was employed [7].

Jackson-Pollock formula was used to compute fat percentage and fat-free body mass and initially the skin-fold of subcutaneous lipoma was estimated in 7 points of the body and at the second step density (concentration) of body of the given participant it was calculated and the finally fat percentage was acquired.

To control the intensity of exercise during walking, the radial heart rate of the person was personally measured and the heat rate monitor (Polar Electro model, Finland) was also utilized for this purpose and the Karvenon formula was used to estimate the intensity of aerobic exercises.

The 6-channel Beautistim Stimulator (680B model, Isfahan Novin Medical Engineering Company) was used to test the electrical stimulation group, which was calibrated by one of the medical engineers in Lar town every week. To reduce the strength of the skin-fold, the given area was cleaned with alcohol and cotton gauze before employing the electrical current [22].

Findings

The information of the collected data was shown in 3 tables after the statistical analysis and in order to express the research findings and the acquisition of its objectives.

Primarily, normality of data distribution was analyzed by means of Kolmogorov-Smirnov test and after the confirmation of the equality of variances and normality of data; the parametric techniques were adapted for data analysis. To describe data, parameters of mean and standard deviation and pairwise t-test were used for intergroup comparison and an independent t-test was employed to compare the mean of parameters in the two groups.

The demographic attributes of participants are shown in Table 1. Both groups were compared with each other in terms of parameters like age, weight, BMI, fat percentage, and fat-free body mass and the homogeneity of the two groups was confirmed by Kolmogorov-Smirnov test.

As it observed in Table 1, there was no significant difference in the two tested groups in terms of age, weight, BMI, fat percentage, and fat-free body mass (p≥0.001), so, this indicates a normal distribution of data in both groups and their homogeneity.

The values of weight, BMI, fat percentage, fat-free body mass before and after testing the two groups is shown in Table 2. With respect to data in the table, it was seen that the studied indices including weight, BMI, and body fat percentage in both groups were significantly reduced (p≤0.001) and the percentage of the fat-free body mass was significantly increased in both groups (p≤0.001).

Table 1. Mean and standard deviation of indices before testing in the studied groups

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Electrical stimulation (18 participants)</th>
<th>Walking (19 participants)</th>
<th>Significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean ± standard deviation</td>
<td>29.5 ± 4.53</td>
<td>30.26 ± 5.37</td>
<td>0.258</td>
</tr>
<tr>
<td>Weight (kilograms)</td>
<td>64.72 ± 7.13</td>
<td>65.95 ± 8.18</td>
<td>0.870</td>
</tr>
<tr>
<td>Mass Body Index (kg/ m²)</td>
<td>26.11 ± 2.66</td>
<td>26.14 ± 2.18</td>
<td>0.241</td>
</tr>
<tr>
<td>Body fat (percent)</td>
<td>38.11 ± 3.66</td>
<td>38.03 ± 3.35</td>
<td>0.882</td>
</tr>
</tbody>
</table>

* It is significant at level (p≤0.001); ** It is significant at level (p≤0.05)

Table 2. Values of the studied variables before and after test in both groups
The values of weight, BMI, fat percentage, and percentage of fat free body mass after the test in both groups are shown in Table 3. With respect to the above table, it was seen that after conducting this study, there was no significant difference among the values of these indices between the two tested groups (p≥0.001).

**Discussion**

The results of the independent t-test indicated that the weight of the tested persons in both groups was significantly reduced after 8 weeks of walking and the electrical stimulation in abdominal area of their bodies (p≤0.001). In fact, the mean weight has been reduced in the groups of walking and the electrical stimulation from 65.95 ± 8.18 and 64.72 ± 7.13 to 64.33 ± 7.37 and 63.57 ± 6.86 respectively. In other words, 1.62 kg and 1.15 kg reduction of weights were seen respectively in walking and electrical stimulation group s. The results of this study were consistent with the findings of investigation done by Hayati (2011) while they were not aligned with the findings from studies of Damirchi (2008), Porkari (2002), and Porkari (2004). It seems that the reason for such a consistency was due to age, gender, body mass, type and intensity of stimulation plan, while the reason for the misalignment with the aforesaid studies can probably refer to the type of the electrical stimulation device, period of stimulation, methodology, and the age of the tested persons and particularly the mice were used as tested persons in the survey of Damirchi.

In 1948, Hawkins declared for the first time that the electric stimulation of the abdomen increases calories with a repeated regulation of a natural weight control center, stimulation of A\(\alpha\) and A\(\beta\) fibers, effect on obesity rate and as a result a rising of metabolism of the given tissue [5].

Aerobic exercise also affects the body weight loss due to the increase in the energy provided by lipolysis [20]. The statistical analysis showed that BMI was significantly reduced after 8 weeks of walking and 8 weeks of electrical stimulation of the abdomen (p≤0.001). Namely,
both walking and the electrical stimulation may reduce BMI. The independent T-test was employed to determine the significant difference among the two groups in which the results showed that there was no significant difference among both groups (p = 0.155).

The results of this study were consistent with the results of investigations of Habibzadeh (2010) and Matic (2002), while they were not aligned with the findings of Porkari (2002) and Porkari (2004), who claimed that the electrical stimulation in the abdominal region did not affect the BMI. Probably the type of stimulator device, age of the tested persons, period of stimulation, and way of execution of test may be assumed as reasons for such a difference.

The reason for the reduction of BMI may be justified this way; both the aerobic exercise and the electrical stimulation caused a weight loss in this research.

Thus, with respect to the formula for calculation of BMI (BMI = Weight/ Square height), as BMI is decreased, the weight will also be reduced.

Body fat percentage was significantly reduced in the present research (p≤0.001). The results of this study were consistent with the findings from the studies of Habibzadeh (2010), Matic (2002), Nikpoor (2008), and Damirchi (2008) while they were not aligned with the results of the survey by Park (2003). The selected BMI, type of executed exercise and intensity and period of exercise were probably considered the reasons for the inconsistency with the previously mentioned study.

The electrical stimulation of the muscles in the abdominal area might probably lead to the consumption of the additional calories and the reduction of fat percentage by passive exercise.

Vermiform contractions and muscular longitudinal contractions caused by the use of electrical stimulation led to the contraction of muscles and displacement of intercellular fluid and they contribute to the omission of metabolites. Therefore, the better conditions were prepared for the omission of metabolites by the opening of the capillaries, which were at relaxation and closed status and this trend led to the improvement of transferring blood to the given area. This trend resulted in an improvement of the muscular mass. Doing aerobic exercises increases the consumption of lipids as a fuel during exercises. The low- and average intensity aerobic exercises cause a further consuming of lipids as the energy source and this will cause a reduction of body fat per se [4]. Horton and Bravan (2001) declared that our body needs to be permanently active all over the period of exercise in order to burn calories and walking is a continuous and gradual activity that efficiently causes lipids burning [11].

Likewise, the estrogen hormone in females increases the speed of lipid metabolism in women, especially during the aerobic exercises with a rising of blood stream circulation in the adipose tissue. As a result, the mutual effect of epinephrine and Estrogen Receptor β (ER-β) increases the rate of transferring free fatty acids from adipose tissue to active muscles in adipose tissue, being improved during exercises [6].

Conclusion

The results of the present research showed that walking with the intensity of a stored heart rate (50-70%) might significantly cause weight loss and it could be utilized as an efficient, secure, and cheap strategy in reducing body fat and in preventing obesity. Similarly, with respect to this important point, there is a social class of people in the community composed of old persons and the society of disabled and patients with osteal traumas and lesions, that they cannot walk and they seek to find a method to reduce body fat, thus the electrical stimulation in the abdominal area can be employed to achieve this objective.

Acknowledgements

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22. Novin Department, 1391, beautistim 680B operating instruction.
Importance of client orientation domains in non-clinical quality of care: A household survey in high and low-income districts of Mashhad

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Abstract
Responsiveness was introduced by WHO as a key indicator to assess the performance of health systems and measures by a common set of domains that are categorized into two main categories “Respect for persons” and “Client orientation”. This study measured the importance of client orientation domains in high and low income districts of Mashhad. In this cross-sectional and explanatory study, a sample of 923 households were selected randomly from two high and low income districts of Mashhad. The World Health Organization (WHO) questionnaire was used for data collection. Standard frequency analyses and Ordinal Logistic Regression (OLR) was employed for data analysis. In general, respondents selected quality of basic amenities as the most important domain and the access to social support networks was identified as the least important domain. Households in high-income areas scored higher domains of prompt attentions and choice compared to low income. There was a significant relationship between variables of ages, having a member who needed care and self-assessed health with the ranking of client orientation domains. The study of the households’ view regarding the ranking of non-clinical aspects of quality of care, especially when faced with limited resources, can help in conducting efforts towards subjects that are more important, and lead to the improvement of the health system performance and productivity.

Keywords: responsiveness, quality of care, client orientation, households

Introduction
WHO identified responsiveness as one of the key goals to which health systems contribute in improving the population health and in facilitating its measurement in a systematic way across countries, by developing a common set of domains [1-3], that were categorized into two main categories [4]: “Respect for persons” and “Client orientation”. Respect for persons refers to the intent of capturing the ethical aspects of the interaction between individuals and the health system and includes three sub-elements: dignity, autonomy and confidentiality [4,5]. Client orientation gauges the components of consumer satisfaction and includes four sub-elements: prompt attention, quality of basic amenities, access to social supports networks (during inpatient care) and choice of care providers [3,6].

WHO claimed that these domains have a “universal” importance, meaning that they are important for all humans, regardless of culture, sex, age and so on. Of course, WHO expressed a serious concern about exploring the users’ priorities with respect to different aspects of health services [6].

Some studies showed that usually there are divergences in priorities “between individual patients and between patients from different cultures and the health care systems, and individual characteristics such as education, health status, sex and age [7,8]; also some studies have reported weak associations between priorities and individuals (or household) and the socio-economic characteristics [9-11]. This difference may lead to conflicts and sometimes even lack of satisfaction [6]. Therefore, determining the relative importance of non-clinical aspects of quality of care among various subgroups (base on income, culture, etc.), can be useful in providing a correct interpretation of health services users’ needs and help in optimizing the allocation of health system resources [12-14]. Despite the importance of this subject, we have a few studies (especially in Iran)
in this area compared to other health system subjects \[6,11\] and the previous studies have generally been done on the concept of measuring patient satisfaction \[15-17\].

The main objective of this study was to determine the relative importance of the sub-elements related to domain of client orientation of non-clinical aspects of quality of care “responsiveness” among selected districts of Mashhad.

**Materials and Methods**

This cross-sectional and explanatory study was performed in 2014. Households that were resident in low and high-income district of Mashhad were the statistical population of the study \[18\]. The sample size for each district was calculated through Cochran Sample Size Formula \(p=.5\) for maximum variability, 95% confidence level and ±5% precision. Finally, the sample size was of 500 households in every district (totally 1000 households).

The multi stage sampling was used for sample selection. After the determination of classes, each class was divided to clusters with similar characteristics (city blocks), each block being the area bounded by four streets. Then, the researcher specified the number of samples of each cluster on a regular basis among the households in the selected districts.

The instrument used in this study was the WHO questionnaire (included a responsiveness module containing questions about the “importance of the responsiveness domains from the people’s view” and demographic characteristics of households). The questionnaire was translated into Persian and its validity and reliability was confirmed in the study of Rashidian et al. \[11\]. Table 1 provides brief descriptions of the client orientation elements in the questionnaire \[6\].

<table>
<thead>
<tr>
<th>Sub-elements of client orientation</th>
<th>Brief Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prompt Attention</td>
<td>• having a reasonable distance and travel time from your home to the health care provider</td>
</tr>
<tr>
<td></td>
<td>• getting fast care in emergencies</td>
</tr>
<tr>
<td></td>
<td>• short waiting times for appointments and consultations, and getting tests done quickly</td>
</tr>
<tr>
<td></td>
<td>• short waiting lists for non-emergency surgery</td>
</tr>
<tr>
<td>Choice</td>
<td>• being able to choose your doctor or nurse or other person usually providing your health care</td>
</tr>
</tbody>
</table>

| Quality of Basic Amenities        | • having enough space, seating and fresh air in the waiting room |
|                                   | • having a clean facility (including clean toilets) |
|                                   | • having healthy and edible food |
| Social Support                    | • being allowed to be provided food and other gifts by relatives while in hospital |
|                                   | • being allowed to have freedom of religious practices |

Eligible respondents (18 years or older, preferably parents) were selected as participants. Questioners were trained before the start of data collection in this study, about the study subject, questions, maintenance of confidentiality of household’s information, sampling methods and interviewing method. Accordingly, at the first contact, the questioner gave some information to the participant based on the study guide (included a description of the study aims, sponsor and questions, etc.). The completion of the questioner took between 15 to 25 minutes. All participants were requested to sign or mark (if illiterate) an informed consent form. If a household did not tend to participate in the study or was not present at home after three times referring, based on the sample selection guideline, it was replaced by a new household. The five-point Likert scale (extremely important, very important, important, fairly important, and not at all important from 5 to 1) was applied. Also this study was approved by the Ethics Committee of the Mashhad University of Medical Sciences. The standard frequency analyses were reported for each importance question by district and, the socio demographically characteristics of households included: sex, age, education, health status (self-reported health). Ordinal logistic regression (OLR) was employed to assess the role of the ten variables on the households’ view regarding the importance of the client’s orientation sub elements. All the analyses were performed by using SPSS 19.

**Results**

A total of 480 householders in low income and 443 householders in high-income districts completed the questionnaires. The examination of the demographic data of participants showed that there was at least one person under the age of 12 in about 41% of the households. More than 62% of them reported their health conditions as good and very good. The extra demographic data are presented in Table 2.
The findings showed that participants identified the quality of basic amenities as the most important sub-element among different client’s orientation sub-elements and after that prompt attention, choice, and social support have the most importance respectively.

From Table 1 we can see a significant relation between districts, literacy, and self-assessed health with the importance of social support (P-Value ≤ 0.01). In addition, there was a statistically significant difference between important scores in social support and the use of health services or having a member who needed care in the household (P-Value ≤ 0.05). Also significant differences were found in ranking a prompt attention in terms of using health services in the past year/ more than one year before (P-Value ≤ 0.05) and having a member who needed care in the household (P-Value ≤ 0.01). As shown in Table 1, the quality of amenities was significantly related to the literacy of responders (P-Value ≤ 0.01). Also, the score of importance of choice of the provider was significantly different between the two districts (P-Value ≤ 0.01) and also between the households with and without insurance (P-Value ≤ 0.05).

Table 3 shows which demographic factors affect the selecting client orientation sub-elements as very important.

### Table 2. Percentage of respondents selecting sub elements as very important

<table>
<thead>
<tr>
<th>demographic characteristics of the study sample</th>
<th>prompt attention</th>
<th>choice</th>
<th>quality of basic amenities</th>
<th>social support</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n%</td>
<td>z (sig.)</td>
<td>n%</td>
<td>z (sig.)</td>
</tr>
<tr>
<td>districts: low/ high income</td>
<td>low (n=480)</td>
<td>47.6</td>
<td>-0.736 (0.462)</td>
<td>41.4</td>
</tr>
<tr>
<td></td>
<td>high (n=443)</td>
<td>49.4</td>
<td>50.5</td>
<td>-0.037 (0.937)</td>
</tr>
<tr>
<td></td>
<td>male (n=448)</td>
<td>48.0</td>
<td>-0.803</td>
<td>47.6</td>
</tr>
<tr>
<td></td>
<td>female (n=441)</td>
<td>49.5</td>
<td>44.3</td>
<td>0.381 (0.361)</td>
</tr>
<tr>
<td>&lt;12 years member living in the household</td>
<td>yes (n=383)</td>
<td>47.4</td>
<td>-0.079 (0.937)</td>
<td>45.0</td>
</tr>
<tr>
<td></td>
<td>no (n=535)</td>
<td>49.1</td>
<td>46.1</td>
<td>0.412 (0.659)</td>
</tr>
<tr>
<td>self-assessed health</td>
<td>good and very good (n=559)</td>
<td>47.6</td>
<td>45.0</td>
<td>0.171 (0.918)</td>
</tr>
<tr>
<td></td>
<td>moderate (n=285)</td>
<td>50.7</td>
<td>-0.455 (0.797)</td>
<td>46.3</td>
</tr>
<tr>
<td></td>
<td>bad and very bad (n=53)</td>
<td>48.1</td>
<td>-0.037 (0.937)</td>
<td>53.8</td>
</tr>
<tr>
<td>65+ years member living in the household</td>
<td>yes (n=262)</td>
<td>50.6</td>
<td>-0.629 (0.529)</td>
<td>48.9</td>
</tr>
<tr>
<td></td>
<td>no (n=648)</td>
<td>47.5</td>
<td>44.3</td>
<td>0.135 (0.361)</td>
</tr>
<tr>
<td>member with needed care living in the household</td>
<td>yes (n=252)</td>
<td>58.1</td>
<td>-2.724 (0.006) **</td>
<td>51.4</td>
</tr>
<tr>
<td></td>
<td>no (n=656)</td>
<td>45.3</td>
<td>43.8</td>
<td>0.130 (0.361)</td>
</tr>
<tr>
<td>using the health services in the past year/ more than one year before</td>
<td>during past year (n=716)</td>
<td>50.7</td>
<td>-2.148 (0.032) *</td>
<td>46.8</td>
</tr>
<tr>
<td></td>
<td>more than one year before (n=179)</td>
<td>41.5</td>
<td>42.4</td>
<td>0.235 (0.918)</td>
</tr>
<tr>
<td>Insurance</td>
<td>have (n=558)</td>
<td>50.5</td>
<td>-0.285 (0.775)</td>
<td>45.0</td>
</tr>
<tr>
<td></td>
<td>do not have (n=289)</td>
<td>49.8</td>
<td>42.9</td>
<td>0.040 (0.918)</td>
</tr>
<tr>
<td></td>
<td>0-6 (n=60)</td>
<td>49.8</td>
<td>42.9</td>
<td>0.040 (0.918)</td>
</tr>
<tr>
<td></td>
<td>6-11 (n=494)</td>
<td>48.3</td>
<td>44.9</td>
<td>0.143 (0.361)</td>
</tr>
<tr>
<td></td>
<td>12 &lt; (n=323)</td>
<td>51.9</td>
<td>50.2</td>
<td>0.143 (0.361)</td>
</tr>
</tbody>
</table>

**Correlation is significant at the 0.01 level (2-tailed).**

**Correlation is significant at the 0.05 level (2-tailed).**

### Table 3. Determinants of selecting client orientation as very important [with 95% confidence intervals], from the Ordinal Logistic Regression (OLR)

<table>
<thead>
<tr>
<th>Variables</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>Sig.</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>0.009</td>
<td>0.004</td>
<td>6.036</td>
<td>0.014</td>
<td>0.002 - 0.016</td>
</tr>
</tbody>
</table>

The quality of basic amenities was significantly related to the literacy of responders (P-Value ≤ 0.01). Also, the score of importance of choice of the provider was significantly different between the two districts (P-Value ≤ 0.01) and also between the households with and without insurance (P-Value ≤ 0.05).
Logistic regression analyses showed that age had a positive effect on the level of importance of the client orientation elements. Self-assessed health (mentioned as very good) of responders and having a member who need care in the household had a negative effect on the level of importance of the client’s orientation sub-elements that were mentioned by the households.

Discussion

Responsiveness expresses respect for human rights in the health care systems and measures the level of fulfillment of legitimated expectations of people from the health system [19].

Responsiveness has two main areas and this study determined the relative importance of each element associated with the client’s orientation from the perspective of the households in high and low income districts. Ranking these areas from the perspective of people with different economic, social and cultural characteristics has been emphasized in several studies [6].

Generally, the results in this study showed that quality of basic amenities was selected as the most important element from the perspective of participants as well as the studies conducted by Rashidian et al. in the district 17 of Tehran, Karami et al. among heart inpatients in hospital and Kowal et al. in Asia (2011)[20].

The similarity of these results does not mean the same expectations, but these results showed that the quality of basic amenities was the most important element compared to other elements of the client’s orientation. However, considering the scale of measurement of the importance level of the sub-elements of client’s orientation, the importance of these areas cannot be proved in various studies.

The next point in the current study was the similarity of this priority between high and low income districts that showed that even households who live in districts with low income, also expect to receive services with an appropriate quality of service. This can be paid more attention to knowing that the significant part of the outpatient health services in Mashhad are similar between households in high income and those in low-income districts. But, in addition to the priorities set and based on the results from the WHO’s general population surveys of “health system responsiveness” in 41 countries, which was reported in 2008, the most important domain for Iranian participants was prompt attention (31%) [6]. This result can also be seen in some other studies [6,19,21,22].

Findings of this study were consistent with the previous studies in Iran and were different from the studies outside Iran in setting the priorities. This difference may be explained through Valentine’s findings. Valentine explains this difference as it follows: “Across subgroups within countries, convergence was stronger than convergence across countries, indicating that health system investments, culture and the human development context were stronger regarding the influences on the populations’ priorities for their health systems than the individual level factors like age, sex, education, health status, and utilization of health services”[6].

On the other hand, the quality of basic amenities not only affects the patient’s comfort, but is also associated with the feeling of promoting health, wellbeing and acceleration in the recovery processes [23]. However, some studies have shown that there is a gap between the patients’ needs and access to basic desired amenities even in developed countries. Undesirability of basic amenities may put the patient at risk [24].

In his study, Valentine showed that setting priorities in the responsiveness domains in field of client orientation is more associated with the geographic area as well as the level of human development and, in some cases, the level of health expenditure. Also, in this study, the significant relationship between the type of location and paying attention to the right choice statistically were also observed. This means that people living in the low-income district have the higher priority for the choice compared to the high-income district [6].

Some studies found that older respondents pay attention to autonomy little more than younger ones. However, in this study and in the study conducted by Rashidian there was no significant relationship between independency and demographic characteristics of people
In the study on eight European countries, Coulter showed that most people (51%) preferred the model of joint decision-making and 31% of the people over 55 years, admitted that the doctor should decide [24].

In his study, like in any other study there were some limitations. The weak willingness of households to participate in these kinds of studies was one of the main limitations this study faced with. To overcome these limitations, we tried to determine the appropriate time by a representative from the households to complete the questionnaire, use the promotional tools, and strengthen the communication skills of interviewers as well. Another limitation was the cultural issues during a visit to the home that was resolved by training interviewers and using researchers in both sexes, as well as obtaining the required legal permissions. Also, the low relationship between importance prioritizing and individual characteristics may be partly explained by the omission of individual characteristics like ethnicity, which was found to be an important determinant in some studies [25].

Policy makers in the health system can apply these results in prioritizing their efforts when faced with resource constraints [5,26]. Because without the understanding of the priorities in the community, efforts to reform and improve the health system performance that often focuses on tangible benefits, such as revenues and costs, may be misguided. This may be due to the fact that many of the costs such as the cost caused by the lack of a convenient accessibility of patients to needed services or caused by the lack of good quality of basic amenities as an important priority cannot be understood by the usual data in performance assessment. Therefore, the design of appropriate mechanisms that allows the prioritizing by people in order to plan to do the reform, the health system is one of the related fields of policy making in the improvement of health system responsiveness.

Acknowledgment

This research would not have been done without the generous and patient cooperation of the residents of Mashhad. We received financial support from Mashhad University of Medical Sciences.

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Evaluation of medical students of teacher-based and student-based teaching methods in Infectious diseases course

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Abstract
Introduction: In recent years, medical education has changed dramatically and many medical schools in the world have been trying to develop new training methods. The aim of this study was to evaluate the medical students of teacher-based and student-based teaching methods in Infectious diseases course, in the Medical School of Hormozgan University of Medical Sciences.

Methods: In this interventional study, a total of 52 medical students who took part in the Infectious diseases course were included. About 50% of this course was presented by a teacher-based teaching method (lecture) and 50% by a student-based teaching method (problem-based learning). The satisfaction of students regarding these methods was assessed by a questionnaire and a test was used to measure their learning. Data were analyzed by using SPSS 19 and paired t-test.

Results: The satisfaction of students of student-based teaching method (problem-based learning) was more positive than their satisfaction of teacher-based teaching method (lecture). The mean score of students in teacher-based teaching method was 12.03 (SD=4.08) and in the student-based teaching method it was 15.50 (SD=4.26) and there was a significant difference between them (p<0.001).

Conclusion: The use of the student-based teaching method (problem-based learning) in comparison with the teacher-based teaching method (lecture) to present the Infectious diseases course led to the student satisfaction and provided additional learning opportunities.

Keywords: Problem-Based Learning, lectures, students, medical, communicable diseases

Introduction

Lecturing has been the main type of education for a long time. During recent decades, newer technologies have been implemented and visual aids such as slides and PowerPoint presentations have been used to boost education. Since lectures have a low effect on the development, the employment of newer techniques is inevitable and actively engage the students in the education process [1].

The main point that leads to an effective learning is an effective and high quality teaching in a proper environment. Making an efficient learning environment is one of the main challenges of medical education. The daily increase in the medical sciences leads to the recognition of more problems. On the other hand, the lecture based education has been replaced with student based education. This has provided new responsibilities for policy makers, professors and students on the basis of selecting the most proper teaching and learning methods according to the field of study [2].

In an overall classification of teaching methods, they can be divided into lecture based and student based methods. Group discussion and problem solving are considered student based methods and lecturing is considered a lecture based method. In student based education, students face with an exciting challenge and brainstorm over solving the challenge. Irrelevant thoughts and ideas are filtered and the conversation goes on over the solutions. In this method, students face with the responsibility of the teaching process and attempt to realize the issue under the guidance of the professor [3].

One of the main applications of the problem solving education is that as they recognize the educational purposes they learn both the basic and the clinical sciences [2,4]. This method improves motivation and clinical reasoning skills [5]. The students spend more time for self-teaching and implement various information sources such as libraries and digital libraries more frequently [4]. A systematic review has shown that the problem solving education increases technical, social, cognitive, management, research and educational skills of the students [6].
Although newer teaching methods have been introduced, the lecture based method is still one of the most usual methods because it is the safest and easiest method and the professor is able to have a better control over the class. Evidence showed that a decent lecture content along with a noble lecturer can lead to positive, appropriate and reasonable results. However, each method has its own benefits and cons. Thus, all the components of the learning process (such as curriculum, teaching methods and students’ learning) should be evaluated [7]. This has led to various discussions and studies. For example, Carey conducted a descriptive study to determine the students’ experiences during the problem solving method and its impacts on their gained knowledge. They showed that more than half of the participants described the process as “relatively hard”, however, an increase in knowledge was reported [8]. This study was conducted to evaluate and compare the efficacy of the lecture-based method versus the student-based method among the medical students of Hormozgan University of Medical Sciences.

Method

This interventional study was conducted on fourth year medical students of Hormozgan University of Medical Sciences in 2013 during their infectious diseases course (three credits equaled to 51 educational hours). All the 52 students who took this course were enrolled.

Both the lecture based and the student-based methods were chosen as the teaching style (50 percent each). In the lecture-based method, the professor presented a lecture with the aid of PowerPoint slides. In the student-based method, the professor asked a problem or question at the beginning and students had to prepare themselves and study on the issue for the next session. During the following session, students commented on the issue and engaged in a supervised discussion. Finally, the professor completed and concluded the discussions.

Both methods were evaluated by using a Likert based questionnaire. The questionnaire was designed by experts while using valid scientific sources. It included 19 questions. Each question contained five options including excellent (five points), good (four points), moderate (three points), weak (two points) and very weak (one point). Thus, each question had a score range of one to five. The questionnaire was reliable (Cronbach’s alpha = 0.95) and the validity was confirmed by experts.

The questionnaires were distributed at the end of the term and students were asked to demonstrate their opinions. The students’ names were concealed. Also, in the final exam, each student had two individual scores (out of 20) and the final scores of each method were compared.

Data were entered in SPSS v.19 and paired t-test was used to compare the differences of each method.

Results

All participants completely filled out and returned the questionnaires (response rate = 100%). Among all students, 46.2 percent were male and 53.8 percent were female.

According to the results of this study, the difference between the lecture based method and the student based method was significant in 12 out of 19 questions (p<0.05). In eight of these items including the student’s participation in education, stability of education topics, self-confidence, personal difference consideration, long-term memory involvement, motivating students, interaction between professor and students, and creation of a team-work sense, the student based method was considered as the better method. On the other hand, the lecture-based method was better in four items; quality of education content, compliance to the structure and sequence of the study, efficacy of class time and creating a comfortable environment in the classroom. Also, the difference between seven items were not statistically significant; forming a positive attitude regarding study topics, establishing the professional needs of the students, helping them to achieve the educational goals, better understanding of the study contents, deeper understanding of the study contents, better responses to the questions and application of the education (Table 1).

The final score of the lecture based method and the student-based method was 12.03 ± 4.08 and 15.50 ± 4.26, respectively. Paired t-test showed that this difference was significant (p<0.001, t=-8.82).

<table>
<thead>
<tr>
<th>Table 1. Students’ attitude toward the two educational methods (paired t-test)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Quality of study content</strong></td>
</tr>
<tr>
<td>3.80</td>
</tr>
<tr>
<td><strong>Creating a positive attitude toward the study topics</strong></td>
</tr>
<tr>
<td><strong>Preparing professional needs of the students</strong></td>
</tr>
<tr>
<td><strong>Student contribution in the learning process</strong></td>
</tr>
<tr>
<td><strong>Helping students achieve the educational goals</strong></td>
</tr>
</tbody>
</table>
Better understanding of the study content & 3.51 & 0.85 & 3.50 & 1.11 & 0.09 & 0.92  
Long-term memory improvement & 3.08 & 0.98 & 3.63 & 1.12 & -2.51 & 0.01*  
Motivating students to learn & 2.96 & 0.96 & 3.46 & 1.19 & -2.46 & 0.01*  
Compliance to study structure and sequence & 3.92 & 1.02 & 3.11 & 0.94 & 4.03 & 0.000*  
Deeper understanding of the study content & 3.26 & 0.95 & 3.46 & 1.07 & -0.92 & 0.35  
Better response to questions & 3.40 & 0.91 & 3.46 & 1.05 & -0.26 & 0.79  
Stability of learning process & 3.09 & 0.91 & 3.78 & 1.12 & -3.06 & 0.003*  
Application of the study content & 3.40 & 1.15 & 3.55 & 1.10 & -0.70 & 0.48  
Self-confidence improvement & 2.61 & 0.95 & 4.00 & 1.22 & -6.06 & 0.000*  
Considering the student differences & 2.84 & 1.28 & 3.48 & 1.24 & -2.65 & 0.01*  
Better interaction of students and professors & 2.94 & 0.97 & 3.78 & 1.28 & -3.69 & 0.001*  
Creating a sense of teamwork among students & 2.42 & 0.95 & 3.80 & 1.10 & -6.72 & 0.000*  
Time efficacy & 3.94 & 1.09 & 2.80 & 1.08 & 4.83 & 0.000*  
Creating a comfortable environment & 3.65 & 1.11 & 3.05 & 1.25 & 2.55 & 0.01*  

**significant at a level of 0.05**

### Discussion

The aim of this study was to demonstrate the students' attitude toward the lecture-based education and the student-based education in the infectious diseases course of Hormozgan University of Medical Sciences. Implementing newer educational techniques and improving them is a main goal in organizations that are involved in education. Most universities of the world are planning to develop their educational methods to improve the students’ learning. There are two main patterns; lecture based education and student based education. Problem solving is a type of student based education which leads to gaining professional views, communicational, proper problem solving and gaining knowledge skills [9].

The results of this study showed that the student based education leads to an improvement in student participation, better long-term memory, motivating students, stability of knowledge, higher self-confidence level, recognizing the educational differences, better student–master interactions, and creating a sense of teamwork. Also, students scored higher in the problem solving method topics in the final exam. These results were consistent with the findings of Nikfar et al. [10], Kermaniyan et al. [11], Momeni Danaei et al. [12], Jafari et al. [13], Hekmatpour et al. [14]. Another study also showed that students were more prone to group discussion and problem solving than to lecture [15]. Another study that enrolled the nursing students showed that they preferred group discussions [16]. Our results also showed that the student-based education was related to student satisfaction. This might be due to the activating of the students' mind during the teaching, deeper knowledge, and assigning more time for studying. Also, these methods give more opportunities to the learner to review and criticize the lecturer and the educational contents [17-19].

The participants of this study believed that implementing the student based methods such as problem solving, results in higher contribution of students in the learning process and creates a sense of team group among students. This was consistent with Nikfar et al. [10] and Kermaniyan et al. [11]. Creating a sense of contribution is an important issue in improving the medical education and since the team work is a necessary part of problem solving, it can be expected that this method will reduce the personal differences and increase the student contribution in the team work [20].

Nikfar et al. [10] and Qin et al. [21] showed in their study that the student based educational methods increase the students’ interest and motivation. In fact, the problem solving method results in critical thinking and communicational skill development and increases the student's interest in learning.

Participants demonstrated that the lecture based method results in a better study content quality, study sequence and structure and a higher time efficacy. Other studies have also mentioned that the scientific information are often unorganized [11,22]. In the lecture-based method, the professor has more authority in the classroom and is able to teach study content in a more organized and less time-consuming way. In this study, participants showed that a more comfortable environment was present in the lecture-based method. This was different from our expectations and further research is needed in this regard.

The mean final exam score of the student-based method was significantly higher than the lecture based method. Mahram et al. also conducted a study to
compare the lecture based method and group discussion method and showed no difference in their final scores [23]. Their results were inconsistent with our study. Delaram also compared these two methods among midwifery students and demonstrated no difference in final scores [24]. Momeni Danaei et al. [12] also showed no significant difference between the two study methods. Dusold and Sadoski also conducted a study to compare the final exams of students of both methods. They reported no statistically significant difference [25]. Herzig et al. also conducted this study on medical students during their pharmacology course. They also reported no significant difference in none of the taken exams [26]. Safari et al. [18] showed that the mean scores of the student based method was significantly higher than the lecture based method. Eslavin et al. also concluded that the student based methods and combined models have a better impact on the students’ learning [27]. The results of these two studies were consistent with our study. It must be kept in mind that in our study, the study content of the two methods was different and this might be the reason for different scores. However, since the results of this study were not consistent with most similar studies, further research is needed.

**Conclusion**

It can be concluded that the overall satisfaction of students attending the infectious diseases course was higher and more learning opportunities were provided.

**Acknowledgement**

We would like to thank all the students who participated in this study.

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Prevalence of Hepatitis C infection in Qeshm Island in 2013-2014, Iran

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Abstract

Introduction: Hepatitis has involved many individuals and has left many complications. Hepatitis C is a type of hepatitis associated with many complications.
The aim of this study was to investigate the epidemiology of Hepatitis C in Qeshm Island in 2014.
Method: this was an interventional study conducted on 1500 inhabitants of Qeshm Island. Participants were selected by using cluster sampling. Five cc of blood was drawn from each participant in order to test for HCV-Ab with ELIZA technique. Positive samples were referred for PCR to investigate the presence of anti Hepatitis C anti body. Data were entered in SPSS v.16 after sample collection and were analyzed using descriptive statistics (prevalence, mean, percent and standard deviation) and chi-square.
Results: out of 1500 participants, 986 (65.7 percent) were females and 514 (34.3 percent) were males. HCV antibody was seen in four patients (0.3 percent). The results of this study showed that neither of the investigated factors (age, gender, marital status, place of residence, educational level, history of IV drug abuse, being in jail, quitting addiction, risky sexual behavior, etc.) was related to the prevalence of anti body.
Conclusion: The prevalence of this disease was 0.3 percent in Qeshm Island, which was consistent with the results of other studies. Also, factors investigated for HCV were not recognized as HCV risk factors.

Keywords: epidemiology, Hepatitis C, Qeshm

Introduction

Viruses are present everywhere and have important roles in health and evolution. Many biologists recognize them as creatures with specific and different life territories that can swap genes between different species [1].

Hepatitis is an infectious disease which causes inflammation in the liver [2]. This disease is classified to Hepatitis B, A, C and E [3-6].

Hepatitis C is an inflammatory and liver necrosis disease, which develops as acute or chronic and belongs to the flaviviridae family. It tends to live inside the liver and to proliferate among its tissue. This virus consists of a single stranded positive RNA with 9500 nucleotides [7]. Genotype one Hepatitis C virus consists of 60 to 75 percent of positive HCV cases in the United States. The treatment of this type is the most difficult treatment [8].

Hepatitis C has different complications including neurological complications. It can also cause hemorrhagic or ischemic CVA. Thus, HCV must be recognized as a differential diagnosis for neurological disorders [9]. However, the most important complications are related to the liver [10]. Chronic hepatitis is one of the other complications of this disease [11]. Some of these patients will be led to liver cirrhosis [12]. Another dangerous complication of Hepatitis C is forming hepatocellular carcinoma which can evolve two to four decades after the hepatitis infection [13].

The different prevalence of Hepatitis C was reported. The Scandinavian countries and England have the lowest prevalence [14]. Other studies have shown that the prevalence of Hepatitis C has increased from 2.5 percent in 1998 to 2.8 percent in 2005 and the frequency of these patients has changed from 122 million to 185 million, worldwide [14].

Since no previous studies have been conducted in this area, this study was carried out to determine the prevalence of Hepatitis C among the general population of Qeshm Island is 2014.

Method

This descriptive study was conducted in 2014 in Qeshm Island of Hormozgan province. The study
population consisted of 130,000 inhabitants. The sample size was calculated to be 1500, by using the following formula:

\[
n = \frac{z^2 \cdot p(1-p)}{d^2}
\]

Before the study, the Ethics Committee of Hormozgan University of Medical Sciences approved the study. Stratified sampling was used to select the participants. Qeshm was divided into several geographical areas and individuals who referred to health centers or hospitals were asked to fill in the checklist and be evaluated for HCV. Data were collected by using a checklist that was designed according to similar studies and the experts' opinion. Data that was collected included name, surname, age, gender, occupation, marital status, residence status, educational level, ethnicity, religion, history of blood donation, knowledge regarding Hepatitis C virus, how they acquired knowledge (friends and family, television, radio and television, newspapers, hospitals and medical centers), blood type and history of previous diseases. Also, participants were assured that all information will remain confidential. All participants provided an informed, written consent.

If a person providing a consent and live in Qeshm included to study, and person with cardiovascular disease, RF, Infections, recent measles infection, mumps, Infectious mononucleosis, past medical history of malaria, brucellosis, tuberculosis, other viral hepatitis, HIV/AIDS, toxoplasma, GI problem, pregnancy, recent trauma, hematogenous or sexual transmitted disease, blood transfusion during one year ago, lactation, vaccination, previous immunoglobulin injection, psychatyric disease, diabetes mellitus and thyroid disorders excluded from study.

In this study, five cc of blood was drained from each participant for HCV-Ab evaluation using a third generation anti-HCV kit (Biometrix). Positive samples (according to ELIZA method) were referred for PCR (third generation, made in France) to confirm the presence of anti-HCV antibodies. Patients with positive HCV RIBA were considered infected with Hepatitis C or having a history of HCV. Another five cc of venous blood was drained from the brachial vein and the serum was isolated and assessed for HCV according to ELIZA technique. Positive cases were determined and referred for genome extraction with RT-PCR using specific primers for HCV infection. Data was entered in SPSS v.16 software and analyzed by descriptive statistics (frequency, mean, percent, and standard deviation) and chi-square.

**Results**

Among 1500 participants, 986 (65.7 percent) were females and 514 (34.3 percent) were males. Only four patients (0.3 percent) were positive for HCV antibodies.

The results of the study showed that none of the investigated factors was related to the prevalence of the antibody. Two women (0.2 percent) and two men (0.4 percent) had positive HCV antibodies and the difference of prevalence of HCV antibody was not significant among genders (p=0.610).

Among all participants, 87.7 percent had an educational level of high-school diploma or below. All HCV positive patients were among them. However, no significant relationship was found between HCV and the educational level (p=0.976).

In this study, 88 percent (1320 participants) were married and 12 percent (180 participants) were male. All HCV patients (four individuals) were married. There was no significant association between the antibody prevalence and the marital status (p>0.005).

In addition, 372 participants (24.8 percent) lived inside the urban area while 1128 (75.2 percent) lived in rural areas. All four patients were from the rural areas. However, no significant association was seen between HCV antibodies and place of residence (p=0.578).

The mean age of HCV positive patients and the healthy group was 36.75 ± 16.78 years and 32.58 ± 13.16. This difference was not significant (p=0.528).

No participant of the study had a history of IV drug abuse, being imprisoned, quitting addiction, or risky sexual behaviors. There was no significant association between these factors and the prevalence of antibody (p>0.005). Also, all four patients had a history of dentist visits, however, this was not significant with the prevalence of antibody (p>0.005). Among all the participants of the study, one (0.07 percent) used opium and two (0.13 percent) used heroin. None of the HCV positive patients was drug abusers. There was no significant association between drug abuse and HCV antibodies (p>0.005).

Also, no participant had a history of hemophilia, dialysis or organ transplantation.

**Conclusion**

Hepatitis C infection is an important problem worldwide that affects almost 200 million people around the world [15]. In some countries, it is an important cause of chronic liver disease and the most common cause of HCC [16,17]. The aim of this study was to determine the prevalence of Hepatitis C among the general population of Qeshm in 2014.

This was the first study conducted in Qeshm Island that investigated the prevalence of Hepatitis C. The results showed that 0.3 percent of the participants had HCV and the PCR results of four patients were positive. However, many studies have been conducted in Iran in this regard.
Our result was consistent with the prevalence of HCV among the general population of Iran being below one percent in a study by Alavian et al. [18]. Alavian et al. [19] conducted another study and reported a prevalence of 0.16 percent and Merat [20] conducted another study which reported a prevalence of 0.5 percent in Iran. Other reports in Iran included: a prevalence of 0.83 percent reported by Sayad et al., 0.2 percent reported by Taghi Shakeri [17] and 0.05 percent reported by Zamani et al. in Amol [21]. The results of our study were similar to the findings of other studies in Iran. The few differences can be related to several factors such as lifestyle, population density and education about Hepatitis C [21].

According to other studies, the prevalence of HCV was higher in other countries; 5.9 percent in Hawaii [22], 2.7 percent among New York population aged above 20 [23], 1.57 percent in Pakistan [24], 1.71 percent in a state of Nigeria [25], 0.5 percent in Serbia and Tajikistan, 13 percent in Uzbekistan among the general population of WHO regions [26], 1.5 percent among Hispanic/Latinos of America [27], two percent in Rhode Island of the US [28], 1.2 percent among the general population of Libya [29] and 4.62 percent in India [30].

Our study showed that half of the patients were males and half were females. Also, no relationship was found between Hepatitis C and gender. Our result was consistent with Shakeri et al. [17] and Alavian et al. [31]. However, Sharifi et al. [32] and Veemehren et al. [33] and Thakral et al. reported inconsistent results and showed a higher prevalence of Hepatitis C among the male population.

Although there was no significant association seen between age and Hepatitis C prevalence in our study, there were three cases in the 25-35 years age group. Shakeri et al. [17], Alavian et al. [34], Vermehren et al. [33] and Sharifi et al. [32] reported that older individuals are more prone to this disease.

All four patients lived in rural regions of Qeshm. However, there was no significant association between the place of residence and hepatitis. Fattahi et al. [35] reported a 0.24 percent prevalence in rural areas of Fars province. Other studies have shown that the place of residence is not related to Hepatitis C infection [36].

No participant of our study had a previous history of hemophilia, using a shared needle, dialysis, or organ donation. Thus, we cannot discuss their effect on Hepatitis C. Other studies have reported them as risk factors of Hepatitis C [37-39].

The prevalence of this disease was 0.3 percent in Qeshm Island, which was consistent with the results of other studies, but lower than other regions of the world. It also proved a lower prevalence of Hepatitis C in Iran compared to other countries.

Limitations

Some inhabitants of the region did not agree with the participation in the study.

Suggestions

Other studies should be conducted to determine Hepatitis C genotype in Qeshm Island and investigate their complications.

Acknowledgements

This study was the result of a general physician thesis. We would like to thank all professors, Qeshm inhabitants, health system authorities, and Hormozgan University of Medical Sciences who helped us during this study.

References


Relationship between personality traits and mental health among the staff in Kermanshah University of Medical Sciences, 2015

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Abstract

Workplace stress affects the mental health of employees and customers can run their occupational safety and health care centers in damage. The employees who are sent to the workplace have different characters and different events happen in their life experience. The present study aimed to investigate the relationship between personality traits and mental health among the staff in Kermanshah University of Medical Sciences, the study being performed for the year 2015. In a cross-correlation, 270 employees working in Kermanshah University of Medical Sciences in 2015 were randomly selected and NEO personality traits and mental health questionnaires were completed by Goldenberg. Data in SPSS 21 were analyzed by using descriptive statistics, Pearson correlation coefficient, and Regression testing. Based on the analysis of solidarity, of conscientiousness (R = 0.332, p < 0.001), OCD (R = 0.221, p < 0.001) and extraversion (p < 0.001, R = 115, 0), the mental health of employees showed a significant positive correlation (p < 0.001). The results of the regression analysis showed that, among the five factors of personality traits, conscientiousness and neuroticism had two variables 14.08 percentage change criterion variables (mental health) to significantly predict staff (p < 0.001). It seemed to support an increased employment rate and provide psychiatric and psychological counseling for employees with improved facilities and, their income could improve their general health and thus improve the efficiency of the quality of health services provided.

Keywords: mental health, personality traits, employees

Introduction

Mental health

In fact, the aspect of the concept of health is based on methods and strategies of preventing the development of mental illness; moreover, treatment and rehabilitation are used [1]. In other words, the mental health of the successful performance of mental function results in fruitful activities, satisfying relationships with the others, the ability to adapt to change and cope with adversity [2,3]. The mental health refers to the feeling of wellbeing and ensures the effectiveness, self-reliance, and self-actualization capacity, competition, intellectual and emotional potential, etc. [4,5]. Today, in most countries, the attempt to industrialization and increasing urbanization and migration could be seen in these fundamental changes from day to day stress and mental health problems and, increased social communities and the world witnessed major changes in stem epidemiology of the disease. The health needs such as mental illness and premature death are not the early causes of disability now [6]. Based on the findings of mental disorders as one of the most important and most meaningful components of the overall burden disease it was predicted that in 2020 the share of the overall burden of mental disorders and neurological diseases will increase by 50% to 15% of the time, 10.5% of the patients being alone straw convention [7,8]. Therefore, the way to mental health in all areas of personal, social and employment matters [9,10]. Considering that mental health is one of the pillars of health, life requires a useful, effective and satisfactory individual by promoting mental health in particular population segments that require an effective and constructive dynamics, development and promotion of the community [11,12]. Being one of the areas of mental health, it is important to mention the characteristics of the character. The character is the most fundamental concept of psychology. Psychology is a field that examines the characteristics of individual characters, both emotional and behavior, and are usually fixed, predictions being followed in daily life [13]. With regard to the first and most important component of paced organization, human subjects with their different personalities, motivations, abilities, attitudes, beliefs and ideas are really important components that make up the human personality, expectations, etc., and expect people and also the
organization to be determined [14]. Thus, without a detailed knowledge of the individuals, a fit between personality and job creation will not be possible and it will be a problem that many organizations grapple with [15,16]. Since the work force is one of the largest sources of funding for each organization, health having the role of increasing the efficiency, any planning and investment in the sector leads to the maintenance and improving of the health of employees and it can eventually lead to an increased efficiency and return the investment associated with it. An effective management cannot be achieved without the attention to the health of the employees, and if the enterprise forgets the human dimension of the work environment and leads it to an acceptable level of performance by adopting various ways, the staff organizations have features such as abnormalities, physical and nervous diseases waiting for the opportunity to live up to their psychological distress negligence, absence, rumors and character assassination [17,18]. Therefore, the mental health staff uses appropriate methods to eliminate disruptive factors of mental health and efficient deployment of forces in organizations is influenced by personality traits [19-22]. Mental health staff and managers monitor such practices, quality of life, performance management, and in particular the characteristics of the affected person [22-24]. Personality traits, including (OCD, extraversion, agreeableness, openness and conscientiousness), in turn, play a role in mental health, followed by the plays [19,25,26]. Research has shown that employees, have, beside their external characteristics, a far better relationship with the other employees, resulting in an improved performance and a better health system [19-22,25,27]. On the other hand, according to the categories of individuals, an organization can help organizations achieve efficiency [28,29]. Achieving the objectives of the organization represents an action based on force capabilities in the implementation of the tasks assigned and the versatility of a changing environment. In the meantime, according to the director, the characterization of the people make the staff work so as to fit in the things that they like and thereby their performance and effectiveness of the organization adds to this [30]. This study is in line with the existing research gap, and, according to the Kermanshah University of Medical Sciences, there has been no study on the relationship between employees. Moreover, five factors of personality and mental health in Kermanshah University of Medical Sciences have been analyzed to evaluate the relationship between the five-factor model personality (neuroticism, extraversion, openness, agreeableness and conscientiousness), all dealing with mental health.

Research Methodology
Research methods, population, and sample: This is a descriptive cross-correlation study. The study sample was represented by all the employees working in different administrative groups (contract, treaty, and formal), and an upper secondary school with 872 people was formed in the headquarters of Kermanshah University of Medical Sciences and Health Services, in 2015. Based on the sampling table by Krejcie & Morgan, the volume of the sample was of 270 (130 males and 137 females). A simple random sampling was performed with the use of a table of random numbers. The inclusion criteria were based on a consent to participate in the study, have at least a secondary school degree and a work experience of two years in the University and the desire to participate in the study.

Measuring tool
Questionnaire: To determine the characteristics of the population, a questionnaire containing demographic characteristics (sex, age, education and work experience), was used.

Big Five Personality Factors Questionnaire: to measure the Big Five personality, the (NEO-Pi-R) NEO Personality Inventory-Revised was used.

A personality test was based on a factor analysis performed in 1985 by Paul T. Costa and Robert Armak McCrae from the National Institute of Health in the Aging Research Center in Baltimore, Maryland [31]. This test of 60 items was based on Likert scale (1 = strongly disagree, 2 = disagree, 3 = somewhat, 4 = agree, 5 = strongly agree) and was designed as one of the Big Five personality 12 Items (OCD, extraversion, agreeableness, openness and conscientiousness), the measured and calculated scores for each factor and the five scores obtained [32-34]. A narrative content to Costa and McCrae (1992), was reviewed having a 90/0 reliability for neuroticism, extraversion equal to 0/78 to 0/76 to openness, agreeableness equal to 0/86 and 0/90 responsibility to report [31]. This test was performed after being translated and adapted from Persian [35]. Gross Carpet in Iran (2001) confirmed the five-factor structure of the questionnaire as a whole and its internal consistency by Cronbach’s coefficients reported for the main factors were of 0/86, 0/73, 0/56, 0/68 and 0/87 [36]. The reliability test using Cronbach’s alpha coefficient for the United States was used in a sample of 0/93 OCD, extraversion 0/87, graceful of 0/89, 0/76 and flexibility or conscientiousness and the task of 0/86, respectively [37]. Kyamehr validated this questionnaire on 380 students of Tehran University, the questionnaire with Cronbach’s alpha coefficient of internal consistency being between 0/54 to 0/79 acquired [38]. Hejazi et al. (2002) reported an alpha value of 74% [39]. In this study, Cronbach’s alpha coefficient values for OCD were the following: 0/91, extraversion 0/78, agreeableness 0/76, experience of 0/73 (openness to experience) and conscientiousness 0/86 respectively. The options mentioned by Mathias questionnaire before were between 0 and 4 (strongly disagree = 0, disagree = 1, somewhat = 2, somewhat agree = 3, strongly agree = 4). The general range of Mathias questionnaire was between 0 and 240.
Groups

The General Health Questionnaire contained 28 items in the form of an option. The seven-item questionnaire contained the four subscales of Somatic Symptoms, Anxiety and Insomnia, Social Dysfunction and Depression Measures. Scoring with a 4-point Likert scale (0 = none to 3 = to submit a more than usual) took place. Each person in this test received four scores and the scores were achieved an overall score. In 2004, Noorbala noted the psychometric properties of internal consistency GHQ, having = 0/83 [44]. In 1999, the internal consistency of the scale, GHQ 85/0 was highlighted by using Cronbach’s alpha coefficient for somatic symptoms, anxiety and insomnia, 0/87, 0/79 social dysfunction, symptoms of serious depression of 0/91 and the total scale of 0/83 representing the public health [45]. In 2004, Rumi carried out the test on 116 Iranian students and the analysis of the questions in the questionnaire, Cronbach’s alpha reaching a value of 91/0. In 1994, Jacob validated the test on 625 residents in urban and rural areas and Some’esara used the simple Likert scoring method of sensitivity and specificity of the test in the best cut off point of 23, respectively of 0/5/86 and 0/82 [46]. The range of Mathias’ questionnaire was between 0 and 84. Regarding Cronbach’s alpha, the reliability was of 0/898 in the present study, indicating that the questionnaire had a good reliability and internal solidarity. To gather information, the necessary permits were obtained from the Department of Science and Technology of the University of Origin and from the responsible staff from the university. At first, the aim of this study was to describe people and ethics by filling in a questionnaire and ensuring the necessary part concerning the confidentiality of personal information. Moreover, a consent to participate in the study sample was signed. The consent of the people to participate in the study and who had at least a high school diploma qualification, a work experience of two years in the University were respectively taken into account. After completing the questionnaire, the data were analyzed and descriptive statistics (frequency, mean, and standard deviation) and inferential statistics were used. The mental health of multiple linear regressions was used to determine the relationship between the five dimensions of personality variables. A significant level of interest in this study was less than 0/05. The calculation of data analysis was performed by using SPSS21 software.

Findings

In this study of 223 patients, 137 (51.3%) were males and 130 (48.71%) were females. The mean age of the sample was of 0/67/7 ± 38. 41 to 45 years old group, having the highest rate of 64, 24%. In terms of education, the samples with the bachelor’s degree were of 64% (171 persons). Most of the samples (89, 33.3%) were between 11 and 15 years of service. The mean sample and standard deviation was of 8.5 years of service ± 17 obliteration of the type of employment relationship, more samples (108, 40.4%) being contracted (Table 1).

The results showed that the personality traits were associated with the greatest and lowest factors, “personality trait neuroticism” with a mean ± SD of 0.29 ± 3.49 and “personality traits of extraversion” with a mean ± SD of 0.37 ± 3.34 (Table 2).

In connection with the mental health samples, the results showed that the highest rate of “social dysfunction”. The mean and standard deviation was of 0.40 ± 3.31 and the lowest grade for “depression” with the mean and standard deviation was of 0.39 ± 2.60 (Table 2).

Regarding the relationship between the personality traits, the mental health of employees and significant were of (R = 0.328, p < 0.001). Also, the conscientiousness personality trait most related to OCD was R = 0.332, p < 0.001 and the character traits of the lowest possible relationship with OCD experience (R = 0.203, p=0.001) (Table 3).

Table 1. Characteristics of individual samples

<table>
<thead>
<tr>
<th>Frequency (percent)</th>
<th>Groups</th>
<th>Demographic</th>
</tr>
</thead>
<tbody>
<tr>
<td>137 (3/ 51)</td>
<td>Man</td>
<td>Gender</td>
</tr>
<tr>
<td>130 (7/ 48)</td>
<td>Woman</td>
<td>Age (years)</td>
</tr>
<tr>
<td>66 (7/ 24)</td>
<td>≥ 30</td>
<td></td>
</tr>
<tr>
<td>41 (4/ 15)</td>
<td>35-31</td>
<td></td>
</tr>
<tr>
<td>42 (7/ 15)</td>
<td>40-36</td>
<td></td>
</tr>
<tr>
<td>64 (24)</td>
<td>45-41</td>
<td></td>
</tr>
<tr>
<td>47 (6/ 17)</td>
<td>50-46</td>
<td></td>
</tr>
<tr>
<td>7 (6.2)</td>
<td>≤ 50</td>
<td></td>
</tr>
<tr>
<td>18 (7/ 6)</td>
<td>Diploma</td>
<td></td>
</tr>
<tr>
<td>35 (1/ 13)</td>
<td>Degree</td>
<td></td>
</tr>
<tr>
<td>171 (64)</td>
<td>License</td>
<td></td>
</tr>
<tr>
<td>28 (5/ 10)</td>
<td>Master’s degree or higher</td>
<td></td>
</tr>
<tr>
<td>15 (6.5)</td>
<td>PhD</td>
<td></td>
</tr>
<tr>
<td>10 (7.3)</td>
<td>≥ 5</td>
<td></td>
</tr>
<tr>
<td>19 (1/ 7)</td>
<td>10-6</td>
<td></td>
</tr>
<tr>
<td>89 (33.3)</td>
<td>15-11</td>
<td></td>
</tr>
<tr>
<td>70 (2/ 26)</td>
<td>20-16</td>
<td></td>
</tr>
<tr>
<td>79 (6/ 29)</td>
<td>≤ 21</td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Index of statistical variables
As it can be seen in Table 2, the findings indicated that the highest scores of the five personality traits, employees, the personality trait neuroticism, with a mean deviation criterion (mean = 3.49, SD = 0.29) and the lowest index of the character traits of extroversion with a mean deviation criterion being of (mean = 3.34, SD = 0.37). The mean total measure personality traits employees was of (mean = 3.43, SD = 0.16), meaning the personality traits the personnel desired. Also, the mental health variable, the highest mean and SD criteria related to social dysfunction (Mean = 3.31, SD = 0.40) and the lowest mean and SD criteria for depression (Mean = 2.60, SD = 0.39), was allocated. In the mean deviation criterion the mental health staff range was (Mean = 2.98, SD = 0.28).

As shown in Table 3 (R = 0, p < 0.001). The personality trait conscientiousness presented the strongest relationships with the mental health (R = 0.332, p < 0.001). In addition, the personality trait agreeableness had the lowest possible correlation with the mental health (R = 0.072, p>0.001). Generally, the relationship between the personality traits and for example, the mental health of employees, is significant.

### Table 3. Pearson correlation coefficients between personality and students happiness

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Independent variable</th>
<th>Dependent variable</th>
<th>Correlation coefficient</th>
<th>Sig (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Conscientiousness</td>
<td>Mental Health</td>
<td>0.332**</td>
<td>0.000</td>
</tr>
<tr>
<td>2</td>
<td>Neuroticism OCD</td>
<td>Mental Health</td>
<td>0.221**</td>
<td>0.000</td>
</tr>
<tr>
<td>3</td>
<td>Extroversion</td>
<td>Mental Health</td>
<td>0.115**</td>
<td>0.041</td>
</tr>
<tr>
<td>4</td>
<td>Openness to experience</td>
<td>Mental Health</td>
<td>0.099**</td>
<td>0.105</td>
</tr>
<tr>
<td>5</td>
<td>Agreeableness</td>
<td>Mental Health</td>
<td>0.072**</td>
<td>0.242</td>
</tr>
<tr>
<td>6</td>
<td>(Total) Personality characteristics</td>
<td>(Total) Mental Health</td>
<td>0.328**</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Correlation was significant at 0.01 (2-tailed)

Table 4. Explanation of the mental health of employees based on personality traits

<table>
<thead>
<tr>
<th>Statistical indicators</th>
<th>Amounts</th>
<th>Multiple correlation coefficient</th>
<th>The coefficient of determination R²</th>
<th>The coefficient of determination of the net R</th>
<th>SEM models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1</td>
<td>0/385</td>
<td>0/148</td>
<td>0/142</td>
<td>0/26121</td>
<td>0/2160</td>
</tr>
</tbody>
</table>

Table 5. Explanation of the coefficients of the variables affecting the mental health of employees

<table>
<thead>
<tr>
<th>Sig</th>
<th>t</th>
<th>Standardized Coefficients Beta</th>
<th>Unstandardized Coefficients Std. Error</th>
<th>Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.000</td>
<td>5.315</td>
<td>-</td>
<td>0.254</td>
<td>1.384</td>
</tr>
<tr>
<td>0.000</td>
<td>5.552</td>
<td>0.316</td>
<td>0.050</td>
<td>0.280</td>
</tr>
<tr>
<td>0.001</td>
<td>3.423</td>
<td>0.195</td>
<td>0.057</td>
<td>0.197</td>
</tr>
</tbody>
</table>

(Consequentiousness Duty) (Neuroticism OCD)
The multiple regression analysis method (Stepwise) according to Table 4, and in anticipation of the total mental health variables remained significant in the second step. The multiple correlation coefficient was equal to $R = 0.385$, coefficient of determination $R^2 = 0.148$ and the coefficient of determination of the net $R^2 = 0.142$ was obtained. The significant influence of the variables in the model, up to about 14.8% of the variance, could be explained by the mental health staff. The standard Beta coefficients of the variables to be considered were the following: conscientiousness with Beta $\beta = 0.316$ and neuroticism with beta $\beta = 0.195$. The highest correlation in predicting the mental health scores were, in fact, due to the low score and indicated a high level of mental health and mental health of individuals. In fact, conscientiousness and neuroticism was positively correlated with the level of mental health.

**Discussion**

The aim of this study was to investigate the relationship between the personality and the mental health of employees in Kermanshah University of Medical Sciences. The results showed there was a significant relationship between neurosis and mental health ($R = 0.221$). The findings of most previous studies in this area were highlighted. Taking into account these findings, it could be argued that people with neuroticism subscale, the high scores people are anxious, depressed, have a sense of guilt in a variety of fields, low self-esteem, are woven, unreasonable, shy and moody [53]. They are also prone to irrational beliefs, and are not able to control their impulsivity and stress. According to this explanation, it can be concluded that employees with high neuroticism, anxiety and depression because of the veins, are more likely to reduce the overall health. The results of this study showed that there is a positive significant relationship between conscientiousness and extroversion features and components of the mental health staff. It could be stated that the relationship between conscientiousness and the mental health of employees is significant ($R = 0.332$). The findings of the studies were consistent. It could be concluded that people with a high conscientiousness, are careful, meticulous, punctual, reliable and able to control their impulses favorably [18,50]. So, it could be concluded that the optimal ability to control impulses, stresses and coping with social situations in people with higher scores in the subscales of openness to experience and conscienctiousness earned more areas to improve their overall health provision. The results showed that the correlation between extroversion and a significant positive correlation with the mental health staff was ($R = 0.115$). This means that people who have a high mental health extraversion score better. In other words, by increasing the extroversion personality characteristics, the rates of mental health increase as well. It can be concluded that extraverts are happy, energetic and optimistic people, willing to interact with others, for them life is movement and emotion of desire and a demand to the environments and positive emotions [55]. According to this explanation, it can be deduced that this group of people have social skills and interact with other mental health and more. The results of this part of the research study were underlined by A. et al., 2009; Goodwin and Friedman, 2006; Ansell et al., 2007 [19,49,55]. According to Gupta & Kumar, the extroversion leads to enjoyment and participation in social activities. Therefore, it can be assumed that the extroverted people are happier because they share their inner feelings with others and their minds are occupied with different things so that they cannot just focus on the negative experiences [56]. Larsen & Keterlaar also suggested that introverted people more than introverted people respond positively to stimuli and are stronger. Therefore, when these people find themselves in enjoyable situations they express more positive feelings [57]. The results of the regression analysis in this study showed that the components of the five personality factors that were predicted for the component of overall health of employees are the following: conscientiousness and OCD. In fact, according to the prioritization of the importance of predictive factors, conscientiousness and neuroticism are the most important factors in predicting mental health. The openness and agreeableness variables were significantly associated with mental health in this study. The findings of some studies [58-59] were consistent in this regard.

**Conclusion**

The highest and lowest average characteristics of workers are “neuroticism” and “extroversion”, respectively. The rate of mental health, as well as “social dysfunction” more and “depression” are the least met among the employees. The personality trait of conscientiousness and neuroticism are two dimensions significantly associated with mental health and mental health among predictor variables. This seems to support an increased employment and provide psychiatric and psychological counseling for employees with improved facilities and their income can improve their general health and thereby improve the quality of health services provided by them.

The current study faced several constraints. In this study, the use of self-report data was collected, but the method might have affected the accuracy of the
results. In addition, with regard to the subjects of this study, the employees of Kermanshah University of Medical Sciences, the results cannot be generalized to other employees of other universities of medical sciences.

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Relationship between ethical leadership and psychological empowerment: perspectives of hospital nurses in Imam Reza (AS) Kermanshah, 2015

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Abstract

Background. The purpose of this study was to prove the relationship between the moral leaders of the psychological empowerment perspectives of nurses in Imam Reza (AS) Kermanshah Hospital in 2015.

Methods. This was a cross-sectional study. The required data were collected at the beginning of the towering use of the Internet search and library. Data related to the population were gathered by using questionnaires. Standard data were collected. The population of the study included all formal hospital-training nurses, meaning the persons responsible with the treatment of patients in Kermanshah University of Medical Sciences, respectively 550. According to the formula of the Cochran, 226 questionnaires were simple random Bayat samples; 219 questionnaires were distributed, used, and returned from the final population. The reliability and their validity were already under investigation and confirmation.

Results. The results showed a psychological relationship between the ethical leadership and the enabling nurses. There was also a significant (sig = .000). Moreover, there was a positive and significant relationship [sig = .000] between the moral leader and enabling the psychological aspects of the nurses.

Discussion. According to the findings of this study, it could be said that the leader of morality led to the psychological empowerment of nurses. The moral evil leader of the yen means creating trust, job satisfaction, increased efficiency and it activates the effective organizational goals.

Keywords: moral leader, psychological empowerment, Imam Reza hospital

Introduction

Psychological empowerment is regarded in the sense of understanding the meaning, competence, self-determination, and efficiency in the short job [1-3], while being interpreted as a mental state and intrinsic motivation. The way employees feel about their work control [1] and the emotions arising from intrinsic motivation turn them into active members of the organization [4]. The concept of psychological empowerment represents the knowledge as a means of encouraging employees regarding the job requirements, their thinking, sense of duty, their level of understanding and competence, their upgrade [5]. The research review was made on the use of psychological empowerment, the cognitive care showing the link between the variable quality of health care [6] among nurses [7] and doctors [8,9], respectively. It is important to note here the number of deaths, patient satisfaction, recovery patients, providing information to patients, privacy, and the likelihood that they will be used in evaluating the quality of patient care, the valid index not working properly [10]. Thus, there is a need for a coherent and integrated approach, which is based on the extent and quality of care, the comment on that, feeling, etc. Clinical governance is important to realize the best possible cover [11]. In addition, the health care management literature has a common view emerging from the lack of a sense of psychological empowerment, doctors being able to increase cognitive stress, absenteeism, and lower job satisfaction [12]. A review of literature regarding the way new leadership suggested that organizational leaders instilled positive thinking was performed, by showing respect for employees, interpersonal skills, inspiration, etc., and ethics influenced subordinates follow their cause [13]. Due to these factors, moral leadership is direct and through clinical governance, its background creation, and promotion of mental empowerment is cognitive. Nurses, the largest human resources in most organizations and health play a major role in the quality of services [14] and represent the bulk of the responsibility for their care. Therefore, the importance of informed leadership on health care, especially in nursing, is clearly apparent [15]. A look at the style of leadership implies the existence of a
variety of other styles, which are newer in terms nature and emphasis of style [16]. The opening leg of the third millennium was the supplier of moral leadership. By definition, moral leadership is "showing a normative behavior through personal actions and interpersonal relationships and promoting this kind of behavior among the followers through bilateral communication, encouragement, and decision-making" [17]. The characteristics of leadership could be the following: respect for others, serving the others, just being honest, characteristics of leadership could be the following: encouragement, and decision-making" [16]. The characteristics of leadership could be the following: respect for others, serving the others, just being honest, characteristics of leadership could be the following: encouragement, and decision-making" [16,20,21]. respect and human relations [22]. In fact, leading to a variety of skills and techniques in order to meet challenges, nowadays needs change and new demands [23]. Research suggests that moral leadership with mental empowerment is cognitively [24] positive and the significant association is important. In 2014, the results of Moghtadery and Nadi referred to the relationship between the ethical, psychological empowerment and job satisfaction and the organizational citizenship behavior among the employees of private hospitals in Shiraz, showing that between the ethical characteristics [ethical climate, ethical leadership and moral values], psychological empowerment, job satisfaction and organizational citizenship behavior, there is a significant positive correlation [25]. In 2014, the results of Gova Fathi et al. regarding the modeling of the relationship between the ethical leadership and the clinical governance psychological empowerment was the following: perspectives of the nurse’s government hospitals in Kermansh showed that there was a relationship between the ethical leadership and the clinical governance and mental empowerment from the cognitive point of view. The cognitive relation was significant regarding the mental empowerment of clinical governance. The results of the research showed that the ethical leadership regarding the influence of nurses was performed directly and through a clinical governance of mental empowerment [26]. In 2013, Mousavi Jad’s research results with the title role of moral leadership in empowering mentality showed that there was a significant relationship with the dimension empowerment between the moral leadership and items [27]. In 2012, the results of Mahdad regarding the individual emotions, were similar to the ones of an association leader, Mir Jafari, with regard to the moral and psychological health of the workplace organizational trust, showing that there is a significant and positive relationship between the ethical leadership and the organizational trust and the work with mental health, mental health workplace organizational trust [28]. Considering the above principles, the aim of this study was to investigate the relationship between the ethical leadership and psychological empowerment from the perspective of hospital nurses in Imam Reza (AS), Kermanshah, in 2015.

**Methods**

This study was cross-sectional and performed in the first half of 2015, in Imam Reza (AS). The data for this study, as the first to use the library and internet search was collected. The data on population were collected by using a questionnaire and the research was done during the development of the hospital. The study sample included all registered nurses teaching hospitals - hospitals affiliated to the city of Kermansh University of Medical Sciences (550 Nurses). According to the formula of the Cochran, 226 questionnaires were given through a random sampling method, and, 219 sable questionnaires were returned. In 2011, Salehniya mentioned the instruments used for data collection: a standard questionnaire, a questionnaire moral leadership and, based on the views of Brown et al. (2005), the model for data collection was designed. Validity and reliability of ethical leadership were reviewed and approved through the confirmatory factor analysis and Cronbach’s alpha value (0/ 88) [21]. The questionnaire moral leadership was in the form of ten questions and the three components of interpersonal relationships, their modeling, and pragmatism was measured. The second survey questionnaire analyzed mental abilities. In 1995, Spritzer elaborated 12 questions about the meaning and significance of four aspects, competence, self-determination impact on the range of five degrees Likert (1 = strongly disagree to strongly agree = 5) size decision. The validity and reliability study of psychological empowerment (Golparvar et. al, 2010) was done by using the confirmatory factor analysis and Cronbach’s alpha value (0/ 89) was examined and approved [24].

**Results**

According to demographic data, 58.6% of the participants were females and 41.4% males. When the educational distribution of the participants was examined, 17.1% had a master degree in science, 46.1% had a bachelor degree, 25.1% had an associate degree, and 11.7% had a regular diploma. 63.2% of the participants were married, and 36.8% were single. The distribution of participants in different age groups was the following: 50.1% between the ages of 25 and 30, 19.7% between 31 and 35 years, 12.5 between 36 and 40 years, 10.4% between 41-45 years, and 7.3% more than 45 years.
Table 1. The relationship between the ethical leadership and the psychological empowerment dimensions by using Pearson

<table>
<thead>
<tr>
<th></th>
<th>Moral Leadership</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychological Empowerment</td>
<td>R: 0.867, Sig: 0.000, N: 219</td>
</tr>
<tr>
<td>Interpersonal Relationships</td>
<td>R: 0.861, Sig: 0.000, N: 219</td>
</tr>
<tr>
<td>Pattern Being</td>
<td>R: 0.852, Sig: 0.000, N: 219</td>
</tr>
<tr>
<td>Pragmatism</td>
<td>R: 0.835, Sig: 0.000, N: 219</td>
</tr>
</tbody>
</table>

Based on the table showing the relationship between the ethical leadership and psychological empowerment of nurses by using Pearson at 95% of the shares, there was a positive relationship (sig = .000) and the correlation coefficient was .867, the main hypothesis of this study being approved. By using Pearson at 95 percent there was a relationship between the ethical leadership and the psychological empowerment of nurses and there was also a significant positive relationship (sig = .000). The correlation coefficient was no more than .8. The hypotheses of the sub-study were also approved.

Table 2. Standardized total, direct, and indirect effects: relationships between hypotheses

<table>
<thead>
<tr>
<th>Standardized Total Effects</th>
<th>Total</th>
<th>Interpersonal Relationships</th>
<th>Pattern</th>
<th>Pragmatism</th>
<th>Moral leadership</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychological Empowerment</td>
<td>0.247</td>
<td>4.12</td>
<td>0.574</td>
<td>0.787</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Standardized Direct Effects</th>
<th>Total</th>
<th>Interpersonal Relationships</th>
<th>Pattern Being</th>
<th>Pragmatism</th>
<th>Moral leadership</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychological Empowerment</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.787</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Standardized Indirect Effects</th>
<th>Total</th>
<th>Interpersonal Relationships</th>
<th>Pattern</th>
<th>Pragmatism</th>
<th>Moral leadership</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychological Empowerment</td>
<td>0.247</td>
<td>0.412</td>
<td>0.574</td>
<td>0.000</td>
<td></td>
</tr>
</tbody>
</table>

Based on the table above, the standard of the whole regarding the relationship between the dimensions of interpersonal relationships, patterns, is pragmatic and the moral leadership rates are 0.247, 0.412, 0.574, and 0.787 respectively. The effects of the standard direct relationship between the size of interpersonal relationships, patterns, is pragmatic and the moral leadership rates are 0.000, 0.000, 0.000, and 0.787 respectively. The standardized indirect effects for the relationship between the dimensions of interpersonal relationships, patterns, were pragmatic and the moral leadership rates were 0.247, 0.412, 0.574, and 0.000.

Table 3. Final fitting: Index research model

<table>
<thead>
<tr>
<th>Standard model</th>
<th>Acceptable level</th>
<th>Interpretation</th>
<th>The result</th>
<th>At reception</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-square CIMIN</td>
<td>The chi-square table</td>
<td>Chi-square obtained with the chi-square table for a certain degree of freedom compared</td>
<td>133.561</td>
<td>Passable</td>
</tr>
<tr>
<td>The root mean square error of estimate (RMSEA)</td>
<td>Younger than 05.</td>
<td>Less than 05. A good fit</td>
<td>0312/ 0</td>
<td>Passable</td>
</tr>
<tr>
<td>Tucker Lewis TLI</td>
<td>Not fitted to 1 [perfect fit]</td>
<td>The amount of nearly 95 a good fit</td>
<td>0792/ 0</td>
<td>Relatively acceptable</td>
</tr>
<tr>
<td>Chi-square relative CIMIN/ DF</td>
<td>1 to 5</td>
<td>Less than 1 indicates poor fitness levels indicate the need for improvement is more than 5</td>
<td>2.260</td>
<td>Passable</td>
</tr>
<tr>
<td>Normalized fit index frugal PNFI</td>
<td>More than 5 or 6.</td>
<td></td>
<td>0523/ 0</td>
<td>Passable</td>
</tr>
<tr>
<td>Comparative fit index frugal PCFI</td>
<td>More than 5 or 6.</td>
<td></td>
<td>0525/ 0</td>
<td>Passable</td>
</tr>
</tbody>
</table>

Fig. 1 The hypothesis of the study explained

Based on the above chart, the moral leadership has a direct effect: the psychological empowerment (0/79), interpersonal relations (0/31), pattern (0/62) and pragmatism (0/86) being explained. The impact of the ethical leadership and the component “pragmatism” was of 73%.
The ratio of the economy or PRATIO, a kind of frugal fit indices considered in it, do not represent the fit index, but rather show the extent to which the researcher spent the definition of free parameters. This index was developed based on degrees of freedom, model-to-model degrees of freedom can achieve independence, a value between zero, and one and, any size is much smaller, indicating that the researcher spent more money regarding the free parameters. Often, higher values of 0.5 were seen for this indicator, the rate being of 0.600. Also, for an adequacy number of samples, HOTLTER index was used in this study sample, number 41 being acceptable according to the study sample size of 54 companies, models of these indicators being also fitted. ECVA, MECVI, AIC, BCC indicators determine the most elegant model with the smallest amounts to more elegant models considered in this study.741, 0.738,162.350, 161.561 respectively, which amounted for a MECVI of 0.738 as the most effective model.

Discussion and Conclusion

This study aimed to investigate the relationship between the ethical leadership and psychological empowerment of nurses in hospitals of Imam Reza (AS). In Kermanshah, the results were highlighted by a positive relationship between the ethical leadership and the empowerment of the shares, which was mental. The main hypothesis of this study was approved. The ethical leadership and empowerment of mental significant positive correlation and secondary research hypotheses were confirmed. In 2014, the results of this study with the positive approach to the characteristics of positive psychology on people and it was not unexpected that leaders were bound by moral principles, underlying the creation and promotion of a sense of psychological empowerment [26]. In 2010, Golparvar et al. established the results of the research direction, which were similar; their findings showed that there is a positive significant relationship between the ethical leadership and the psychological empowerment of employees. In other words, the existence of moral leadership as the creation of infrastructure for the staff is a psychological sense of empowerment [29]. The results of this study were consistent with the results of Moghtadery and Nadi (2014), Mousavi Jad (2013), Avatefi Monfared (2012), Mahdad and Mirjafari (2012). The ethical leaders believe that intrapersonal and interpersonal trust can create effects, inside and outside the organization, so that to influence the organizational success, the constant changes in technology and design of jobs and roles and responsibilities that are necessary [28]. With regard to the findings of this study, it can be said that the moral leadership empowers the mental meaning that moral leadership builds trust, job satisfaction, increased efficiency of activities and goals, so that the running style and effectiveness of ethical leadership creates a positive atmosphere in the hospital. It should be noted that the leaders feel valuable by demonstrating integrity and respect in relationships and interactions, involving employees in decision-making and showing confidence in themselves.

References


A study of the relationship between personality traits and Employee Engagement
(A case study of nurses across Kermanshah, Iran in 2015)

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Abstract
Employee Engagement is an individual’s interest and willingness to carry out the assigned duties, together with his continued employment with organizations. Therefore, the present study aimed to delve into the relationship between the personality traits and Employee Engagement among nurses employed in Kermanshah-based hospitals in 2015. In this descriptive-correlational study, 322 nurses of public hospitals in Kermanshah were selected in 2015. For data collection, Schaufeli & Bakker's Utrecht Employee Engagement scale and NEO Five-Factor Inventory (NEO-FFI) were used. Data were analyzed through descriptive statistics (Frequency, Percentage, Mean, and Standard Deviation) and inferential statistics (Pearson Correlation Test and Multiple Regression Analysis). Also, the 21st version of SPSS software was used for data analysis. The results demonstrated that the highest and lowest means of personality traits among nurses related to openness to experience (3.75 ± 0.63) and neuroticism (2.82 ± 0.55). Also, the highest and lowest means of Employee Engagement related to absorption (5.41 ± 0.76) and vigor (5.04 ± 0.86). Furthermore, the results of the Pearson correlation test showed that there were significant relationships between the two dimensions of personality traits, i.e. neuroticism (P<0.001, r=0.172) and extraversion (P <0.001, r=0.038), and work engagement. Moreover, neuroticism had the most important relationship with Employee Engagement (P<0.001, r=0.172). On the other hand, the results of multiple regression analysis showed that conscientiousness and agreeableness were good predictors for work engagement. Given that the two dimensions of personality traits, i.e. conscientiousness and agreeableness, were closely related to work engagement, it was suggested that these dimensions were given a careful consideration in the event of employing workforce, especially nurses, with the aim of boosting the organizational productivity.

Keywords: Employee Engagement, personality traits, nurses, Kermanshah

Introduction
Personality is a complex psychological construct used for the discovery of the way individuals behave and as a general rule, shows different kinds of human behaviors in diverse situations [44]. The individuals' personality dimensions fall into different categories. The five factors of neuroticism (including traits such as nervousness, moodiness, and tempera mentality), extraversion (implying an energetic approach and includes traits such as sociability, activity, assertiveness, and positive emotionality), openness to experience (including traits such as imagination, curiosity, and creativity), agreeableness (including traits such as altruism, tender-mindedness, trust, and modesty), and conscientiousness (including traits such as organization, thoroughness, and reliability) were introduced by Costa & McCrae (1992) as basic biological inclinations [10]. These basic inclinations are readiness to act and feel in certain manners and are not directly affected by the environment [48]. According to this model, individuals can adopt certain inclinations and attitudes towards tasks and goals in organizations based on their personality traits [46]. Thus, the differences in the individuals' personality traits can be a source of creativity or the root cause of hassles in organizations, and they can influence actions, conducts, and decisions across enterprises [47]. Since personality traits act as factors that determine the individuals' behaviors, identifying such traits can result in increasing the Employee Engagement in organizations through predicting behaviors [35,44]. Given that the variable of Employee Engagement is a new, positive idea, it has proven to be capable of suitably predicting occupational and personal outcomes [7,17]. In recent years, Employee Engagement has interested so many scholars and has been given a great deal of attention. Employee Engagement is widely believed to predict staffs’ outcomes, organizational success, and financial performance [8,17,30,36]. In fact, Employee Engagement is a positive construct with great potential in identifying desirable organizational outcomes. It is the individuals' interests and willingness to carry out the assigned duties,
Engagement (vigor and dedication) relationship between work volume and Employee by Halbesleben (2010) showed that there was a positive relationships with age and gender, and studies performed (2005) showed that personality traits had significant The results of studies performed by González et al. and leadership exist without Employee Engagement in organizations, considerable contacts, significant planning, employment with organizations growth, play vital roles in the staffs' continuation of leadership, collaborative decision-making, understanding qualified nurses, conversant, proficient, reliable accountability and clear duties, sufficient number of factors as communication and conduct mixed with trust, throttle towards the set aims groups' actions get adjusted and advance with a full throttle towards the set aims. In studies conducted by Cheung (2008), the results demonstrated that such factors as communication and conducts mixed with trust, accountability and clear duties, sufficient number of qualified nurses, conversant, proficient, reliable leadership, collaborative decision-making, understanding the value of nurses' jobs, and the chance of professional growth, play vital roles in the staffs' continuation of employment with organizations. Haslam et al. (2003) have the opinion that no emotional relationships in organizations, considerable contacts, significant planning, and leadership exist without Employee Engagement. The results of studies performed by González et al. (2005) showed that personality traits had significant relationships with age and gender, and studies performed by Halbesleben (2010) showed that there was a positive relationship between work volume and Employee Engagement (vigor and dedication). The results of the studies conducted on nurses by Jahanbakhsh Ganjeh et al. (2009) demonstrated that they had the highest scores in terms of conscientiousness and flexibility. “Work engagement” is defined as “positive, satisfying, job-related mental states that are differentiated by three indexes of vigor, dedication, and absorption”.

Since nurses are seen as the most prominent resources in hospitals, they make quite an impact on the levels of health and hygiene in societies through the agency of delivering diverse health care services. The differences in personality traits among nurse communities influence their manner of Employee Engagement and interactions with patients and are of vital significance. Employee Engagement is necessary for all occupations, including nursing jobs and helps managers assess the level of the employees' personality traits and loyalty to organizations.

Therefore, given that no earlier studies have dealt with the relationship between the nurses’ personality traits and work engagement, the present study aimed to study the foregoing. Furthermore, considering the definition and different nature of the dimensions of work engagement, the relationship between personality traits and work engagement, and their effects are ambiguous, so clarifying such a relationship is deemed a scientific necessity.

**Methodology**

The present work is a descriptive-correlational study. According to the statistics collected from the HRM Department of the Medical School of Kermanshah in 2014, the statistical population consisted of all nurses employed in public hospitals across Kermanshah (n=1987, including 1542 males and 445 females). Also, the number of the sample population was determined through Cochran’s sample size formula (n=322, including 249 females and 73 males), chosen through the agency of stratified-random sampling. For data collection, three questionnaires were used: (1) a demographic questionnaire containing the staffs' personal information (gender, age, education, work experience, and job positions), (2) NEO Five-Factor Inventory (NEO-FFI), and (3) Schaufeli & Bakker’s Utrecht Employee Engagement scale.

The NEO Five-Factor Inventory (NEO-FFI) was based on the factor analysis and was constructed by Costa & McCrae (1992) in Baltimore, Maryland in 1985. This questionnaire consisted of 60 questions with five-point Likert scaling (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree) and examined the five dimensions of personality traits: openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism. The content validity of NEO Five-Factor Inventory (NEO-FFI) was confirmed by Costa & McCrae (1992), and the reliabilities of neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness were 0.90, 0.78, 0.76, 0.86 and 0.90, respectively. In Iran,
the five-factor structure of this questionnaire was generally confirmed by Garousi Farshi et al. (2001), and their internal consistency reliability coefficients were reported by the measure of Cronbach’s alpha as 0.86, 0.73, 0.56, 0.68 and 0.87, respectively [13]. In the American sample, the reliabilities of neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness were 0.93, 0.87, 0.76, 0.89, and 0.86, respectively [1]. In a study conducted by Kiamehr (2002), the internal consistency reliability coefficient of this questionnaire was reported by the measure of Cronbach’s alpha ranging from 0.54 to 0.79 [24]. Furthermore, in studies performed by Hejazi & Iravani (2002), the Cronbach’s alpha for this questionnaire was 0.74 [19]. In the present study, Cronbach’s alphas of neuroticism, extraversion, agreeableness, openness to experience, and conscientiousness were 0.91, 0.78, 0.76, 0.73, and 0.86, respectively.

As for the Employee Engagement questionnaire, it was constructed by Schaufeli et al. (2002) and consisted of 17 questions with seven-point Likert Scaling (0=strongly disagree, 1=quite disagree, 2=slightly disagree, 3=neither, 4=slightly agree, 5=quite agree, 6=strongly agree) and examined 3 dimensions of vigor, dedication, and absorption [38]. This questionnaire has been used in China, Finland, Greece, Japan, South Africa, and Spain and has a high reliability and validity [39]. The content validity of Employee Engagement questionnaire has been confirmed in studies performed by Abaszadeh et al. (2013) and Isakhani et al. (2013) [2,3]. In the present study, the Cronbach’s alphas of vigor, dedication, and absorption were 0.92, 0.89, and 0.86, respectively. As for data analysis, the descriptive statistics (Frequency, Percentage, Mean, and Standard Deviation) and inferential statistics (Pearson Correlation Test and Multiple Regression Analysis) were applied. Also, the 21st version of SPSS software was used for data analysis.

Results

Out of the 322 participants in the present study, 73 individuals (22.7%) were males and 249 individuals (77.3%) were females. The Mean and Standard Deviation of the age of the sample population were 31.54 ± 6.03. The 31-40-year-old age group held the biggest number (125 individuals, 38.8%). In terms of education, 260 individuals (80.7%) held a B.A. and 62 individuals (19.3%) held an M.A. and higher degrees. Most samples (115 individuals, 35.7%) had 21-26 years of work experience. The Mean and Standard Deviation of the work experience of the sample population were 18.48 ± 6.5. In terms of job positions, most samples (235 individuals, 73%) were head nurses (see Table 1).

As for the five dimensions of personality traits in the sample population, the results demonstrated that the openness to experience held the highest level (Mean=3.75, SD=0.63) and neuroticism held the lowest level (Mean=2.82, SD=0.55) (see Table 2).

As for the dimensions of Employee Engagement in the sample population, the results demonstrated that absorption held the highest level (Mean=5.41, SD=0.76) and vigor held the lowest level (Mean=5.04, SD=0.86) (see Table 2).

The results of the Pearson correlation coefficient test showed that there were positive, significant relationships between the two dimensions of personality traits, i.e. neuroticism (p<0.001, r=0.172) and extraversion (p<0.001, r=0.38) and work engagement. Furthermore, neuroticism and extraversion had the strongest and weakest relationships with work engagement, respectively (Table 3).

Concerning the relationships between the five dimensions of personality traits (openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism) and work engagement, the results of stepwise linear regression tests indicated that only two dimensions of Conscientiousness and Agreeableness remained in the final model, and the other dimensions were eliminated. Given the β coefficients, conscientiousness and agreeableness significantly specified work engagement. Also, comparing the standard coefficients demonstrated that conscientiousness (β =0.148) and agreeableness (β =0.140) had the most and the least impacts on the dependent variable of nurses’ work engagement, respectively (Table 4).

### Results

#### Table 1. The Demographic Characteristics of participants

<table>
<thead>
<tr>
<th>Variables</th>
<th>Groups</th>
<th>No (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>male</td>
<td>73 (22.7%)</td>
</tr>
<tr>
<td></td>
<td>female</td>
<td>249 (77.3%)</td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30≤</td>
<td>171 (53.1%)</td>
<td></td>
</tr>
<tr>
<td>31-40</td>
<td>125 (38.8%)</td>
<td></td>
</tr>
<tr>
<td>41-50</td>
<td>26 (8.1%)</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bachelor’s degree</td>
<td>260 (80.7%)</td>
<td></td>
</tr>
<tr>
<td>Master’s degree</td>
<td>62 (19.3%)</td>
<td></td>
</tr>
<tr>
<td>Work Experience (years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5≤</td>
<td>29 (9%)</td>
<td></td>
</tr>
<tr>
<td>6-10</td>
<td>24 (7.5%)</td>
<td></td>
</tr>
<tr>
<td>11-15</td>
<td>16 (5%)</td>
<td></td>
</tr>
<tr>
<td>16-20</td>
<td>110 (34.2%)</td>
<td></td>
</tr>
<tr>
<td>26-21</td>
<td>115 (35.7%)</td>
<td></td>
</tr>
<tr>
<td>26≥</td>
<td>28 (8.7%)</td>
<td></td>
</tr>
<tr>
<td>Positions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>nurse managers</td>
<td>22 (6.8%)</td>
<td></td>
</tr>
<tr>
<td>Supervisor</td>
<td>65 (20.2%)</td>
<td></td>
</tr>
<tr>
<td>Head nurse</td>
<td>235 (73%)</td>
<td></td>
</tr>
</tbody>
</table>

#### Table 2. The Mean, Standard Deviation, Minimum Score, Maximum Score and participants’ Rankings

<table>
<thead>
<tr>
<th>Statistic indexes</th>
<th>Variables</th>
<th>Mean</th>
<th>SD</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Openness to experience</td>
<td>3.75</td>
<td>0.6</td>
<td>First</td>
</tr>
<tr>
<td>Personality traits</td>
<td>Extroversion</td>
<td>3.48</td>
<td>0.5</td>
<td>Second</td>
</tr>
<tr>
<td></td>
<td>Conscientiousness</td>
<td>3.46</td>
<td>0.3</td>
<td>Third</td>
</tr>
<tr>
<td></td>
<td>Agreeableness</td>
<td>3.18</td>
<td>0.3</td>
<td>Fourth</td>
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</tbody>
</table>
As for the independent variable of personality traits, the results showed that openness to experience held the highest mean score (Mean=3.75, SD=0.63) and neuroticism held the lowest mean score (Mean=2.82, SD=0.55) (see Table 2). In total, the Mean and Standard Deviation of nurses' personality traits were 3.34 and 0.29, respectively, which indicated that all indexes of nurses' personality traits were at average levels. As for the independent variable of work engagement, the results showed that absorption held the highest mean score (Mean=5.41, SD=0.76) and vigor held the lowest mean score (Mean=5.04, SD=0.86) (see Table 2). In total, the Mean and Standard Deviation of nurses' Employee Engagement were 5.23 and 0.48, respectively.

### Table 3. Pearson correlation coefficients between nurses' personality traits and work Engagement

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Independent variable</th>
<th>Dependent variable</th>
<th>Correlation coefficient</th>
<th>Sig (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Neuroticism</td>
<td>work Engagement</td>
<td>0.172**</td>
<td>0.002</td>
</tr>
<tr>
<td>2</td>
<td>Agreeableness</td>
<td>work Engagement</td>
<td>0.165**</td>
<td>0.003</td>
</tr>
<tr>
<td>3</td>
<td>Conscientiousness</td>
<td>work Engagement</td>
<td>0.072</td>
<td>0.199</td>
</tr>
<tr>
<td>4</td>
<td>Openness to experience</td>
<td>work Engagement</td>
<td>0.061</td>
<td>0.276</td>
</tr>
<tr>
<td>5</td>
<td>Extroversion</td>
<td>work Engagement</td>
<td>0.038</td>
<td>0.496</td>
</tr>
<tr>
<td>6</td>
<td>(Total) Personality traits</td>
<td>(Total) work Engagement</td>
<td>0.162**</td>
<td>0.004</td>
</tr>
</tbody>
</table>

**Correlation is significant at 0.01 (2-tailed)**

As it was shown in Table 3, there was a positive, direct, significant relationship between the nurses' personality traits and Employee Engagement (p<0.001, r=0.162). Except for the conscientiousness that had a negative, insignificant relationship with work engagement, the other ones (openness to experience, extraversion, agreeableness, and neuroticism) had positive, direct, significant relationships with Employee Engagement (p<0.001). In addition, neuroticism had the most important relationship with Employee Engagement (p<0.001, r=0.172), while extraversion had the least important relationship with Employee Engagement (p<0.001, r=0.038).

To predict the level of Employee Engagement based on different dimensions of personality traits, the stepwise multiple regression test was used. The results of this test indicated that the two dimensions of Neuroticism and Agreeableness predicted 4.9% of the variance of nurses' work engagement. Therefore, after eliminating the insignificant variables (openness to experience, extraversion, and conscientiousness), the results of multiple regression test for predicting the nurses' Employee Engagement were as it follows (see Table 4):

### Table 4. The results of multiple regression test for predicting the nurses' work Engagement

<table>
<thead>
<tr>
<th>The dimensions of personality traits</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>R</th>
<th>R Square</th>
<th>Beta</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>4.197</td>
<td>0.279</td>
<td>0.221</td>
<td>0.049</td>
<td>0.148</td>
<td>2.681</td>
<td>0.008</td>
</tr>
<tr>
<td>neuroticism</td>
<td>0.128</td>
<td>0.048</td>
<td>0.140</td>
<td>0.253</td>
<td>0.012</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agreeableness</td>
<td>0.211</td>
<td>0.083</td>
<td>0.000</td>
<td>5.067</td>
<td>0.000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Discussion

The present study aimed to delve into the relationship between personality traits and Employee Engagement among the nurses of hospitals based in Kermanshah in 2015. The results of the present study showed that the Mean and Standard Deviation of nurses' personality traits were 3.34 and 0.29, respectively. This result was consistent with the results of studies conducted by Zaidi et al. (2013), Ziapour et al. (2015), and Inceoglu & Warr (2012) [20,43,45]. The maximum and minimum levels of personality traits related to the openness to experience and neuroticism, respectively. To put it bluntly, the less the neuroticism developed in nurses, the more the Employee Engagement increased, while the more the openness to experience developed in nurses, the more their Employee Engagement was. One explanation for the foregoing might be that the ones with high levels of...
neuroticism are incapable of coping with conflicts and anxieties, resulting in a lack of Employee Engagement in the workplace. To some extent, this result was consistent with the results of studies conducted by Komaraju et al. (2009), Zhang & Bruning (2011), and Naseh et al. (2012) [4,26,32,44]. In studies performed by Langelan et al. (2006), the results demonstrated that the Employee Engagement was differentiated by low levels of neuroticism and high levels of extraversion [27]. In studies carried out by Kim et al. (2009) and Neetu (2013), the results indicated that the Employee Engagement could be predicted by neuroticism and conscientiousness [25,33].

The results of the present study showed that the Mean and Standard Deviation of the nurses’ Employee Engagement were 5.23 and 0.48, respectively. Also, the maximum and minimum levels of Employee Engagement related to absorption and vigor. The results of the studies conducted by Abaszadah et al. (2013) showed that the Mean of nurses’ Employee Engagement in Sirjan-based hospitals was 3.50 out of 6. In studies performed by Mauno et al. (2007) [31], the Mean of nurses’ Employee Engagement in hospitals was 4.45 out of 6. Furthermore, in American samples, the results of the studies carried out by Lawarence (2009) [28] showed that the Mean of nurses’ Employee Engagement in American hospitals was 4 out of 6, which was lower than the mean of the Employee Engagement in the present study.

There was a significant relationship between neuroticism and work engagement in the present study, which was consistent with the results of studies performed by Swider & Zimmerman (2010), Shimizutani et al. (2008), Azeem (2010), and Ghorpade et al. (2007) [6,14,40,42]. Due to such symptoms such as anxiety, insecurity, and anger in nurses with high levels of neuroticism, it was expected that these staffs had high levels of work engagement, too. Therefore, given the tendency of these staffs towards negative feelings, it was anticipated that neurotic individuals had higher levels of work engagement.

In addition, there was a significant relationship between agreeableness and work engagement, which was to some extent consistent with the results of studies performed by Swider & Zimmerman (2010), Shimizutani et al. (2008), Azeem (2010), and Ghorpade et al. (2007) [6,14,40,42]. Those with high levels of agreeableness, even when working in horrible conditions, do their utmost to adapt to their working conditions and their agreeableness (which involves traits such as altruism, tender-minded, trust, and modesty) gives them enough incentive to achieve personal success. Agreeable individuals are cooperative, reliable people. Therefore, their perceptions of work performance in the future should result in positive psychological conditions. In the present study, no relationships were found between the three dimensions of personality traits, i.e. conscientiousness, openness to experience and extraversion, and the dependent variable of work engagement.

The present study was faced with several limitations: (1) data were collected through self-reporting method, which may influence the accuracy of results, (2) due to the fact that the data were collected from samples in Kermanshah-based hospitals, the results cannot be generalized to other nurses employed in other hospitals across Iran. Given the prominent roles that nurses’ personality traits play in hospitals, it is recommended that further studies are conducted in other public and private hospitals throughout Iran, and the results are compared with one another.

Conclusion

The maximum and minimum levels of personality traits related to the openness to experience and neuroticism, respectively. Furthermore, two dimensions of work engagement, i.e. absorption and vigor, held the highest and lowest means among staffs. Out of five dimensions of personality traits, the two variables of neuroticism and agreeableness had significant relationships with Employee Engagement and could specify it. The individuals’ personality traits, as inherent components of human beings’ personalities, influence organizational environments. The organizational commitment, one of the outcomes of work engagement, is directly influenced by the individuals’ personality traits, deemed the biggest human resources in hospitals influencing the quality of services outstandingly. Therefore, to increase the productivity of human resources in organizations, especially for major managerial positions, it is suggested that the individuals’ personality traits are given acute consideration in the event of recruitment and appointment of workforce.

Acknowledgements

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Relationship between patient safety and accountability of nurses in Al-Zahra Gilangharb Hospital in 2015

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Abstract

Introduction The aim of this study was to investigate the relationship between the patient safety and the accountability of nurses in Gilangharb Hospital in 2015.

Methods. This was a cross-sectional study conducted in Al-Gilangharb, in 2015. The data needed for research was taken from the library and an internet search and was collected by using standard questionnaire. The professional and caring nurses’ questionnaire was based on the extension evaluation office Nursing Care, Ministry of Health and Medical Education and demographic information and questions about 4 different roles of nurses were prepared and included. Moreover, patient safety was highlighted in a validation questionnaire, validated by an experts judging group of teachers and academics, which was established. Cronbach’s alpha test was used to assess the reliability. Finally, the reliability and professional standards of nursing care, patient safety questionnaire 093. 86/0 percent calculated the population of Gilangharb Hospital nurses (n = 70) and, in the strata selected, a statistical analysis using data from the questionnaires included in the SPSS statistical software, version 21, took place.

Results. The patients’ safety and accountability was observed at the level of 95 percent by using the Spearman correlation (SIG = .000). The correlation coefficient was (R=.768). Also, the dimensions of responsibility between the patient’s safety (regarding the role of the nurse educator, administrator, researcher and clinician) at 95 percent and the positive use of Spearman correlation was found (SIG = .000).

Conclusions. Given the correlation between the patient safety and accountability, it can be said that the nurses in all roles (educator, researcher, administrator, and clinical specialist) have been successful, so, we suggested that given the experience, expertise and abilities, they have made an efficient use of their lifting power.

Keywords: patient safety, accountability, responsiveness, nurse, Gilangharb Hospital

Introduction

Since the task and mission of critical health care and community life represent the quality of services in the health sector, it has a special place [1]. Patient safety is one of the main components of health care, in the sense of avoiding the introduction of any injury to the patient during health care [2] and includes items such as medication errors (wrong type or dose of medication prescribed), applying to compromise (acting in the wrong position, wrong technique, postoperative complications), false diagnosis (delayed diagnosis, misdiagnosis, incorrect diagnosis), failure of plant and equipment, leading to misdiagnosis and other cases, such as nosocomial infections, patient falls, bed sores, wrong treatment, etc. [3].

The issue of patient safety (Patient safety)

After the release of the report of the Institute of Medicine (Institute of Medicine-IOM), in the United States, in 1999, whose role was to determine the prevalence of medical errors in this country, it has been of interest to researchers and experts in the health field [4]. This report, together with reports of similar other institutions in countries like Britain, Canada and Australia, on this topic, made the international monitoring health regimes understand that they are not safe enough [3]. According to the available evidence, it was estimated that, in developing countries, one out of ten patients enters and appeals to hospital services while being injured. However, there are no accurate statistics on this issue in developing countries. The World Health Organization estimates that tens of millions of people are lost or suffer from disabilities every year due to medical errors and unsafe processes [5]. Care and treatment services for people suffering from a heavy financial burden represent an unsafe addition to the estimated time that would come forth, in fact between 5% and 10% of the health-related costs resulting from non-clinical services that are safe. The proportion of patients is represented by the damage and failure of systems and procedures over the role of individuals [6]. In addition, nursing, which is one of the largest health care provider groups in the public and private health sectors, is more in contact with patients than nurses and other
personnel providing care and performance and activity resulting from the interaction of a combination of terms such as nurse, health, environment, and nursing [6]. In addition to the basic tasks related to the clinical care of patients (based on their professional mission delegation which means a lot of responsibility in different areas), professional nurses are responsible for eight general standards, the following indicators being considered: 1. accountability. The continuity of expertise and efficiency. The application of knowledge, skills, and judgement. 4. Professional ethics. 5. Professional communication and participation. 6. Professional leadership and management. 7. Quality of care. 8. Self-control and evaluation of performance.

Four major roles in determining the nursing profession. These roles include the clinical expert, educator, administrator, and researcher. One or more roles for nurses concern the location and the skill level [7]. Accountability represents the status of the person responsible for the work of the others. Currently, professional accountability is very important into the age of accountability and rapid changes in the health system in which treatment occurs. As defined by the standard of accountability, “directing professional standards of nursing practice are determined based on the scope and range of performance”. Based on this definition, each nurse is responsible for her performance, guidance, and direction to her performance on the road to professional and legal standards. Also, the nurse should provide optimal clinical care and should be skilled and responsive to community. The World Health Organization recognizes the importance of patient safety and public health as a main concern of the World Health Assembly resolution - WHO 55/ 18, and outlines the various responsibilities of the organization chart, which include technical support of Member States for the development of reporting systems and risk reduction, setting evidence-based policies, promoting a safety culture and encouraging research into patient safety [8]. Regarding the research in Iran, several problems were found in fields related to patient safety, including the incidence of bedsores, infection, and falling from bed. With regard to the importance of patient safety and a wide range of effects on patients and our health care system, and given that Employees in organizations in which resources are scarce and diverse skills and capabilities and flexibility have helped improve organizational performance are effective, The solutions and projects aimed at promoting changes in order to achieve greater safety for patients who need urgent health care system is growing, this study showed the importance of patient safety and accountability of nurses in hospitals in Al-Zahra Gilanharb. Daily, many patients in hospitals worldwide are safely treated and cured, but with the knowledge and technology in recent decades, health care facilities are more very complex. Naturally, in such circumstances, the possibility of increased risk in health care facilities and experimental evidence indicates that the number of patients who are due to complications of medical errors is indispensable. Therefore, the issue of patient safety is a crucial issue in the health systems of different countries [7]. With regard to the importance of patient safety, a wide range of effects has been taken on patients and our health care system. According to that, staff resources are scarce and if you put the skills and capabilities of a variety and flexibility to the organization's competitive advantage, the improvement of organizational performance is of an effective help, according to the role of human resources in service organizations, especially hospitals and the importance of the performance of the organization, this study investigating the way patient safety and accountability of nurses are explored. In a study undergone in 2011, Movahedgar and Arabs tried to determine the perceptions of patients in clinical departments of general hospitals of Tehran University of Medical Sciences to participate in treatment decisions and patient safety showing that the abnormal signals that might be interpreted by a person were probably explained differently by another person. This difference was due to demographic differences. The patient participation in treatment decisions affected his assessment of the safety of the patient in the hospital [9]. In 2011, Ravaghi and et al. described the relationship between the perception of a culture of patient safety and care providers, patients' perception of medical errors in public hospitals in Tehran showing that patients in hospitals, with a more positive safety culture, presented one of more errors experience and were providers of a more positive perception of some aspects of safety culture regarding the patient compared to other dimensions respectively. These dimensions included organizational learning and continuous improvement and teamwork within the unit [1]. During a study performed in 2011, Zh. Abdi demonstrated the culture of patient safety as the harvest workers in selected hospitals of Tehran Medical University showed that various aspects of safety culture in that hospital needed to improve and assess the culture of patient safety in hospitals, being able to assume multiple roles. According to a study by Moghry and et al. performed in on the one hand, there can be a strong or weak degree of safety culture of the center and it is clear on the other hand, that managers and supervisors have the potential to increase staff awareness of patient safety, contributing to improvement [10]. The Persian translation of a questionnaire validated patient safety culture surveys of hospital (HSOPSC) and the assessment of safety culture from the perspective of nurses, physicians, laboratory and radiology staff of public hospitals in Tehran University of Medical Sciences in Iran has confirmed validity and reliability to work [11]. In 1389, the doctor and his colleagues presented the attitudes regarding the safety of employees of a medical center, a hospital in Tehran, to evaluate the safety of a hospital staff showing that the attitude of managers and employees was relatively low and efforts of promoting hospital safety culture were essential (Singer et al., 2009) [12] to investigate the relationship between safety climate and safety performance in the hospital, 12 Patient safety indicators (PSIs) were presented and the study showed a significant
relationship between a safety climate and stronger and safer performance in hospitals [13]. In the study of Al-e Ahmad (2010), examining the relationship between a safety climate hospital and hospital performance in patient safety indicators (PSIs), a significant relationship was found between a safety climate and stronger and safer performance in hospitals [14]. Following this, in 2010, Screw et al. showed the relationship between the culture of patient safety and the adverse events in US hospitals studied. In their study, from the relationship between the 15 variables related to patient safety culture surveys of hospital and eight patient safety indicators for the expected (negative) and the relationship of these 15, seven were statistically significant. In other words, a better safety culture in hospitals was associated with lower rates of adverse events [2]. In 2010, Homer and his colleagues titled psychometric characteristics of hospital care in the patient safety culture for hospital management (HSOPS_M) so as to investigate a wide range of sub-dimensions questionnaire HSOPS, such as feedback and communication about errors/ events, organizational learning, hands and transferring personnel, and, their team work showed that with the help HSOPS_M, the survey of hospitals could be viewed as a cross-country evaluation of senior management on a safety culture at the hospital and as a measurement tool to support interventions in the hospital in terms of safety performance and the attitudes and perceptions of senior management, expectations, and Senior management of hospital patient safety measures on fundamental aspects of a safety culture [15].

Main hypothesis:
1) Are there any patient safety events regarding responsibility in Al Gilangharb?

Sub assumptions:
1) Are there any safety events with an index clinician nurse regarding the relationship in Gilangharb Al-Zahra hospital?
2) Are there any events in hospital regarding patient safety indicators or the nurse educator role in Gilangharb Al-Zahra?
3) Are there any patient safety events regarding the role of the director of nursing in Gilangharb Al-Zahra hospital?
4) Are there any researchers regarding the role of nurses in hospital patient safety events in Gilangharb Al-Zahra?

Methods

This study was cross-sectional and was carried out in 2015 in Al Gilangharb. Data needed for research in using the library and internet search were collected by using standard questionnaires. According to the evaluation office extension of the Nursing Care Ministry of Health and Medical Education, the questionnaire professional nursing care was prepared and included demographic information and questions about 4 different nurses roles (clinician, educator, administrator, researcher) and patient safety was highlighted by Likert scale responses from very disagree to very agree with the grading of 1 to 5, respectively. The validation questionnaire validated by experts judged group of teachers and specialist academics that were established. To assess the reliability, Cronbach’s alpha was used. Finally, reliability and professional standards of nursing care, 86/ 0 was calculated and, given that the value of alpha was of more than 7.0, the questionnaire was desirable and acceptable. The population consisted of hospital nurses in Gilangharb (70 cases), and the Census Select the strata. Data from questionnaires were analyzed by using statistical software version SPSS 21.

Results

Based on demographic information, 58.6 percent were females and 41.4 percent were males. 63.2 percent and 36.8 percent were single, married, 50.1% between 25 and 30 years old, 19.7 Drsd 31-35 years, 12.5 percent Byn 36 and 40 years, 10.4% between 41 and 45 years and 7.3 percent more than 45 years old. 46.1 percent had a bachelor's degree, 25.1% a high school degree, 11.7% had a higher education degree and 17 percent a MS degree.

Table 1. Evaluation of data normality - Kolmogorov-Smirnov test

<table>
<thead>
<tr>
<th></th>
<th>safety</th>
<th>Accountability</th>
<th>Researcher</th>
<th>manager</th>
<th>Training Providers</th>
<th>Specialist Clinical</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>385</td>
<td>385</td>
<td>385</td>
<td>385</td>
<td>385</td>
<td>385</td>
</tr>
<tr>
<td>Mean</td>
<td>196.605</td>
<td>126.1221</td>
<td>14.8779</td>
<td>29.2416</td>
<td>37.4260</td>
<td>44.5766</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>81.94874</td>
<td>4.08671</td>
<td>0.089</td>
<td>0.089</td>
<td>110</td>
<td>-0.106</td>
</tr>
<tr>
<td>Most Extreme Differences</td>
<td>0.071</td>
<td>0.077</td>
<td>0.077</td>
<td>0.089</td>
<td>0.108</td>
<td>0.108</td>
</tr>
<tr>
<td>Negative</td>
<td>-0.069</td>
<td>-0.059</td>
<td>-0.108</td>
<td>-0.080</td>
<td>-0.054</td>
<td>-0.064</td>
</tr>
<tr>
<td>Kolmogorov-Smirnov Z</td>
<td>1.392</td>
<td>2.126</td>
<td>1.753</td>
<td>2.154</td>
<td>2.079</td>
<td>0.000</td>
</tr>
<tr>
<td>Asymp. Sig. (2-tailed)</td>
<td>0.042</td>
<td>0.022</td>
<td>0.004</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
</tbody>
</table>

a. Test distribution was Normal.
b. Calculated from data.

Based on the table above for normal data, One-Sample Kolmogorov-Smirnov Test was used as the significance
level and less than 0.05 results showed that profits were not so normal data and Spearman test was used to analyze the data.

Table 2. The relationship between the hypotheses using Spearman’s rho test

<table>
<thead>
<tr>
<th>Correlations</th>
<th>Spearman’s rho</th>
<th>N</th>
<th>SIG</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accountability</td>
<td></td>
<td>70</td>
<td>0.000</td>
<td>0.768</td>
</tr>
<tr>
<td>Specialist Clinical</td>
<td></td>
<td>70</td>
<td>0.000</td>
<td>0.817</td>
</tr>
<tr>
<td>Training Providers</td>
<td></td>
<td>70</td>
<td>0.000</td>
<td>0.622</td>
</tr>
<tr>
<td>manager</td>
<td></td>
<td>70</td>
<td>0.000</td>
<td>0.691</td>
</tr>
<tr>
<td>Researcher</td>
<td></td>
<td>70</td>
<td>0.000</td>
<td>0.666</td>
</tr>
</tbody>
</table>

The table above showed that patient safety and accountability was situated at the level of 95 percent, the use of Spearman correlation was positive (SIG = .000) regarding the correlation coefficient for the 768. The main hypothesis was confirmed. Between patient safety and accountability at the level of 95%, using Spearman and positive relationship existed (SIG = .000) and secondary hypotheses were also approved.

Table 3. Mean standard deviation and the mean rating by Friedman test to rank the dimensions of responsibility

<table>
<thead>
<tr>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Mean Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Researcher</td>
<td>14.8779</td>
<td>4.08671</td>
</tr>
<tr>
<td>manager</td>
<td>29.2416</td>
<td>8.09490</td>
</tr>
<tr>
<td>Training Providers</td>
<td>37.4260</td>
<td>11.06752</td>
</tr>
<tr>
<td>Specialist Clinical</td>
<td>44.5766</td>
<td>12.77877</td>
</tr>
</tbody>
</table>

The above table showed the highest average standard deviation for the later Specialist Clinical, the rate being 12.77877 ± 44.5766. The average standard deviation of Training Providers, manager, Researcher, was 4.08671 ± 14.8779 11.06752 ± 37.4260,8.09490 ± 29.2416 and also the results used the Friedman test with 1048.856 Chi-Square = And DF = 3 And SIG = .000 to rank the dimensions of the responsibility that the Specialist Clinical had with an average 3.82 rating and dimensions, Training Providers, manager, Researcher respectively, with an average rank of 3.09, 2.09 and 1, having the highest average rating.

Conclusion

The findings showed that a positive and significant relationship between patient safety and accountability could agree that the main theory was approved; patient safety and positive relationship between the dimensions of responsibility were therefore sub-hypotheses that were confirmed. In 2012, Stoic et al. suggested that patients in hospitals with a positive safety culture would experience fewer errors [1]. Screw and colleagues showed that a better safety culture in hospitals was associated with lower rates of adverse events [2]. In 2011, Hope et al. indicated that safety programs had a positive impact on reducing accidents indicators that would play a role in reducing the severity of accidents, reduce accident frequency index, reduce the severity of accidents and loss of a repeated diseases-frequency, various amounts of leading and indicated job consequently, increasing the level of productivity for any organization [16] especially in the area of governance and leadership strategies using aggressive teeth, a hospital patient safety could be considered as a priority strategy and upgrade [17]. In 2014, Hemati Maslakpak stated that nurses could use the appropriate communication skills with patients in intensive care, maintain, and improve safety [18]. Friedman rank test results showed that nurses in roles of responsibility, such as Specialist Clinical, Training Providers, manager and Researcher respectively, had the highest priority. Kim and colleagues demonstrated that the error reporting and coordination between sectors were identified as priority cases [19]. With regard to the relationship between patient safety and responsibility, it could be said that nurses in all roles (teacher, researcher, administrator and specialist clinical) have been successful, so we suggested that given the experience, expertise, and their ability and power, they could force the operation for an efficient use. In addition to the increase of patient safety and accountability, nurses need to attract collaborate and have contract with the employment from a treaty change and, according to the theory of equality of benefits, they are changed.

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Evaluation of stress factors among the elderly in the nursing homes for the elderly (Eram and Mother) in Kermanshah, in 2015

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Abstract
Introduction: The purpose of this study was to assess the stress factors among the elderly living in nursing homes (Eram and Mother) in Kermanshah, in 2015.
Research method: This was a descriptive - cross analysis and was done in the first half of 2015 in a sectional way. The statistical society included 150 elderly men and women aged 60 to 74, and the sample size was selected from 108 people using the Cochran formula. A standard questionnaire was used to collect data from a previously validated survey. Finally, a total of 100 questionnaires were filled in and data were analyzed by using Amos 21 and SPSS 21 software.
Results: The results showed that the dimension of the physiological problems had the highest average and standard deviation of 5.36 ± 21.02 and Disappointment, Home empty, Disability and independence, Relationship problems, Seclusion with an average and standard deviation of 3.12 ± 20.55, 5.29 ± 18.82, 4.54 ± 17.72, 3.59 ± 16.66 and 4.55 ± 16.41, had the highest average and standard deviation.
Conclusion: Given that the majority of elderly live with the family in Kermanshah and have sufficient support, recommended that the government planned to reduce isolation and increase the social support for this group of elderly nursing.

Keywords: assessment, stress factors, elderly

Introduction
The phenomenon of the increasing population of the elderly is one of the most important economic, social, and health challenging in the 21st century [1]. Based on UN estimates, the world's elderly population of 350 million people reached one billion in 1975 and it is estimated to reach one hundred million people in 2025, the growth of the elderly population growing much faster than the total population of the world, most of them living in developing countries [2]. So, an increasing age increases the risk of one or more chronic diseases so that most people over 60 years old have at least one chronic disease [3]. Almost 80 percent of the elderly patients had a chronic disease, so that they became more vulnerable than others [4]. Elderly people are increasingly exposed to various diseases [5]. The physiological changes that occur during the aging process and certain changes in the nervous system and the musculoskeletal system, could be affected regarding the performance of the gestures, increasing the risk of accidents such as burns, accidents, etc. [6]. One of the goals of dynamic aging is to reduce disability related to chronic diseases in old age [7]. According to the National Council of the Elderly, people above 60 years old are elderly [8]. With regard to improving health and economic communities, each year, the number of elderly increases [9]. At the same time, almost 70% of the elderly suffer from multiple chronic diseases. Due to the increasing number of elderly in the population and the increase of chronic diseases among older people with multiple chronic diseases, their care can be difficult and, unfortunately, care systems act inefficiently [10]. To improve the control population and increase life expectancy, as well as improve the treatment, the global population ages [11]. The growth of the elderly population in developed countries is over and now more than half of the world’s elderly live in developing countries. According to the UN report, in 2000, the elderly population in developing countries was 12.5%-17% of the world’s population [12]. On the other hand, the total number of elderly in the world, in 2006, was 687 million and will be of 923 thousand in 2050, and the figure reached one billion and 968 million and 53 thousand people, also, according to the report, currently 6% of the population aged up to 26 million and 393 thousand (equivalent to 26% of the population per year). Also, according to the center's
report, the life expectancy for men and older women in Iran during the years 2005 and 2010 was 77 and 78 years respectively [13]. Taking into account the stressing factors period, aging is a loss, the loss of a child, spouse, vision, hearing, occupation, social status, etc. [14]. Elderly people, who are prone to disease and disability, are physically different regarding the mental health of those whom they accept. Some psychological problems within this period of life are more prevalent [15]. The aging population influences the various economic and political aspects, causing a sharp rise in public spending and imposing additional pressure on social security [16]. One of these problems is stress. Stress and new diseases of the civilization today is the rise of many physical and mental diseases [17]. The aim and principles of this study were to evaluate the stressor factors among the elderly living in nursing homes for the elderly (Eram and Mother) in Kermanshah, in 2015.

Method

This cross-sectional analytical-descriptive study design was done in the first half of 2015 in the Welfare Rehabilitation Center in Kermanshah to assess the stressor factors among the elderly, in the nursing homes for the elderly (Eram and Mother). The statistical society included all 60 years old people and older men and women who were staying in welfare institutions. The sample included 150 elderly men and women aged 60 to 74, and a sample size of 108 Cochran formulas was used, which came to a final number of 100 questionnaires filled in. The questionnaires were distributed randomly. Data collection was performed by using a standard questionnaire. To collect the questionnaires, the centers of the Elderly Rehabilitation Center for Men (Eram) and Women (Mothers) were visited and a list of the elderly people was provided. Then, the questionnaires were completed and the final data were analyzed with the help of SPSS 21 and AMOS 21 software. A valid and reliable questionnaire from the study of Sadrossadat et al. (2013) [18] was approved. Cronbach’s alpha reliability coefficient method of total scale was equal to 0.95 and the Spearman–Brown’s was 0.84 and 0.79 respectively, the tests indicating a good reliability for this scale [19].

Results

The results showed that in terms of gender, 53% were females (53 patients) and 47% (n = 47) were males. 33% were single (late spouse and widow), 33 and 67 percent (67 people) were married. 33% (32) had an under diploma certificate, 34% (33) held a diploma, 11.3% (11) held an associate degree, 16.5% (16) had a bachelor’s degree and 5.2% (5 patients) held an MA and upper.

Table 1. Mean, standard deviation and the mean scores by using the Friedman test

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Mean Rank</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disappointment</td>
<td>2.61</td>
<td>16.4100</td>
<td>4.55958</td>
</tr>
<tr>
<td>Seclusion</td>
<td>4.57</td>
<td>20.8500</td>
<td>3.12169</td>
</tr>
<tr>
<td>Home empty</td>
<td>2.77</td>
<td>16.6600</td>
<td>3.59073</td>
</tr>
<tr>
<td>Relationship problems</td>
<td>3.54</td>
<td>18.8200</td>
<td>5.29604</td>
</tr>
<tr>
<td>Physiological problems</td>
<td>4.26</td>
<td>21.0200</td>
<td>5.36728</td>
</tr>
<tr>
<td>Disability and independence</td>
<td>3.26</td>
<td>17.7200</td>
<td>6.878</td>
</tr>
</tbody>
</table>

The table above shows the dimension of the physiological problems with the highest mean and standard deviation of 5.36 ± 21.02, Disappointment, Home empty, Disability and independence, Relationship problems, Seclusion with a mean and standard deviation of 3.12 ± 20.55, 5.29 ± 18.82, 4.54 ± 17.72, 3.59 ± 16.66 and 4.55 ± 16.41, was the highest average and standard deviation. Also, the rankings of the Friedman test with chi-square 91.092 and, df = 5, and the significant level of 0.000 was used, the results showing the dimension Seclusion, with an average grade of 4.57, the highest rank and aspects of Physiological problems and Relationship problem and Disability Disappointment and independence and Home empty and the average rating respectively 4.26, 3.54, 3.26, 2.77 and 2.61, having the highest rank.

Table 2. Relationship between stressor factors and their dimensions

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th>C.R.</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disability and independence</td>
<td>----</td>
<td>Stressors of aging</td>
<td>.157</td>
<td>.023</td>
</tr>
<tr>
<td>Physiological problems</td>
<td>----</td>
<td>Stressors of aging</td>
<td>.168</td>
<td>.028</td>
</tr>
<tr>
<td>Relationship problems</td>
<td>----</td>
<td>Stressors of aging</td>
<td>.175</td>
<td>.027</td>
</tr>
<tr>
<td>Home empty</td>
<td>----</td>
<td>Stressors of aging</td>
<td>.104</td>
<td>.019</td>
</tr>
<tr>
<td>Seclusion</td>
<td>----</td>
<td>Stressors of aging</td>
<td>.112</td>
<td>.015</td>
</tr>
<tr>
<td>Disappointment</td>
<td>----</td>
<td>Stressors of aging</td>
<td>.196</td>
<td>.020</td>
</tr>
</tbody>
</table>

***Indicates the significance of the relationship at the level of 95%.

Based on the table, there is a significant relationship between the dimensions of stress factors among the elderly living in nursing homes for the elderly (Eram and mother) in Kermanshah. The means confidence level is less than 0.05, meaning the relationship between the dimensions of significant stress factors and positive factors.
Table 3. Total, directly or indirectly standardized effects

<table>
<thead>
<tr>
<th>Stressors of aging</th>
<th>Standardized Total Effects</th>
<th>Standardized Direct Effects</th>
<th>Standardized Indirect Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disappointment</td>
<td>0.708</td>
<td>0.708</td>
<td>0.000</td>
</tr>
<tr>
<td>Seclusion</td>
<td>0.591</td>
<td>0.591</td>
<td>0.000</td>
</tr>
<tr>
<td>Home empty</td>
<td>0.478</td>
<td>0.478</td>
<td>0.000</td>
</tr>
<tr>
<td>Relationship problems</td>
<td>0.545</td>
<td>0.545</td>
<td>0.000</td>
</tr>
<tr>
<td>Physiological problems</td>
<td>0.515</td>
<td>0.515</td>
<td>0.000</td>
</tr>
<tr>
<td>Disability and independence</td>
<td>0.569</td>
<td>0.569</td>
<td>0.000</td>
</tr>
</tbody>
</table>

The table above shows that the standard of the total amount of their direct effects is equal to the dimensions Disappointment, Seclusion, Home empty, Relationship problems, Physiological problems, Disability and independence equal to the amount 0.708, 0.591, 0.478, 0.545, 0.515 and 0.569 respectively. Also indirect effects are standard for all resolution 0.000, respectively.

Table 4. The final model-fitting index of the research

<table>
<thead>
<tr>
<th>Acceptation level</th>
<th>Obtained value</th>
<th>Interpretation</th>
<th>Accepted level</th>
<th>Standard criterion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accepted</td>
<td>283.483</td>
<td>Chi-square obtained compared with the chi-square table for a certain degree of freedom. Value of chi-square in the table</td>
<td>Chi-square CMIN</td>
<td></td>
</tr>
<tr>
<td>Accepted</td>
<td>0.042</td>
<td>Should be less than 0.5</td>
<td>Less than 0.5</td>
<td>The root mean square error of estimate (RMSEA)</td>
</tr>
<tr>
<td>Rather Accepted</td>
<td>0.854</td>
<td>Near to 0.95 is fitted</td>
<td>Zero (non-fitted), one (good fitted)</td>
<td>Louise Tucker TLI</td>
</tr>
<tr>
<td>Accepted</td>
<td>4.899</td>
<td>Less than 1 indicates weakness; more than 5 shows the need to improve fitness levels.</td>
<td>relative Chi-square CMIN/DF</td>
<td></td>
</tr>
<tr>
<td>Rather Accepted</td>
<td>0.575</td>
<td>Should be more than 0.5 or 0.6</td>
<td></td>
<td>Normalized frugal fit index PNFI</td>
</tr>
<tr>
<td>Rather Accepted</td>
<td>0.589</td>
<td>Should be more than 0.5 or 0.6</td>
<td></td>
<td>Comparative frugal fit index PCFI</td>
</tr>
<tr>
<td>Rather Accepted</td>
<td>0.848</td>
<td>Should be more than 0.9</td>
<td>Comparing the model to model without its relationship</td>
<td>Bentley Bonet index NFI normalized Fitness indicator CFI</td>
</tr>
<tr>
<td>Rather Accepted</td>
<td>0.883</td>
<td>Should be more than 0.9</td>
<td>Comparing the model to model without its relationship</td>
<td></td>
</tr>
<tr>
<td>Rather Accepted</td>
<td>0.878</td>
<td>Standard value is more than 0.9</td>
<td></td>
<td>Incremental Fitness index IFI</td>
</tr>
</tbody>
</table>

Chi-square = 283.483
Degrees of freedom = 15
Probability level = .000

The ratio of the economy or PRATIO, a kind of frugal fit indices considered in itself, is not fit index, but rather shows the extent to which the researcher has spent the definition of free parameters. This index was developed based on the degrees of freedom model, which can achieve independence, a value between zero and the one to take any size is much smaller, indicating that the researcher has spent more money in the free parameters. Often, higher values of 0.5 for this indicator have seen that this rate is of 0.714. Also, for an adequacy number of samples, the HOTLTER index used in this study sample number 41 was acceptable and according to the study sample size it was of 100 companies and models of these indicators were also fitted. Indicators ECVA, MECVI, AIC, BCC, were used to determine the most elegant model deemed and a model with the smallest amounts to more elegant models were considered in this study, respectively, 3.303, 3.268, 326.999, 323.483, which amounted to 3.268, ECVA being the most effective model.
Based on the above, stress factors have a direct effect on dimension Disability and independence (0.57), Physiological problems (0.51), Relationship problems (0.55), Home empty (0.48), Seclusion (0.59) and Disappointment (0.71). The highest impact between the stress factors among the elderly and those dimensions related to dimension Disappointment were at a rate of 0.71 percent and the lowest for Home empty dimension 0.48 respectively.

Discussion and Conclusion
The purpose of this study was to assess the stress factors among the elderly in Kermanshah. According to the results obtained, the dimension physiological problems, with the highest average standard deviation dimensions of 5.36 ± 21.02 respectively and then Disappointment, Home empty, Disability and independence, Relationship problems, Seclusion, with an average and standard deviation of 3.12 ± 20.55, 5.29 ± 18.82, 4.54 ± 17.72, 3.59 ± 16.66 and 4.55 ± 16.41, was the highest average and standard deviation. Oldehinkel et al. noted that physical health problems, problems related to disability, hearing, vision, and memory as stressor for the highest average and standard deviation. Oldehinkel et al. noted that physical health problems, problems related to disability, hearing, vision, and memory as stressor for the highest average and standard deviation. 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Acknowledgment:
Colleagues of the University of Medical Sciences, who helped us in implementing this project. This project did not have a source of financing.

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Assessing the reasons for the choice of dentistry as a career by Iranian dental students: A Questionnaire Survey

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Abstract
Aims: The aim of this study was to determine the reasons for the choice of dentistry as a career by undergraduate dental students in Iran.

Materials & Methods: Questionnaires were distributed among the first-year to the sixth-year undergraduate dental students at the College of Dentistry in Qazvin University of Medical Sciences in Qazvin, Iran. The questionnaires were presented in a lecture hall at the end of the second semester in the 2011-2012 academic years. The questionnaire comprised 30 items and the students were required to rate the importance of each item for selecting dentistry as a career, on a 10-points scale. T-test and ANOVA were also used for the data analysis.

Results: The response rate in the study was 55% (out of 100%) of the students recruited. Ninety-six students (93.2%) selected dentistry as a first choice. Dentistry as a career which is “insurer of financial independence” was given a maximum score by 82.5% of the students recruited and a similar number of the students (75.7%), gave a maximum score to the factor “I like to make a lot of money”. Dentistry as a “science-based profession” was also given a score by 80.6% of the students.

Conclusion: There were no differences in the motivation between male and female students. It was concluded that “insurer of financial independence” and “I like to make a lot of money” were important motivating factors in this population of dental students.

Keywords: dentistry, career, questionnaire, dental students, dental education

Introduction

The motivations for choosing dentistry as a career in Iran are not clear. This study was aimed at exploring the reasons why students chose this career. Dentists have an important position in the society as licensed healthcare workers [1,2].

Dentistry is ranked fourth in comparison with medicine, pharmacy, and veterinary science. Consequently, a high level of academic performance is necessary to start a career as a dentist. However, less clearly defined are the factors that influence the choice of dentistry as a career. Ranking and correlating these factors would be helpful in determining the students' needs and expectations in their subsequent undergraduate careers. Recent studies were performed elsewhere [3-8].

The motives for choosing a career are complex and a choice of dentistry as a career is no exception. There are a number of factors deciding the career choices, such as: working conditions and financial rewards, the nature of the career, working with people, etc. [9,10].

Choosing dentistry as a career has been studied in many countries. A variety of reasons has been mentioned for this, including: status and security, the nature of career, patient care, and working with people [9]. Most of the studies investigating the reasons for a choice of dentistry as a career have been carried out in developed countries such as the US [10], UK [9-11], Ireland [12], Australia [5] and Denmark [14]. Self-employment and business-related motives were reported as important factors by the students in the US [10] and perceived as ease of employment were, being self-employed, working for regular hours, and having a high income and the opportunity to help people, being reported as the reasons for entering this profession in Ireland [12].

In Iran, the dental program lasts for at least for 6 years. Admission to the program depends on the results of the Iranian University Entrance Exam (the Concurs) which requires 12 years of study in order to be qualified to take this exam. A high level of academic performance or a high grade point average (GPA) is necessary for dental students to start a career as a dentist. There is limited information concerning the career choices of students in developing countries [15].
Nevertheless, there is no available data regarding the reasons for the choice of dentistry as a career in the Iranian population. Our study is therefore aimed at investigating the carrier motivation.

Materials & Methods

The Questionnaire

The dental program consists of two years of basic science theory and one year of preclinical theory and a three-year clinical phase. The method adopted was an anonymous questionnaire distributed by the authors to the first-year to the sixth-year students at the College of Dentistry in Qazvin University of Medical Sciences. Ethical approval was granted by the Qazvin University of Medical Sciences. All participants received a copy of the questionnaire before the lecture was started and they were informed, through a brief oral announcement, about the structure and the aims of this survey. During the completion of the questionnaire, participants were expected to encounter some tasks or questions that might have seemed incomprehensible, as the questionnaire was aimed at assessing various levels of competence, from elementary to highly advanced levels. The predictable time for the completion of the questionnaire was ten minutes. The data were collected at the end of the second semester in the 2011-2012 academic years.

The three-page questionnaire used in this study was based on the previous studies [10,12,15]. In addition to the items related to cultural and family influences and the university admission procedures, socio-demographic factors such as gender, nationality, family income, and parents’ occupation were recorded. Moreover, motives that influenced dental students in their choice of study were recorded as well. These included the motives categorized as “financially-oriented”, “people (caring)-oriented” and “business (flexibility)-oriented” (Table 1). The questionnaire (Table 1) was translated into Persian to ensure that all the aspects were clearly understood by the students. It consisted of 30 items with each item on the questionnaire containing a statement which required the respondents to indicate their level of agreement on a 10-point scale ranging from 0 = strongly disagree to 10 = strongly agree. Two additional questions were answered with yes or no depending on the fact whether dentistry was the student’s first choice and whether the student would choose dentistry again. There was also the opportunity to make free comments on the questionnaire.

Table 1.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Scores (Mean) (Sd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>(4.28)(3.52)</td>
</tr>
<tr>
<td>21</td>
<td>(4.15)(3.62)</td>
</tr>
<tr>
<td>27</td>
<td>(4.05)(3.35)</td>
</tr>
<tr>
<td>8</td>
<td>(4.03)(3.21)</td>
</tr>
<tr>
<td>22</td>
<td>(3.93)(3.4)</td>
</tr>
</tbody>
</table>

Table 2.

<table>
<thead>
<tr>
<th>Year</th>
<th>No.</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>15</td>
<td>14.9</td>
</tr>
<tr>
<td>2</td>
<td>18</td>
<td>17.8</td>
</tr>
<tr>
<td>3</td>
<td>27</td>
<td>26.7</td>
</tr>
<tr>
<td>4</td>
<td>23</td>
<td>22.8</td>
</tr>
<tr>
<td>5</td>
<td>18</td>
<td>17.8</td>
</tr>
<tr>
<td>Total</td>
<td>101</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 3.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Scores (Mean) (Sd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td></td>
</tr>
<tr>
<td>13 I like working with people.</td>
<td></td>
</tr>
<tr>
<td>21 Dentistry is a science-based profession.</td>
<td></td>
</tr>
<tr>
<td>27 Dentistry as a career ensures financial independence.</td>
<td></td>
</tr>
<tr>
<td>8 I want to treat people to improve their appearance.</td>
<td></td>
</tr>
<tr>
<td>22 I like to make a lot of money.</td>
<td></td>
</tr>
</tbody>
</table>
A career in dentistry offers better job security. (3.88)(3.44)
15 I like the autonomy that dentists have. (3.78)(3.6)
23 Dentistry is a prestigious profession. (3.77)(3.36)
18 Choosing dentistry will give me more time to spend with my family. (3.75)(3.39)
20 Dentistry is a caring profession. (3.52)(3.23)

Female
27 Dentistry as a career ensures financial independence. (3.77)(3.24)
10 Other people encouraged me to become a dentist. (3.49)(3.41)
29 Dentists usually do not deal with life-or-death situations on a routine basis. (3.47)(3.56)
15 I like the autonomy that dentists have. (3.43)(3.27)
3 My GPA encouraged me to choose dentistry as a career. (3.37)(3.48)
22 I like to make a lot of money. (3.35)(3)
7 I want to be self-employed. (3.35)(3.95)
23 Dentistry is a prestigious profession. (3.31)(3.11)
14 I had a good experience when visiting the family dentist. (3.29)(3.61)
5 It is easy for dentists to find employment. (3.27)(3.05)

Table 4. Factor loadings on primary motive factors

<table>
<thead>
<tr>
<th>Factors</th>
<th>Factor 1 Money</th>
<th>Factor 2 People</th>
<th>Factor 3 Flexibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>****</td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
</tr>
<tr>
<td>6- Dentistry pays better than other jobs.</td>
<td>3.48</td>
<td>3.26</td>
<td>3.77</td>
</tr>
<tr>
<td>27- Dentistry as a career ensures financial independence.</td>
<td>4.05</td>
<td>3.77</td>
<td></td>
</tr>
<tr>
<td>5- It is easy for dentists to find employment.</td>
<td>3.23</td>
<td>3.27</td>
<td>3.23</td>
</tr>
<tr>
<td>7- I want to be self-employed.</td>
<td>2.1</td>
<td>3.35</td>
<td>3.35</td>
</tr>
<tr>
<td>22- I like to make a lot of money.</td>
<td>3.93</td>
<td>3.35</td>
<td>3.88</td>
</tr>
<tr>
<td>16- A career in dentistry offers better job security.</td>
<td>3.26</td>
<td>3.26</td>
<td>3.88</td>
</tr>
<tr>
<td>15- I like the autonomy that dentists have.</td>
<td>3.78</td>
<td>3.43</td>
<td></td>
</tr>
<tr>
<td>29- Dentists usually do not deal with life-or-death situations on a routine basis.</td>
<td>3.2</td>
<td>3.47</td>
<td></td>
</tr>
<tr>
<td>8- I want to treat people improve their appearance.</td>
<td>4.03</td>
<td>3.18</td>
<td></td>
</tr>
<tr>
<td>13- I like working with people.</td>
<td>4.28</td>
<td>2.88</td>
<td></td>
</tr>
<tr>
<td>19- Dentistry gives me the opportunity to work with my hands.</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>18- Choosing dentistry will give me more time to spend with my family.</td>
<td>3.13</td>
<td>3.75</td>
<td></td>
</tr>
<tr>
<td>28- There is not much “un-call” work.</td>
<td>3.03</td>
<td>3.45</td>
<td></td>
</tr>
<tr>
<td>29- Dentists usually do not deal with life-or-death situations on a routine basis.</td>
<td>3.11</td>
<td>3.47</td>
<td></td>
</tr>
<tr>
<td>9- Dentistry has more regular hours than other caring professions.</td>
<td>3.2</td>
<td>2.88</td>
<td></td>
</tr>
<tr>
<td>17- A dentist has a flexible schedule.</td>
<td>2.19</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Mean (total)</td>
<td>3.49</td>
<td>3.63</td>
<td>3.05</td>
</tr>
<tr>
<td></td>
<td>3.31</td>
<td>3.17</td>
<td>2.37</td>
</tr>
</tbody>
</table>
Statistical Analysis

The returned questionnaires were checked for completeness of data; the data were processed and analyzed by means of the Statistical Package for the Social Sciences (SPSS PC Version 14.0) (SPSS Inc., Chicago, USA). The t-test was used to investigate whether statistically significant differences existed between scores for different groups. The t-test was used for the analysis of the two groups and ANOVA was used for more than two groups. Scale means for males and females were calculated and an independent sample t-test was then used to examine the differences in the scores related to gender and the first choice group and the non-first choice group.

Results

An overall response rate of 55% (103 out of 188) was obtained. Out of 103 respondents, 39.2% (40) were males and 60.8% (62) females, and one student did not identify his/her gender. There was no statistically significant difference in gender distribution among the participants from each year (P>0.05). Iranian dental students can directly enter the Dental School after graduating from high school and after passing the National University Entrance Exam. At the time of the survey, the age of the respondents ranged from eighteen to twenty-seven, with a median age of twenty-one.

The majority of the students (93.2%) placed dentistry as their first career choice. On the other hand, 3% of the students placed other courses, other than dentistry, as their first preferences.

Most fathers (34.5%) were clerks and most mothers (59.8%) were housewives. Also, 50% of the fathers had a bachelor's degree and 29.6% of the mothers had higher degrees. This included 10.3% of the fathers and 4.5% of the mothers with postgraduate degrees. There was no significant correlation between the parents' educational levels.

Discussion

The educational requirements, admission requirements, and selection procedures greatly varied among schools and, not surprisingly, the impact of these requirements was reflected in the sociodemographic profile of the students. Additionally, there was an increase in female representation among the dental students. A similar trend has also been observed in the US [16], the UK [17] and South Africa [7].

Most of the students (93.2%) placed dentistry as a first career choice, and the majority of those who did not, had dentistry as their second choice (65%). This represents an increase from the 43% reported to have placed dentistry as a first choice in the 1981-1985 period [18] and in the mid-1990s [13]. However, some research reports [18] found no difference in the academic performance or graduation rate of “first choice” students and other students. Still, this is similar to the almost 90% reported in the UK [19]. Qualitative approaches are obligatory to explore and understand the students’ reasons for choosing or not choosing dentistry as a career. Moreover, due to the lack of professional and longitudinal studies on oral health, studies should survey the career path and retention according to career choices [20].

The results of a study in the US showed that there were differences in the motivation of male and female students [10]. Female students were less concerned than male students with the business component of a career choice (were less financially oriented) and were more concerned with the caring and people factors (were more people (caring)-oriented) [10,21]. This was similar to a recent study conducted by the first-year dental students in Peru [14].

However, in our study, the high number of the female students who have chosen dentistry as a first choice might be due to the easy dental practice requirements.

It could be concluded that “prestige” and “helping people” were important motivating factors for this group of dental students [15]. Our study came up with the same results.

The results presented in this study are the first reported data in the Islamic Republic of Iran on the reasons and motives for choosing dentistry as a career. Further research could increase the sample surveyed, by extending the study to the remaining Dental Schools in Iran. A longitudinal data set could also be created by repeating the survey for several years and by comparing the results obtained with the baseline results reported here. It was decided to confine the study to a single Dental School in a single year, but further research could extend this to a longitudinal study including the other schools as well.

Conclusion

The present study was the first data on the Iranian population, looking into the choice of dentistry as a career. “Prestige” and “helping people” were found to be important motivating factors for this group of dental students. There were also statistically significant differences in the motivation between male and female students with the financial factors being more influential for the former. Of concern is the result that half the students indicated that dentistry was not their first choice of career. It might be a good idea to establish career education programs in schools in order to educate students regarding their career choices and employment opportunities following graduation. Based on the results
obtained, it was concluded that the reasons for choosing dentistry as a professional career were different for the sexes.

Conflict of Interest
The authors declare that they have no conflicts of interest.

Acknowledgements
The authors wish to thank the anonymous referees for their commentaries on an earlier draft of this paper. And also, we would like to acknowledge the participation of students without whom we would not have reached this high response rate. The authors are also greatly indebted to Professor Al-Bitar, Z.B from the University of Jordan for his helpful comments and contribution to the manuscript.

References
Explaining the relation between self-controlling and child parenting styles and psychological welfare of high school students

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Abstract

Introduction: One of the axes of health evaluation of different societies is psychic welfare of the societies. Welfare means effort to Self-actualization and promotion which reveal in accommodation of individual's talents and abilities. No doubt psychological welfare plays an important role in ensuring dynamism and effectiveness in each society and can be influenced by various factors. Therefore, present study was done with aim of explaining relation between self-controlling and child parenting styles and psychological welfare among high school students of Abadeh City.

Methodology: In this sectional-correlation study, 370 students were chosen and included in the study in stage-cluster sampling method from high schools of Abadeh City. To collect information, Tangney's self-controlling questionnaire, Bamrynd's child parenting scale, Reef's psychological questionnaire and a form of demographic information were used. Data was analyzed using software SPSS 19 or Pearson's correlation coefficient test and stepwise multivariable regression analysis.

Findings: Analysis of data shows self-controlling variable has high and reverse predictability about psychological welfare variable (t = 0.003, β = -0.158, P=2.99). So self-controlling has high and reverse predictability about two elements of psychological welfare scale i.e. self-acceptance (P= 0.0001, t=4.87, β= - 0.181) and dominance on environment (P= 0.0001, t=3.807, β= - 0.200). The results represent presence of a significance relation between predictability of child parenting styles about psychological welfare (p=0.01, F=3.85, r²= 0.031, r=0.177). These results show high predictability of child parenting methods in two different directions in two styles of autocratic (P=0.035, t= 2.12, β=0.113) and authoritative (P=0.014, t=2.437, β= 0.434). Autocratic style has reverse significant relation in most aspects of psychological welfare. Also they show that “authoritative style” variable alone has predication ability 0.143 according to variance of psychological welfare variable. And adding two other variables i.e. self-controlling and authoritative, this figure increase to 0.188 and 0.225. Highest value for predicting ability belongs to authoritative style of child Parenting directly and after that to self-controlling and autocratic style reverse.

Conclusion: According to meaningful correlation of child parenting methods and self-controlling in predicting psychological welfare, necessity of attention to these factors is felt in explaining psychic welfare of students as much as possible. So, it is recommended that training of child parenting methods is considered as a preventive and promoting way for psychological welfare in psychic health programs for all teenagers especially students so that parents can be successful in promoting their children's psychological welfare and preventing their psychic disorders with knowledge and using proper child parenting styles (as authoritative style) and avoiding inefficient methods of child parenting (as autocratic style).

Keywords: self-controlling, child parenting style, psychological welfare

Introduction

In modern world, health views have received vaster perspectives and non-medical determining factors of health have been faced with special attention. Each of these determinants has influence on health status in their self or by influencing each other and causes injustice in health status. These determinants include genetics; way of life, environment, and psychic-social-economic status, etc. that have significant effect on health and its consequences like life quality and psychological welfare.

One of axes of health evaluation related to different societies is psychic health of the societies. Certainly psychic health plays important role in insuring dynamism and efficiency of each society. Psychic health is among things which humans search in their lives. Since psychic health has been considered vital need for improving humans’ quality of life, World Health Organization (WHO) describes health as a mood of welfare in which a person recognizes his capabilities, uses them in effective and productive way and is useful for his own society [57]. Psychic health is a fundamental need and vital aspect for
improvement of human’s quality of life [58]. Approximately
60 years ago, WHO described health as a mood of
complete physical, psychic and social welfare rather than
just not being sick [57,58]. A decade later, Jahooda
criticized not being sick as psychic health criterion and
instead offered multiple criteria for determining psychic
health [28]. Unfortunately, no considerable development
was observed in application of these views in scientific
and practical areas for some times. In some places of the
world, indices of health status has been focused yet on
disease and negative concepts and fundamental concepts
of Epidemiology deal with death rate but not positive
performance level of people [42]. Health is a
multidimensional concept and includes merriness and
welfare feeling in addition to not being sick and unable
[32]. Most of psychiatrists, psychologists and researchers
of psychic health ignore positive aspects of health [42,48].
Some efforts made to transit from traditional patterns of
health have provided necessary ground for considering
health as a mood of welfare (not just being sick) but are
not enough. Of course new patterns of health emphasize
generally on negative features and in them measuring
tools of health often deal with bodily problems (mobility,
ache, marital problems, etc.), psychic problems
(depression, anxiety and concern) and social issues
(disability in playing social role, marital problems and etc.)
[43]. Psychic health has relation with inner enabling
features or inner resources of power. Presence of these
inner resources increases ability of a person for adaptive
growth in spite of adverse conditions and negative events
to keep his own psychic health. Psychologists and
psychiatrists know a person having healthy psyche who
has balance between his behaviors and control in dealing
with social problems [11]. But study around personal and
social effective determining factors on psychic health in all
aspects has become a necessity for health care system of
societies. A group of researchers in psychic health area
has chosen a different theoretical and research approach
to explain and study of this concept inspired by Positive
psychology perspective. They have treated psychic health
as equivalent to positive function of psychology and
conceptualized it in psychological welfare term. This
group knows lack of disease is not enough for feeling
health. It believes having satisfaction of life, sufficient
progress, effective and efficient interaction with world,
positive energy and creation of connection, desired
relation with all people, society and positive progress is
among features of healthy person and psychic welfare
[41,29]. This has changed a study around effective
personal and social determining factors on physical health
and psychic welfare into a necessity for health care
system of societies. Vising and Vanaden recognized a
general psychological welfare factor in 1997 and
described it as a combination of special qualities including
solidarity feeling, life satisfaction, emotion balance and
general approach to optimism or positive orientation to life
[15].

Reef knows psychological welfare as person’s
effort for vindicating his real potential abilities. Reef’s
model has been formed and developed through merging
different theories of personal growth (like Maslow’s self-
actualization and Rajerz’s perfect person) and adaptive
performance (like Jahooda’s positive psychic health
theory) [17]. Based on exact review of research literature
and developmental theories solidarity Reef reminded that
these views include similar and supplementary criteria of
positive psychological welfare [43]. Psychological welfare
is a multi dimensional context that includes merriness and
hope in addition to being healthy and lack of disability
[32,54]. Theoretical dimensions of positive psychological
welfare in recent view involve independency,
environmental dominance, personal growth, positive
relations with others, being purposeful in life and self-
acceptance. Mentioned pattern has been studied vastly in
all over the world [3,18,42]. On the other hand,
psychological welfare is related to personal and
environmental factors and healthy life condition as well as
healthy body. How environment and other factors
influence human’s psychological welfare structure and
with which way they deal with environmental conflicts are
matters proposed in different psychological approaches
and each describe human’s psychological welfare in a
special way according to their own views about human
nature and his impetus. Meanwhile two factors considered
in describing individuals’ psychological welfare by
researches are self-controlling and parents’ child
parenting style. Investigations suggest that self-controlling
has positive relation with psychic and physical health and
reduces negative effects of stress as an inner resistance
source and prevents from happening of psychic and
physical disorders and generally lead to rise of person’s
welfare [8,30]. In a condition that injured people’s psychic
welfare is influenced by negative consequences of
undesirable events, self-controlling and self-toleration are
personal inner sources that can moderate stress and
disability levels in undesirable conditions and cause less
brilliance of negative effects of stress [5]. One of
important skills which are characteristic of individuals’
psychic welfare is that they have self-controlling. People
who can prioritize realistic purposes and make balance
between feelings and wisdom while making decision are
self-controlling [4,6]. Self-controlling represents adaption
rate of self-behavioral characteristics and available
conditions and situation [31]. Self-controlling concept
which was developed by Schneider means a how flexible
or stable is a person in a special situation [30]. Results of
studies show people with high self-controlling have
highest social skill and desirable psychological welfare
[19]. Log describes self-controlling as this: addressing
those behaviors which results in further delayed rewards.
Self-controlling can be seen in various aspects for
example as a delay in gratification and practically as time
duration that a person waits to reach more valuable but
later consequence [33]. Adolescents use self- controlling
skills when they want to reach a long term purpose. For this they must waive from enjoyment of food, alcohol, gamble, spending money, etc. They did this through controlling temptations of lying, escape from made promise and also calming themselves for obtained failure. In many complicated and dual situation which need having choice by the adolescent, he must use self-controlling. So deficiency in self-controlling is main core of many problems in front of the adolescent. Insufficiency in self-controlling has relation with impulsiveness and anxiety and is indicative of inability in thinking about consequences of the behavior. Therefore, recognition and determination of influence of this important variable seem necessary on psychological welfare. On the other hand, parents’ child parenting style has meaningful influence on formation of children’s thoughts, behavior and emotions. According to vulnerability-stress model in psychic pathology, a number of researches have investigated role of factors related to the family as underlying factor in person’s vulnerability and psychic welfare [25,26]. Family has been always considered by related specialists due to its certain influence on children’s social and psychic growth. It is basis of community formation and keeping human emotions as smallest social unit and every deficiency in family’s performance causes undesirable effects on normalizing children [45]. Most of incompatible and problematic people live in families having inconsiderate and autocratic style and children in families with severe conflicts show further incompatible behaviors due to lack of psychic peace, further lack of concentration and disturbance and suffer from weaker psychological welfare [2,59].

In other words, relation between parents and children and other members of family can be seen as a system or network that interacts with each other. This system influences on children directly or indirectly through different styles and methods of child parenting. Child parenting styles are a set of trends, actions, and nonverbal expression that determine interaction nature of children and parents in all various situations. They have effect on different growth aspects of child of which can mention responsibility and self-controlling [52,53]. Bamyrand proposed for the first time autocratic, authoritative and inconsiderate child parenting styles. Based on Bamyrand’s theory, child parenting styles serve as medium between parents’ normal variables and children’s sociability. They also have supportive and non-supportive roles and consequences of applying each one is different on child’s evolution. Obtained results of some works have shown relation between child parenting styles and children’s social competencies and psychological welfare [10,60]. Also some studies emphasize on presence of relation between individuals’ psychic health status and their child parenting styles. In a study Shake studied influence of parents’ child parenting methods on adolescents’ psychic health. He concluded that parents’ child parenting features have correlation with adolescents’ psychic health. For example, autocratic parents provide children with anxiety more than other parents and are in second rank after style of indifferent (inconsiderate) parents [49].

Already a number of studies have been carried out about child parenting methods and their psychological results including role of mothers’ severe disciplinary methods in increasing children’s negative excitements [23], deficiency of participation, intimacy and reward in child-parents relationship as predicator of problems happening in the future [7], inconsiderate parents’ role in impulsiveness and aggression, dependency and responsibility in children [9], influence of excessive support of parents or their rejection in inner disorders of children and adolescents [14], autocratic child parenting effect on early identity and inconsiderate styles in identity disturbance [24]. Therefore, according to studies and importance of role related to self-controlling and child parenting style variables in explaining compatibility and psychic health, fundamental issue at present study is this: whether are self-controlling and child parenting styles able to predict students’ psychological welfare?

**Method**

Present study is sectional-descriptive type with correlation design that was carried out with aim of investigating relation between self-controlling and child parenting styles and psychological welfare of high school students in Abadeh City. Main variables studied in the research include self-controlling, child parenting style, and psychological welfare. Statistical population of present study consisted of all students of public high schools in Abadeh City in 2013-14. Sample size was obtained 370 persons according to purposes and type of the study and previous studies in this area and considering suppositions as significance level 95% and error 0.05 and chosen in stage-cluster sampling method from mentioned centers. In this work, Tangney’s revised scale of self-controlling, Bamyrand’s child parenting scale and Reef’s psychological welfare questionnaire were used related to aims of the study:

**A) Tangney’s self-controlling scale:** this test has been prepared by professor Tangney et al. in 2004 and has 36 items which have been provided with inspiration of previous studies and for eliminating defects of those questionnaires developed for self-controlling. Questions of this scale was answered based on Likert’s 5-point spectrum i.e. 1= it has similarity at all, 2= it has a few similarity, 3= incomparable similarity, 4= high similarity, 5= very high similarity. Total score of people participated in the test will be 36 ones in least case and 180 ones in maximum mood.

**Terms**

1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34 are scored
reversely. Tangney reported 0.89 as validity and credibility of these tools using Crohnbach's alpha [38]. Spencer (2005) reported its inner correlation coefficient as 0.92 using Crohnbach's alpha and Piquero et al. (2002) reported it as 0.84 [39,40]. Allahverdipoor et al. (2006) obtained 0.80 for its Crohnbach's alpha in their research on high school students of Tehran City which shows high inner consistency of the test [1].

B) Bamyrand’s child parenting styles questionnaire: this questionnaire is a self-reporting tools that has been developed by Diana Bamyrand (1967) and measured 3 child parenting styles with 30 items and based on Likert’s 5-point scale. 3 child parenting and their relatedlocations include:
1. Inconsiderate style: 1,6,10,13,14,17,19,21,24,28
2. Autocratic style: 2,3,7,9,12,16,18,25,26,29
3. Authoritative style: 4,5,8,11,15,20,22,23,27,30

The style with higher score is considered as dominant child parenting style. Credibility of this questionnaire was reported 0.81, 0.85, and 0.92 by Bamyrand in retest method for inconsiderate, autocratic, and authoritative child parenting styles respectively. She also reported about reliability of the questionnaire and showed that autocracy of mother has relation with her inconsideration (- 0.50) and rational authority (- 0.52) [21]. Buri (1991) has reported credibility of the questionnaire among mothers and fathers groups using retest method as following: 0.81, 0.86, 0.78 were obtained for respectively inconsiderate, autocratic and authoritative methods in group of mothers and 0.77, 0.80 and 0.92 related to these methods in group of fathers. He observed autocracy of mother has reverse relation with inconsideration (- 0.38) and rational authority (- 0.48) [16]. In a research done by Raisi (2004) in Iran, test reliability was reported for inconsiderate, autocratic, and authoritative styles in retest method as respectively 0.69, 0.77, and 0.73, which show acceptable credibility and validity of these tools [40].

C) Reef’s psychological welfare scale: this tool is a self-reporting scale that was developed by Reef in 1989 for measuring psychological welfare structures. This questionnaire has 84 items and 6 subscales which has 14 locutions and is responded based on Likert’s 6- point spectrum (1= completely disagree – 6= completely agree). To obtain score of each scale it is enough to sum scores of all locutions related to considered subscale. Total score of psychological welfare is revealed by score sum of 84 locations. In the scale, higher score shows better psychological welfare [42,43]. Validity and reliability of psychological welfare scales have been reported proper in various researches. Dierendonck (2005) reported that inner consistency of all subscales were appropriate and their Crohnbach’s alpha was between 0.77- 0.90 [20]. Schmitt and Reef (1997) obtained inner consistency of psychological welfare between 0.82- 0.90 [47]. In another work, Reef found inner consistency coefficient of scales between 0.86-0.93 [42]. Bayani et al. (2002) reported credibility and reliability of the questionnaire between 0.89- 0.90 in Iran showing desirability of this tool in Iranian sample [11]. Finally, data was analyzed which was gathered by statistical software SPSS and there is possibility of performing descriptive and inferential statistics. However, main methods for analysis of assumptions in this plan include: frequency, mean, percent, and also tests of Pearsonian correlation coefficient and multivariable regression analysis were used simultaneously to determine relation between studied variables.

Research questions
1. How much is predicting validity of students’ psychological welfare based on self-controlling?
2. How much is predicting validity of students’ psychological welfare based on child parenting styles?
3. How is comparison of predicting validity of students’ psychological welfare based on self-controlling and child parenting styles?

Findings
4-1 descriptive information related to sample group
In this section, descriptive and inferential statistics and information have been offered. Table 1 shows mean and standard deviation of variables studied in the research with understudied sample.

<table>
<thead>
<tr>
<th>Table 1. Mean and standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>scale</td>
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<tr>
<td>Psychological welfare</td>
</tr>
<tr>
<td></td>
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<td></td>
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<td></td>
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</tbody>
</table>
As findings of Table 1 show highest and lowest score means was respectively dedicated to self-acceptance scale (M=47.10, SD=6.257) and personal growth scale (M=44.99, SD=6.77) in psychological welfare questionnaire. Mean and standard deviation of self-controlling were 97.52 and 13.50 respectively. Highest mean score in questionnaire of child parenting style was obtained in scale of autocratic child parenting style (SD=3.65, M=29.32). Table 2 shows correlation matrix of self-controlling, child parenting styles and psychological welfare areas.

4-2 correlation between under studied variables

Table 2 correlation matrix between self-controlling, child parenting styles and psychological welfare areas.

<table>
<thead>
<tr>
<th>Psychological Welfare</th>
<th>Self-acceptance</th>
<th>Positive relationship with others</th>
<th>Autonomy</th>
<th>Dominance on environment</th>
<th>Purposeful life</th>
<th>Intellectual development</th>
<th>Inconsiderately</th>
<th>Autocratic</th>
<th>Authoritatively</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-acceptance</td>
<td>0.30**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive relationship with others</td>
<td>0.22**</td>
<td>0.04</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Autonomy</td>
<td>0.47**</td>
<td>-0.13</td>
<td>-0.19</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dominance on environment</td>
<td>0.36**</td>
<td>0.14</td>
<td>-0.24**</td>
<td>0.05</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purposeful life</td>
<td>0.44**</td>
<td>-0.31**</td>
<td>-0.03</td>
<td>0.21**</td>
<td>0.04</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personal growth</td>
<td>0.49**</td>
<td>-0.10</td>
<td>-0.123</td>
<td>0.23**</td>
<td>-0.14**</td>
<td>0.20**</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inconsiderate style</td>
<td>0.01</td>
<td>0.04</td>
<td>-0.07</td>
<td>-0.15**</td>
<td>0.25**</td>
<td>-0.02</td>
<td>-0.02</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Autocratic style</td>
<td>-0.12</td>
<td>-0.23**</td>
<td>-0.08</td>
<td>-0.05</td>
<td>0.12</td>
<td>0.114**</td>
<td>-0.12</td>
<td>-0.22**</td>
<td>1.00</td>
</tr>
<tr>
<td>Authoritative style</td>
<td>0.13</td>
<td>0.11**</td>
<td>-0.09</td>
<td>0.10‘</td>
<td>0.02</td>
<td>0.07</td>
<td>0.10</td>
<td>-0.09</td>
<td>-0.06</td>
</tr>
<tr>
<td>Self-controlling</td>
<td>-0.16**</td>
<td>-0.25**</td>
<td>0.05</td>
<td>-0.08</td>
<td>-0.20**</td>
<td>0.06</td>
<td>0.05</td>
<td>0.09</td>
<td>-0.04</td>
</tr>
</tbody>
</table>

*: p=<0.05 **: p=<0.001

Findings of Table 2 show that correlation between under studied variables has different levels and directions in this research. Highest score of positive correlation can be observed in the element of personal growth (r=0.49) and its lowest score can occurred in the element of positive relations with others (r=0.22) with total score of psychological welfare scale. Generally, element of positive relations with others has lowest correlation comparing with other Elements and scales in the research.

Among elements of psychological welfare scale and child parenting style, highest rate of positive correlation was observed in element of dominance on environment (r=0.25) with inconsiderate child parenting style while highest rate of negative correlation was seen in element of self-acceptance (r=0.23) with autocratic child parenting style. Also two elements of self-acceptance (r=0.25) and dominance on environment (r=0.20) had highest negative correlation coefficient with self-controlling scale.

Among different styles of child parenting, only two styles of inconsiderate and autocratic child parenting had negative correlation coefficient (r=0.22) with each other. There has not been observed meaningful
correlation between authoritative style and two other styles (Table 2).

4-3 investigating predictability of self-controlling on psychological welfare
To calculate predictability of self-controlling on psychological welfare and its elements, linear regression method was used with technique of enter of all variables simultaneously. Then tables of regression score of self-controlling scale on total score obtained from psychological welfare scale and a table including its all elements were investigated. Results of calculating regression for self-controlling predictability about psychological welfare represent presence of significance statistical relation ($r=0.158$, $r^2=0.025$, $F=8.94$, $P=0.003$). Therefore, investigation of predicting potential and direction of self-controlling about psychological welfare was considered in next step. Table 3 shows results of the investigation.

Table 3. Results of calculating regression predictability of self-controlling about psychological welfare

<table>
<thead>
<tr>
<th>Predicting variable</th>
<th>$P$</th>
<th>$T$</th>
<th>$\beta$</th>
<th>$B$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-controlling</td>
<td>0.003</td>
<td>2.99</td>
<td>-0.158</td>
<td>-0.164</td>
</tr>
</tbody>
</table>

Through investigating results represented in Tables 3,4 and according to $\beta$ value obtained in psychological welfare variable, high and reverse predicting potential of self-controlling scale was considered ($\beta=0.158$, $t=2.99$, $P=0.003$). Consequently, research supposition is supported and statistical supposition is rejected. So, according to findings we can say that in the research, the higher is person’s self-controlling, the lower success can be predicted for person in providing conditions that lead to psychological welfare. Or in other words, self-controlling acts as an inhibiting factor in learning necessary abilities for psychological welfare.

4-3-1 investigating predictability of self-controlling about elements of psychological welfare scale
To determine predictability rate of self-controlling about six elements of psychological welfare scale, linear regression method was used with technique of enter of all variables simultaneously. Calculation results of the regression have been brought in two Tables 4 and 5.

Table 4. Primary results of measuring variance of self-controlling variable in different aspects of psychological welfare

<table>
<thead>
<tr>
<th>Psychological welfare aspects</th>
<th>$R$</th>
<th>$R^2$</th>
<th>value $F$</th>
<th>Significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-acceptance</td>
<td>0.252</td>
<td>0.064</td>
<td>23.74</td>
<td>0.0001</td>
</tr>
<tr>
<td>Positive relationship with others</td>
<td>0.048</td>
<td>0.002</td>
<td>0.821</td>
<td>0.336</td>
</tr>
<tr>
<td>Autonomy</td>
<td>0.081</td>
<td>0.007</td>
<td>2.291</td>
<td>0.131</td>
</tr>
<tr>
<td>Dominance on environment</td>
<td>0.200</td>
<td>0.040</td>
<td>14.94</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

As the results in Table 4 show self-controlling variable has predicting potential for two elements of self-acceptance ($r=0.252$, $r^2=0.064$, $F=23.74$, $P=0.0001$) and dominance of environment ($r=0.200$, $r^2=0.040$, $F=14.94$, $P=0.0001$). Next investigations were done with these conditions. Tables 4,5 show results investigation of ability and direction of this scale for 6 aspects of psychological welfare scale.

Table 5. Self-controlling regressions about psychological welfare elements

<table>
<thead>
<tr>
<th>Predicting variable</th>
<th>$B$</th>
<th>$\beta$</th>
<th>$T$</th>
<th>$P$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-acceptance</td>
<td>11</td>
<td>-0.25</td>
<td>4.87</td>
<td>0.0001</td>
</tr>
<tr>
<td>Positive relationship with others</td>
<td>0.26</td>
<td>0.06</td>
<td>1.16</td>
<td>0.246</td>
</tr>
<tr>
<td>Autonomy</td>
<td>0.03</td>
<td>-0.08</td>
<td>1.51</td>
<td>0.131</td>
</tr>
<tr>
<td>Dominance on environmen t</td>
<td>0.08</td>
<td>-0.20</td>
<td>3.80</td>
<td>0.0001</td>
</tr>
<tr>
<td>Purposeful life</td>
<td>0.06</td>
<td>-0.06</td>
<td>1.16</td>
<td>0.264</td>
</tr>
<tr>
<td>Personal growth</td>
<td>0.02</td>
<td>-0.05</td>
<td>1.01</td>
<td>0.309</td>
</tr>
</tbody>
</table>

According to obtained data that has been brought in Tables 4,5, self-controlling variable has high and reverse predicting ability in two elements of psychological welfare i.e. self-acceptance ($\beta=0.181$, $t=4.87$, $P=0.0001$) and dominance of environment ($\beta=0.200$, $t=3.807$, $P=0.0001$). Therefore, research supposition is supported in these elements and is rejected in other elements. In other words, the results suggest that self-acceptance and person’s dominance on environment will decrease wherever person’s self-controlling is higher. It means self-controlling variable can influence as inhibiting variable on accepting abilities and weaknesses and also providing proper self-confidence in ability of dominance on environment.

4-4 Investigating predictability of child parenting styles about psychological welfare
To calculate predictability of self-controlling about psychological welfare and its elements, linear regression method was used with technique of enter of all variables simultaneously. Then tables of regression score of self-controlling scale on total score obtained from psychological welfare scale and a table including its all elements were investigated. Results of calculating regression for predictability of child parenting styles about
psychological welfare represent presence of significance statistical relation (r=0.177, r²= 0.031, F=3.85, P=0.01). These results justify presence of at least a significance statistical relation between various child-parenting styles. Therefore, investigation of predicting potential and direction of child parenting styles about psychological welfare was considered in next step. Table 6 shows results of the investigation.

Table 6. Calculation results of predictability regression of child parenting about psychological welfare

<table>
<thead>
<tr>
<th>Predicting variable</th>
<th>B</th>
<th>β</th>
<th>T</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inconsiderate style</td>
<td>-0.011</td>
<td>-0.004</td>
<td>0.068</td>
<td>0.946</td>
</tr>
<tr>
<td>Autocratic style</td>
<td>-0.428</td>
<td>-0.113</td>
<td>2.12</td>
<td>0.035</td>
</tr>
<tr>
<td>Authoritative style</td>
<td>0.434</td>
<td>0.130</td>
<td>2.437</td>
<td>0.014</td>
</tr>
</tbody>
</table>

Through investigating results represented in Table 6 and according to obtained β value, high predicting potential in two different directions in two autocratic (β= -0.113, t=2.12, P=0.035) and authoritative (with direct prediction β=0.434, t=2.437, P=0.014) styles was observed. Consequently, research supposition is supported in these two styles and statistical supposition is rejected. So, according to findings we can say that in the research, desirable psychological welfare can be reached by applying authoritative child parenting style and avoiding autocratic style. In other words, findings of this research suggest that inconsiderate child parenting style has no influence on people's psychological welfare. So, zero supposition is supported for this style.

4.4.1 Investigating predictability of child parenting styles about elements of psychological welfare scale

To determine predictability rate of three child-parenting styles about 6 elements of psychological welfare scale, linear multivariable regression method was used with technique of enter of all variables simultaneously. Calculation results of these regressions have been brought in two Tables 7 and 8.

Table 7. Preliminary results of variance for child parenting variable in different aspects of psychological welfare

<table>
<thead>
<tr>
<th>Psychological welfare aspects</th>
<th>R</th>
<th>R²</th>
<th>F value</th>
<th>Significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-acceptance</td>
<td>0.264</td>
<td>0.070</td>
<td>8.89</td>
<td>0.0001</td>
</tr>
<tr>
<td>Positive relationship with others</td>
<td>0.160</td>
<td>0.025</td>
<td>3.104</td>
<td>0.027</td>
</tr>
<tr>
<td>Autonomy</td>
<td>0.185</td>
<td>0.034</td>
<td>4.197</td>
<td>0.0001</td>
</tr>
<tr>
<td>Dominance on environment</td>
<td>0.319</td>
<td>0.102</td>
<td>13.427</td>
<td>0.0001</td>
</tr>
<tr>
<td>Purposeful life</td>
<td>0.062</td>
<td>0.004</td>
<td>1.35</td>
<td>0.264</td>
</tr>
<tr>
<td>Personal growth</td>
<td>0.139</td>
<td>0.019</td>
<td>2.353</td>
<td>0.070</td>
</tr>
</tbody>
</table>

According to results brought in Table 7 it can be seen that child parenting styles do not have enough variance for proper comparison of groups only in two elements of purposeful life (r=0.022, r²=0.004, F=1.35, P=0.264) and personal growth (r=0.139, r²=0.019, F=2.353, P=0.07). In this condition, it is expected that at least one of the styles has high ability for prediction in other aspects of psychological welfare. Accordingly, next investigations were carried out. Table 8 shows investigation results of ability and direction of this scale for 6 aspects of psychological welfare scale.

Table 8. Calculation results of predictability regression for child parenting about psychological welfare

<table>
<thead>
<tr>
<th>Psychological welfare aspects</th>
<th>Predicting variable</th>
<th>B</th>
<th>T</th>
<th>P</th>
<th>β</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-acceptance</td>
<td>Inconsiderate style</td>
<td>0.962</td>
<td>0.047</td>
<td>0.002</td>
<td>0.003</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Autocratic style</td>
<td>0.000</td>
<td>4.542</td>
<td>-0.239</td>
<td>-0.393</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Authoritative style</td>
<td>0.056</td>
<td>1.920</td>
<td>0.099</td>
<td>0.145</td>
<td></td>
</tr>
<tr>
<td>Positive relationship with others</td>
<td>Inconsiderate style</td>
<td>0.050</td>
<td>-1.967</td>
<td>-0.106</td>
<td>-0.144</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Autocratic style</td>
<td>0.041</td>
<td>-2.049</td>
<td>-0.110</td>
<td>-0.190</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Authoritative style</td>
<td>0.053</td>
<td>-1.944</td>
<td>-0.102</td>
<td>-0.157</td>
<td></td>
</tr>
<tr>
<td>Autonomy</td>
<td>Inconsiderate style</td>
<td>0.004</td>
<td>-2.874</td>
<td>-0.154</td>
<td>-0.186</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Autocratic style</td>
<td>0.164</td>
<td>-1.394</td>
<td>-0.075</td>
<td>-0.114</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Authoritative style</td>
<td>0.119</td>
<td>1.563</td>
<td>0.082</td>
<td>0.111</td>
<td></td>
</tr>
<tr>
<td>Dominance on environment</td>
<td>Inconsiderate style</td>
<td>0.000</td>
<td>5.794</td>
<td>0.300</td>
<td>0.356</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Autocratic style</td>
<td>0.000</td>
<td>3.802</td>
<td>0.196</td>
<td>0.296</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Authoritative style</td>
<td>0.208</td>
<td>1.260</td>
<td>0.064</td>
<td>0.085</td>
<td></td>
</tr>
<tr>
<td>Purposeful life</td>
<td>Inconsiderate style</td>
<td>0.850</td>
<td>0.189</td>
<td>0.010</td>
<td>0.012</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Autocratic style</td>
<td>0.025</td>
<td>2.253</td>
<td>0.121</td>
<td>0.185</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Authoritative style</td>
<td>0.131</td>
<td>1.513</td>
<td>0.080</td>
<td>0.108</td>
<td></td>
</tr>
<tr>
<td>Personal growth</td>
<td>Inconsiderate style</td>
<td>0.488</td>
<td>-0.694</td>
<td>-0.037</td>
<td>-0.053</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Autocratic style</td>
<td>0.028</td>
<td>-2.199</td>
<td>-0.118</td>
<td>-0.211</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Authoritative style</td>
<td>0.090</td>
<td>1.701</td>
<td>0.090</td>
<td>0.142</td>
<td></td>
</tr>
</tbody>
</table>
With a glance at Table 8 it can be found that autocratic style has meaningful and reverse relation in most of psychological welfare aspects (self-acceptance $\beta=-0.393$, $t=4.542$, $P=0.0001$; positive relations with others $\beta=0.144$, $t=2.049$, $P=0.041$; personal growth $\beta=-0.028$, $t=2.199$, $P=0.028$) but this relation is positive and meaningful in aspect of dominance on environment ($\beta=0.296$, $t=3.802$, $P=0.0001$). In other words, further applying of autocratic style leads to fall of self-acceptance level, having positive relations with others, personal growth and morale increase of dominance on environment. Inconsiderate child parenting style has second highest predicting ability following autocratic style. This style has reverse relation with two aspects of positive relations with others ($\beta=0.144$, $t=1.976$, $P=0.05$) and self-autonomy ($\beta=0.186$, $t=2.874$, $P=0.00$) and direct relation with dominance on environment ($\beta=0.356$, $t=5.794$, $P=0.0001$). This result suggests that inconsiderate child parenting style reduces expecting positive relations with others and ability of self-autonomy and increases tendency for dominance on environment. On the other hand, psychological aspect of relation with others is the only aspect that has shown reverse and meaningful predicting ability in every 3 child parenting styles.

4-5 Comparison of predictability for child parenting styles and self-controlling about psychological welfare

To compare predictability of child parenting styles and self-controlling about psychological welfare, linear multivariable regression was used with technique of stepwise enter. In the following, first investigation of score correlation tables for child parenting and self-controlling scales about total score obtained from psychological welfare scale and then regression tables were performed. Table 9 includes information about correlation investigation of child parenting styles and self-controlling about psychological welfare.

Table 9. Correlation coefficients of self-controlling and child parenting styles variables about psychological welfare

<table>
<thead>
<tr>
<th>Predicting variable</th>
<th>Number</th>
<th>R</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-controlling</td>
<td>341</td>
<td>-0.12</td>
<td>0.013</td>
</tr>
<tr>
<td>Inconsiderate style</td>
<td>341</td>
<td>0.015</td>
<td>0.390</td>
</tr>
<tr>
<td>Autocratic style</td>
<td>341</td>
<td>-0.126</td>
<td>0.010</td>
</tr>
<tr>
<td>Authoritative style</td>
<td>341</td>
<td>0.143</td>
<td>0.004</td>
</tr>
</tbody>
</table>

As findings obtained from Table 9 show, primary results of investigating correlation of self-controlling and child parenting styles with psychological welfare suggest meaningful correlation of three variables of self-controlling, autocratic, and authoritative styles with psychological welfare. The variable “inconsiderate style” was excluded from calculation process because of its lower correlation rate with psychological welfare. Therefore, next steps of regression were performed based on three other variables.

Table 10. Predictable variance amount as stepwise by under studied variables in predicting psychological welfare

<table>
<thead>
<tr>
<th>Predicting variable of variance</th>
<th>R</th>
<th>$R^2$</th>
<th>F value</th>
<th>Significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Authoritative style</td>
<td>0.143</td>
<td>0.021</td>
<td>7.109</td>
<td>0.008</td>
</tr>
<tr>
<td>Self-controlling and authoritative style</td>
<td>0.188</td>
<td>0.035</td>
<td>6.168</td>
<td>0.002</td>
</tr>
<tr>
<td>Self-controlling and authoritative and autocratic styles</td>
<td>0.225</td>
<td>0.051</td>
<td>5.987</td>
<td>0.001</td>
</tr>
</tbody>
</table>

Based on results represented in Table 10, variable of authoritative style has alone predicting ability 0.143 of variance of psychological welfare variable. By adding two other variables i.e. self-controlling and autocratic style, this figure increases to 0.188 and 0.225. Accordingly, regression coefficients of these variables were calculated in stepwise way. Table 11 shows these results.

Table 11. Different models of regression with stepwise increase of variables for calculating predictability of variables having ability to predict psychological welfare

<table>
<thead>
<tr>
<th>Stage</th>
<th>Variables</th>
<th>P</th>
<th>T</th>
<th>$\beta$</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>One variable</td>
<td>Authoritative style</td>
<td>0.008</td>
<td>2.666</td>
<td>0.143</td>
<td>0.505</td>
</tr>
<tr>
<td>Two variables</td>
<td>Authoritative style</td>
<td>0.008</td>
<td>2.684</td>
<td>0.143</td>
<td>0.506</td>
</tr>
<tr>
<td></td>
<td>Self-controlling</td>
<td>0.024</td>
<td>2.267</td>
<td>-0.121</td>
<td>-0.140</td>
</tr>
<tr>
<td>Three variables</td>
<td>Authoritative style</td>
<td>0.010</td>
<td>2.599</td>
<td>0.138</td>
<td>0.487</td>
</tr>
<tr>
<td></td>
<td>Self-controlling</td>
<td>0.019</td>
<td>2.365</td>
<td>-0.126</td>
<td>-0.145</td>
</tr>
<tr>
<td></td>
<td>Autocratic style</td>
<td>0.02</td>
<td>2.337</td>
<td>-0.124</td>
<td>-0.427</td>
</tr>
</tbody>
</table>

With reference to results obtained from Table 11, it is understood that highest rate of predicting potential belongs directly to authoritative style of child parenting and following that is reversely in self-controlling and autocratic style.

Discussion

Before starting discussion about findings and results, it is worth mentioning that demographic information of testees was offered based on gender, education grade, field of study, education stand of parents and economic status of the family and testees were matched based on this information. However, 56.5% and 43.5% of participants were among girls and boys respectively. Most of studied sample students (48.6%) have educated in second grade in high school. Also most of them have studied in experimental field. About education stand of parents, most of fathers (50.3%) had diploma and most of mothers (47.6%) were with education stand of under diploma. In addition, most of
studied sample (67.4%) reported their economic status in medium level. Average score of students' self-controlling was reported 97.52% and this figure suggests desirable status of self-controlling in the sample of present research. Highest score in elements of psychological welfare scale was dedicated to self-acceptance with 47.10%, which shows the students have more desirable status in self-acceptance. Also, autocratic child parenting style has received highest average (29.32%) among elements of child parenting styles. This finding implies that autocratic child parenting style has been used more than other styles by parents of the students.

The findings represent correlation between studied variables has different levels and directions in this research such that highest rate of positive correlation for total score of psychological welfare scale can be observed with personal growth element and its lowest rate is with positive relations with others. Generally, element of positive relations with others has lowest correlation with other elements and scales of this work. Among elements of psychological welfare scale and child parenting styles, highest positive correlation was observed between element of dominance on environment and inconsiderate child parenting style and highest negative correlation belonged to element of self-acceptance and autocratic child parenting style. Also, two elements of self-acceptance and dominance on environment have highest negative correlation coefficient with self-controlling scale. Among various styles of child parenting, only two styles of autocratic and inconsiderate child parenting have negative correlation coefficient with each other. No meaningful relation of correlation has been shown between authoritative style and two other styles. As findings about first question of the research i.e. “how much is predicting ability of students’ psychological welfare based on self-controlling?” show results of calculating predicting regression of self-controlling about psychological welfare, suggest presence of meaningful statistical relation. According to findings and $\beta$ value obtained in psychological welfare variable, it can be concluded that self-controlling has high and reverse predicting potential about psychological welfare. These results are along with findings of other studies [8,13,30,50,56]. Findings of these researches significantly suggest self-controlling has high predicting potential about variants like social compatibility, responsibility, solving conflict, psychic health, and psychological welfare. However, in most of studied, direction of predicting potential of self-controlling about these variables were positive while in present study, self-controlling has reverse predicting ability about psychological welfare. Therefore, based on findings it can be said that in the work, the higher person’s self-controlling, the lower success is expected for person in creating conditions that lead to psychological welfare. In other words, self-controlling acts as an inhibitive factor in learning necessary abilities for psychological welfare. For predictability of self-controlling about psychological welfare scale, research findings show self-controlling variable has high and reverse predicting potential in two elements of psychological welfare scale i.e. self-acceptance and dominance on environment. In other elements, self-controlling did not show significant statistical predicting potential. In other words, the results of the study indicate self-acceptance and dominance on environment rates reduce wherever person’s self-controlling is higher. This means that self-controlling can be influencing as an inhibitive variant in accepting abilities and weaknesses and also providing proper self-confidence in ability for dominance on environment. In explaining these findings it can be said that self-controlling is an unique personality feature that is different in various people i.e. individuals who have high self-controlling show different reactions according to their level of self-controlling and behave differently or people with high self-controlling prefer compatibility and accordance with their environment rather than dominance on environment and self-acceptance and this area requires necessity of doing accurate and extensive studies by specialists. Also, Mayer and Salovey introduce self-controlling under title of correct application of excitements and believe power of adjusting feelings cause increase of personal capacity to mitigate himself, understanding popular anxieties, depressions or impatience [36]. People with weak self-controlling encounter permanently with hopelessness, depression and uninteresting to action and use weaker psychological skills. While people with strong skill in this area can pass misfortunes more quickly and have desirable elements of psychological welfare [44] and this finding is not in agreement with findings of present study. As findings about second question of the research i.e. “how much is students’ predicting ability of psychological welfare based on child parenting styles?” show results of calculating predicting regression of child parenting styles about psychological welfare represent existence of significant statistical relation. These results suggest existence of at least one significant statistical relation between various styles of child parenting. According to research findings and obtained $\beta$ value, high predicting potential about psychological welfare in two directions in two autocratic and authoritative styles can be understood. Based on this finding of the research it can be seen that utilizing authoritative child parenting style and avoiding autocratic style can lead to desirable psychological welfare. On the other hand, findings of this work suggest that inconsiderate child parenting style has no effect of individuals’ psychological welfare. These results agree with findings of other studies [22,27,34,35,39,40,55]. Findings of these studies significantly justify that there is meaningful relation between type of child parenting style and psychic health and psychological welfare.

By reviewing previous studies, it seems that adolescents and youth are self-confident, calm, and
hopeful in families with authoritative style and their personal identity is not injured. Also this method accompanies with further attachment to parents especially during childhood and further satisfaction of life and provides ground for further feeling of being worthwhile and self-confidence in adolescent and as a result more desirable psychic health status. On the other hand, autocratic treatment with children can provide ground for happening of mental disorders and derangement as well as undesirable emotional effects and low self-confidence. In this regard, some experts believe authoritative child parenting style relates to individuality and independency feeling of the child in the family unlike autocratic style which is so important in promoting psychic health and psychological welfare. While autocratic child parenting style injures individuality and independency of children in the family with cruel, limiting and extreme controlling treatments [7]. For predictability of child parenting styles about 6 elements of psychological welfare, research findings show autocratic child parenting style has meaningful and reverse relation with most aspects of psychological welfare like self-acceptance, positive relations with others and personal growth but in aspect of dominance on environment, this relation is meaningful and positive. In other words, further applying of autocratic style leads to reduction level of self-acceptance, positive relations with others and personal growth and morale increase of dominance on environment. Also these findings represent inconsiderate child parenting style has second rank for maximum potential of predicting following autocratic style. This style has reverse relation with two aspects of positive relations with others and autonomy and direct relation with dominance on environment. It is concluded that inconsiderate child parenting style reduces persons’ expectation for positive relations with others and ability of autonomy and increases person’s tendency to dominate on environment. In other words, psychological aspect of relations with others is the only aspect about which each 3 child parenting styles have shown meaningful and reverse predicting potential. Results of present research are in agreement with results of previous researches [7,27,55,40] and show child parenting methods have meaningful influence on psychic health and psychological welfare. In other words, autocratic child parenting style has worst influence on status of psychological welfare comparing to other styles. It can be mentioned that the more autocratic style is used, the more providing conditions and factors are inhibited which lead to psychological welfare. Also, inconsiderate method results in undesirable status in psychic health and psychological welfare for children because of rise of autonomy chance for children and ignorance of parents about them instead of disciplinary behavior following autocratic style. Generally, findings of this research characterize child parenting methods influence status of psychological welfare. Such that ability of predicting for each method about psychological welfare is different and authoritative style has maximum ability of direct prediction about psychological welfare. While autocratic style has meaningful and reverse relation with psychological welfare. Also, autocratic and inconsiderate child parenting methods have respectively maximum meaningful and reverse ability for prediction about 6 elements of psychological welfare.

As findings about third question of the research i.e. “how is comparison of students’ predicting ability of psychological welfare based on self-controlling and child parenting styles” show authoritative child parenting method has highest ability of direct prediction about psychological welfare and is followed by self-controlling and autocratic style with reverse but not direct prediction. In explaining these findings, it can be noted that in authoritative child parenting method, parents have high level of control and responding and their children are social and effectively competent and have less behavioral problems [12] and high psychological welfare but in autocratic style, parents apply high level of control and low level of responding. They expect their children obey them and often punish their children for preventing from disobedience. In inconsiderate style, parents are so responsive unlike strict parents, permit much autonomy for children, and do not oblige them to have immature behavior [46]. Influence of autocratic child parenting on early identity and of inconsiderate styles on identity disorder has been supported in several researches [24]. Agreement is on existence of relation between child parenting style and different consequences including psychic pathology, behavioral problems and educational achievement [37,55]. Thompson et al. reminded autocratic child parenting approaches as a danger for behavioral problems [52] and Turner et al. characterized in a research with aim of determining relation of authoritative child parenting style with educational achievement, self-efficacy and progress motivation on university students that authoritative child parenting has also positive effect on students’ educational achievement and inner motivation and education self-efficacy [53]. Generally, results of these studies show psychological welfare and psychic health have direct meaningful correlation with authoritative child parenting method and reverse and meaningful correlation with autocratic child parenting method. Also, findings of present research show self-controlling has maximum meaningful and reverse ability to predict about psychological welfare after authoritative child parenting method. Or in other words, self-controlling in this research acts as an inhibitive factor in providing psychological welfare.

Conclusion

One of evaluation axes for health of different societies is their psychological welfare. Undoubtedly, psychological welfare plays important role in securing dynamism and efficiency for each society and meanwhile
self-controlling and methods of child parenting are important as two factors influencing on adolescents' psychological welfare. According to results obtained from this research, psychological welfare has direct correlation with authoritative child parenting style and high meaningful reverse correlation with autocratic style. In other words, it can be said that in this research, desirable psychological welfare will obtain by utilizing authoritative child parenting style and avoiding autocratic style. Also, autocratic child parenting style has reverse and meaningful relation with most aspects of psychological welfare as self-acceptance, positive relations with others and personal growth but this relation is positive and meaningful in dominance on environment aspect. In other words, further application of autocratic style leads to reduction level of self-acceptance, positive relations with others and personal growth and morale increase of dominance on environment. In addition, findings of this research show self-controlling have high and reverse potential to predict psychological welfare. Or in another direction, self-controlling acts as an inhibitive factor in learning necessary abilities for psychological welfare. Therefore, it is recommended that methods of child parenting are considered as a preventive and promoting strategy for psychological welfare in health programs for all adolescents especially students so that parents can promote their children's psychological welfare and be successful in preventing from children's psychic disorders with knowledge and using proper method of child parenting (as authoritative style) and avoiding inefficient method of child parenting (as autocratic style) and nurturing their children's self-controlling skills.

Research suggestions

1- Holding training and justifying programs for families and providing knowledge for parents about influence of their child parenting methods on their children's psychological welfare.
2- Holding courses for self-controlling skills and rate and situation of using these skills related to students' abilities.
3- Attention to understanding parents' child parenting methods and self-controlling skills to promote students' psychological welfare.
4- Determining influencing variables on students' psychological welfare and trying to promote these variables such that they lead to increase their psychic welfare and promotion of life quality.
5- Based on high and reverse predicting potential of self-controlling variable about psychological welfare, it is necessary to do comprehensive and exact studies about influencing mechanism of this variable on psychological welfare by specialists and psychologists as much as possible.

Research limitations

This research has been performed on high school students of Abadeh City and generalization of its results to other communities must be done accurately. Also, results of this research cannot be generalized to student societies of other cities and provinces especially those with so different cultural, ethnic and training from Abadeh City features due to limitation of above community and it is necessary to be careful in generalizing results of the research.

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Priorities of continuing education for general practitioners in Kashan University of Medical Sciences 2013

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Abstract

Introduction: Continuing the medical education has already been a concern, as a universal principle and necessity in the world, so that the World Health Organization has also recognized it as an urgent necessity. The aim of the study was the assay of priorities of continuing education for general practitioners at Kashan University of Medical Sciences.

Materials and Methods: In this cross-sectional study, 212 out of 600 general practitioners participating in the continuing the medical education programmes held by KUMS were covered. After being interviewed about their needs and interest in the programmers, a questionnaire containing demographic data such as the education needed, way of teaching, etc., was given to them. The data were then analyzed by SPSS v 11.5.

Results: 137 (64.6%) cases were males and 75 (48.3%) were females. Also, 38 (17.9%) individuals were working in emergency wards. Findings indicated that the first priority of the programs was the internal diseases emergency, and then the pediatric common diseases. The third priority was the infectious common diseases.

Conclusions: The needs of the CME and the use of the appropriate methods to match the content of the training needed the assessment of the GP training program design painting by the learners, thus improving quality and increasing the productivity of CME applications.

Keywords: continuing education, medical sciences, general practitioners

Introduction

Continuing medical education has already been a concern, as a universal principle and necessity in the world, so that the World Health Organization has also recognized it as an urgent necessity. At the world conference of medical education in Edinburgh 1993, CME was emphasized as a necessary activity for the maintenance of professional standards and skills. It was declared that in order for the medical educations to be more effective and relevant, the educations should be given based on the needs of the graduates [1,2]. Since continuing medical education is to enhance the physicians’ knowledge and functionality, gain advantageous standards for the medical services matched with the needs of society, and promote the health level, the assessment and consideration of the needs of this group is of value. Various studies have been conducted on CME in different countries in which different methods for the assessment and design of the CME programmes have been evaluated. Davis investigated about 1% of the studies done in this regard. He declared that programmes provided for physicians or those addressed by the CME were all satisfactory and designed based on their needs, beliefs, and opinions. He hoped the programmes were more attractive and could promote professional capacities of the participants [3]. Also in Iran, continuing the medical education was given much attention. It is growing both from the quantitative and from the qualitative point of view. Nevertheless, since various programmes were scheduled and performed for general practitioners, it is important to what extent these programmes were principally designed and according to the needs of learners or how they contributed to the promotion of providing health and therapeutic services. Few studies in Iran revealed that a part of CME programmes could not meet the real needs and concerns of the society due to an incorrect recognition and prioritization of educational needs. Therefore, the education given had a trivial value. For instance, based on a study conducted in the Medical University of Zahedan on the attitudes of general practitioners on the contents of CME programmes, 87.8% of the participants asked for more applied programmes, 78.2% were interested in previous discussions, information, and sources; 76.3% requested seasonal and domestic
discussions selected according to surveys. Regarding the proportion of time to the contents of internal and surgical programmes, 85.3% and 83.9% of the physicians found it inappropriate, respectively. 50% of the participants mentioned no positive point for the programmes. Based on the above-mentioned findings, monitoring factors and cases such as carefully selected discussions, setting times for each discussion, prioritizing domestic and seasonal diseases, using survey results for the selection of discussions, and giving information to participants about the contents and resources were recommended in order to improve continuing medical education [4]. Another study entitled “Attitudes of general practitioners towards their profession” was carried out in Kashan University of Medical Sciences in 1380. The findings were the following:

Mostly, physicians had a problem with the diagnosis and the interpretation of radiographs. They rarely had a problem with the examination of the patients. In the case of drug prescription, drug interactions were their main concern. General practitioners requested to perform CME courses in the field of emergency skills, nutrition, and radiography interpretation. Emergency skills, toxicities, and cardiac pulmonary arrest were the main problems physicians were encountered with. Consequently, meeting the physicians’ needs, especially those focused on by the physicians themselves was necessary to achieve the best outcomes in order to continue medical education. Therefore, since reviewing opinions of learners is considered one of the vital ways to improve the quality of continuing education, using their ideas could be effective and could guarantee the quality of the programmes. Thus, this study’s aim was to determine the attitudes of general physicians towards their educational priorities and programmes of the medical continuing education performed in Kashan University of Medical Sciences during 2012 and 2013.

Methods

212 out of 600 general practitioners participating in the continuing medical education programmes held by Kashan University of Medical Sciences were covered in this cross-sectional study. After being interviewed regarding their needs and interest in the programmes, a questionnaire containing demographic data such as education needed, way of teaching, etc., was given to them. The data were then analyzed by SPSS. The validity of the study was assessed by studying at least 30 of the physicians by using Cronbach’s alpha coefficient. Related experts confirmed the reliability of the study based on similar studies.

Results

This study covered 212 general practitioners and experts (10 cases) in Kashan of whom, 137 (64.6%) were males and 75 (48.3%) were females. 95 (45%) were recruited officially or by contract, 1 (5%) was working on a project, 66 (31.1%) were businessmen, and 10 (4.7%) were faculty members (Table 1 and 2).

Table 1. Prevalence distribution of priority for continuing medical education in the view of general practitioners

<table>
<thead>
<tr>
<th>Methods of Teaching in CME</th>
<th>Times of being selected as the first priority (%)</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methods of Lecturing in CME</td>
<td>64 (30.3)</td>
<td>212 (100)</td>
</tr>
<tr>
<td>Methods of questioning and Answering in CME</td>
<td>74 (22.2)</td>
<td>212 (100)</td>
</tr>
<tr>
<td>Methods of Group Work in CME</td>
<td>35 (16.5)</td>
<td>121 (100)</td>
</tr>
<tr>
<td>Methods of teaching Case Reports in CME</td>
<td>71 (33.5)</td>
<td>212 (100)</td>
</tr>
</tbody>
</table>

Table 2. Prevalence distribution of priority for continuing medical education in the view of general practitioners

<table>
<thead>
<tr>
<th>Type of continuing the education programme</th>
<th>Times of being selected as the first priority (%)</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuing education programmes</td>
<td>76 (35.8)</td>
<td>212 (100)</td>
</tr>
<tr>
<td>Conferences of CME</td>
<td>9 (4.2)</td>
<td>212 (100)</td>
</tr>
<tr>
<td>Seminars of CME</td>
<td>8 (3.8)</td>
<td>212 (100)</td>
</tr>
<tr>
<td>Workshops of CME</td>
<td>13 (6.1)</td>
<td>212 (100)</td>
</tr>
<tr>
<td>Educational symposium of CME</td>
<td>6 (2.8)</td>
<td>212 (100)</td>
</tr>
<tr>
<td>Congresses of CME</td>
<td>18 (8.5)</td>
<td>212 (100)</td>
</tr>
<tr>
<td>Professional short-term programmes of CME</td>
<td>29 (13.7)</td>
<td>212 (100)</td>
</tr>
<tr>
<td>Self-educated programme in CME</td>
<td>37 (17.5)</td>
<td>212 (100)</td>
</tr>
</tbody>
</table>

38 (17.9%) individuals were working in emergencies, 41 (19.3%) in hospitals, 62 (29.2%) in private offices, 8 (3.8%) in private clinics, 18 (8.5%) in health and hygiene centers, and 14 (6.6%) in other centres. Among the 212 participants, 27 and 77 individuals were the youngest and oldest physicians, respectively with a mean age of 41 years. 162 cases had a work experience of 11.3 years (1-41 years of work experience) (Table 3 and 4).
Table 3. Prevalence distribution of priority for time of continuing medical education in the view of general practitioners

<table>
<thead>
<tr>
<th>Day</th>
<th>Times of being selected as the first priority (%)</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saturday</td>
<td>39 (18.4)</td>
<td>212 (100)</td>
</tr>
<tr>
<td>Sunday</td>
<td>13 (6.1)</td>
<td>212 (100)</td>
</tr>
<tr>
<td>Monday</td>
<td>20 (9.4)</td>
<td>212 (100)</td>
</tr>
<tr>
<td>Thursday</td>
<td>22 (10.4)</td>
<td>212 (100)</td>
</tr>
<tr>
<td>Wednesday</td>
<td>26 (12.3)</td>
<td>212 (100)</td>
</tr>
<tr>
<td>Tuesday</td>
<td>85 (40.1)</td>
<td>212 (100)</td>
</tr>
</tbody>
</table>

Table 4. Prevalence distribution of priority for continuing medical education in the view of general practitioners

<table>
<thead>
<tr>
<th>Type of continuing the education programme</th>
<th>Times of being selected as the first priority (%)</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal diseases emergency</td>
<td>141 (66.5)</td>
<td>212 (100)</td>
</tr>
<tr>
<td>Pediatric common diseases</td>
<td>100 (47.2)</td>
<td>212 (100)</td>
</tr>
<tr>
<td>Infectious common diseases</td>
<td>100 (47.2)</td>
<td>212 (100)</td>
</tr>
<tr>
<td>Cardiovascular common diseases and emergency</td>
<td>98 (46.2)</td>
<td>212 (100)</td>
</tr>
<tr>
<td>Digestive common diseases</td>
<td>92 (43.4)</td>
<td>212 (100)</td>
</tr>
</tbody>
</table>

Discussion

The main purpose for the performance of the continuing education programmes for the general physicians or other groups addressed was to fulfill their basic needs so as to promote their professional abilities. Performing an appropriate assessment was the main way to achieve that goal. That helped the executers design more effective and useful programmes. The main priorities in this study included 141 (66%) cases of internal diseases emergency, 100 (47.2%) cases of pediatric common diseases, 98 (46.2%) cases of common cardiovascular diseases, 98 (46.2%) cases of cardiovascular disease emergency, 92 (43.3%) cases of digestive common diseases and paraclinic laboratorial results, 85 (40.1%), cases of pediatric diseases emergency, and 82 (38.7%) cases of surgical disease emergency. In their study “Continuing education needs of general practitioners”, Abolghasem Amini et al. concluded that their priorities were the following: injuries and events emergency (61.7%), heart internal diseases (60.4%), skin diseases (58.5%), internal common emergency (58.2%). As it was shown, heart diseases along with internal emergency had the highest rate of consistency in our study. Also, in a study conducted by Abbasalat Borji in Zahedan Medical University [3], internal diseases (85.9) were prioritized over others. That result was in consistency with the one in the present study. Abdollahossein Shokournia et al. believed that the main educational needs were related to the internal diseases just as mentioned in our study [5].

Moreover, that study showed that the physical educational activity in performing the continuing education programmes (52 cases, 24.5%), case report representation (71 cases, 33.5%), and type of programme (76 cases, 35.8%) were the main priorities. However, based on a study done in Zanjan in 1389, the general practitioners evaluated the efficacy of the continuing education programmes as average or low, which was not the same as that in our study [6]. The results gained by Mehdi Amirnia et al. [7]. confirmed the inefficiency of the way of lecturing versus the active methods of teaching. According to a Canadian study, lecturing did not have any effect on changing the clinical function or health care, which was stated in our study as well. Programmes of the continuing education mostly focused on giving new and latest information about treating patients (92 cases, 43.4%). This was consistent with the results gained by Mehdi Amirnia and colleagues. Mandana Shirazi et al. [8], concluded that lecturing using videos (52%) and types of programmes (58.3%) were the most common ways for continuing education, which was in line with our study. Also, this study demonstrated that the best time to hold the programmes was on Thursdays (85 cases, 40.1%). The length of one-day programmes (84 cases, 39.6%) was two hours (43 cases, 20.3%), while for the programmes lasting for more than two days, the participants included 48 individuals (7.30%). These results were the same as those given by Abolghasem Amini et al. [9]. in the Medical University of Tabriz, in which the best days were Thursday (61%) and Friday (52%). The best time was before noon as well. According to our study, the top priorities in continuing education programmes included internal diseases emergency, common pediatrics diseases, infectious diseases, common cardiovascular diseases and emergency, and common digestive diseases, respectively.
Results

Since the educational needs of general practitioners, the application of novel methods for the evaluation of the target population, and the consistency of educational content with the general practitioners’ educational needs all contribute to the promotion of continuing the education programmes, they will consequently lead to a general satisfaction among the learners. The top priorities in this study included internal diseases emergency, common pediatric and infectious diseases, common cardiovascular diseases, and common digestive problems, respectively.

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The authors declare that they have no competing interests.

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Prevalence of Hepatitis B infection among Qeshm Island population in 2013-2014, Iran

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Abstract
Introduction: About 1/3 of the world population (2 billion) suffers from HBV infection. 15 to 40% of Hepatitis B cases develop into chronic hepatitis, cirrhosis, and hepatocellular carcinoma (HCC). Considering the dangerous complication of the disease and the fact that the prevalence is different in various areas of the country, this study was conducted with the purpose of determining the prevalence of the Hepatitis B among Qeshm Island population.

Method: This cross-sectional study was conducted on 1500 subjects. The sampling method was the stratify-cluster combination. After completing the checklist, including the demographic data and risk factors, blood samples were drawn. The prevalence of HBsAg was assessed by ELISA method. Finally, the statistical analyses were performed by using the Statistical Program for Social Sciences software (SPSS) system version 16.0. The data were analyzed by Chi-square and descriptive statistical tests.

Result: The overall prevalence of HBsAg positivity was 1%, 0.8%, and 1.1% among men and women, respectively. The mean age of participants was 30.07 years. Infection was more prevalent in married persons, students, lower than in 15-years-old educated people and persons who had a history of vaccination and transfusion. The prevalence of Hepatitis B in people who had a history of sex and substance infusion was zero. Finally, the results of the study showed that none of the investigated factors was related to the prevalence of HBsAg.

Conclusion: It seems that the prevalence of HBV infection in Qeshm is slightly lower than that of the nation.

Keywords: epidemiology, Hepatitis B, Qeshm

Introduction
Hepatitis B virus (HBV) was discovered in 1966. According to the World Health Organization (WHO), HBV infected almost 1/3 of the world’s population (2 billion) [1], among whom more than 350 million people worldwide are chronically infected with the virus [2-4] and 75% of them live in Asia [5]. HBV infection is one of the deadliest diseases which leads to the death of 0.5-1.2 million people annually. It was reported that 15-40% of HBV infected patients would develop chronic hepatitis, cirrhosis and hepatocellular carcinoma (HCC), in whom the later plays a major pathogenic role worldwide [6] and accounts for 320000 deaths each year [3,7]. Hepatitis B prevalence varies in different parts of the world from 1 to 20%. Overall, approximately 45% of the global population lives in areas of hyper-endemic HBV prevalence where the amount of hepatitis B surface antigen (HBsAg) is reported in more than 8% in these areas. 43% of the world’s people live in the intermediate-endemic regions with a prevalence of 2 to 7%; and 12% live in low-endemic areas of lower than 2% prevalence of HBsAg [7-9]. In the hyper-endemic areas, the risk of infection with HBV is of more than 60% and the transfer mostly occurs prenatally from mother to baby. This value is between 20 to 60% in intermediate-endemic areas like Iran and can affect all ages. In the low-endemic regions, the risk of infection decreases to lower than 20% and limits to adults (World Health Organization). HBsAg, Hepatitis B e Ag (HBeAg) and antibodies against HBeAg are tested by ELISA. The presence of HBsAg in the serum for 6 months or longer is indicative of chronic Hepatitis B infection [10].

The complications of chronic Hepatitis B include advancement to cirrhosis and liver failure, hepatocellular carcinoma and extra-hepatic diseases (polyarteritis nodosa, glomerulonephritis and leukocytoclastic vasculitis) [11]. HBV is transmitted prenatally or by percutaneous and mucous membrane exposures to infectious body fluids, such as serum, semen, and saliva [12].

The prevalence of HBsAg in Iran was reported to be between 2.5% and 7.2% in 1979. In the 1980s, almost 3% of the population was affected, differing from a prevalence rate of 1.7% in the Fars Province to 5% in
Sistan-Balouchestan Province [13-15]. The most common routes of transmission mentioned are perinatal transmission and intravenous drug abuse [16]. There has been little work done to investigate the prevalence of HBV in Iran until now and it seems that the importance of this problem is underestimated. Given that the prevalence of HBV varies in different regions and based on what was said, the study investigates the prevalence of Hepatitis B among the inhabitants of the Qeshm island.

Method

During these two years (2013-2014) cross-sectional study, the statistical population included 130,000 people of Qeshm Island. The sample size was calculated to be 1500, by using the following formula:

$$n = \frac{z^2 \cdot p(1-p)}{d^2}$$

The island was divided into several regions in which participants were selected by a multistage cluster sampling from people who referred to health centers, hospitals, and health houses in different areas. Data were collected by using a checklist that was designed according to similar studies and the experts' opinion. After the selection of persons, the study’s purpose was clearly discussed with the participants and demographic characteristics and medical histories including name, age, gender, job, level of education, history of sexual contact, history of vaccination, history of blood transfusion and injecting drug use, were collected by using a checklist.

The inclusion criteria consisted of being a Qeshm inhabitant and providing a consent. Participants with cardiovascular diseases, hypertension, rheumatoid fever, active infections, recent measles infection, mumps and IMN, history of malaria, toxoplasma, brucellosis, tuberculosis, HBs-Ag+, HCV-Ab+, HIV or its probability, gastrointestinal diseases such as ulcers, blood or sexual diseases, pregnancy, lactation, recent accident, receiving immunoglobulin during three months previous to the study, mental disorders, diabetes, thyroid disorders or patient-in-cooperation, were excluded from the study.

In this study, ten-milliliter venous blood samples were obtained from each individual. Serum was separated by centrifugation, and samples were stored at -20°C. Serum samples were screened for HBsAg by ELISA using a third generation Kit (Biomeriex, Amsterdam). Positive samples (according to ELISA method) were referred for polymerase chain reaction (PCR) to confirm the presence of HBsAg. Patients with positive HBsAg in PCR were considered as being infected with Hepatitis B. Two copies of the laboratory test results were prepared. One of these was delivered to the participants and another was encoded and an anonymous copy was kept for the study.

The study was approved by the Ethical Committee of the Hormozgan University of Medical Sciences. Written informed consent was obtained from all of the participants and personal data were kept confidential both during and after the study. The results of the viral marker tests were given to each of the participants (over 18 years old) or their parents (for participants under 18 years old).

Collected data was entered in SPSS v.16 software and analyzed by using descriptive statistics (frequency, mean, percent, and standard deviation) and chi-square test.

Results

A total number of 1500 individuals were included in this study, 511 males, and 989 females. HBsAg positivity of the serum samples were investigated by ELISA and the PCR method where 1% (11 females and 4 males) with the mean age of 30.07 and standard deviation (SD) of 13.69 (P=0.540) were HBsAg positive, and the remaining 99% (1485 persons) with the mean age of 32.63 and standard deviation of 13.17 were HBsAg negative (P=0.340).

HBV infection was only detected in lower than 15-year-old educated people (P=0.390). The largest amount of HBV prevalence was detected in the students (1.8%; 4 persons) while the others (workers, employees, and un-employees), were HBV negative (P=0.510) (Table 1).

According to Table 2, one person had a history of substance infusion and 4 persons had the sex history, however, they were not infected (P=1.000). HBV infection prevalence was reported to be 2.9% (2 persons) for those people with transfusion history, while it was 0.9% (13 persons) for the remaining people with no history of transfusion (P=0.370). Finally, the results of this study showed that none of the investigated factors was related to the prevalence of HBsAg.

<table>
<thead>
<tr>
<th>Variable</th>
<th>No.</th>
<th>HBsAg Positive</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>511</td>
<td>4 (0.8%)</td>
<td>0.540</td>
</tr>
<tr>
<td>Female</td>
<td>989</td>
<td>11 (1.1%)</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 15 years</td>
<td>1344</td>
<td>15 (1.1%)</td>
<td>0.390</td>
</tr>
<tr>
<td>More than 15 years</td>
<td>156</td>
<td>0 (0%)</td>
<td></td>
</tr>
</tbody>
</table>
**Table 2. Risk factors associated with Hepatitis B surface antigens**

<table>
<thead>
<tr>
<th>Variable</th>
<th>No.</th>
<th>HBsAg Positive (%)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>History of injecting drug use</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1</td>
<td>0%</td>
<td>1.000</td>
</tr>
<tr>
<td>No</td>
<td>1499</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>History of sexual contact</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>4</td>
<td>0%</td>
<td>1.000</td>
</tr>
<tr>
<td>No</td>
<td>1496</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>Hepatitis B vac.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>489</td>
<td>1%</td>
<td>0.570</td>
</tr>
<tr>
<td>No</td>
<td>540</td>
<td>0.9%</td>
<td></td>
</tr>
<tr>
<td>Unknown</td>
<td>471</td>
<td>1.1%</td>
<td></td>
</tr>
<tr>
<td>Transfusion history</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>70</td>
<td>2.9%</td>
<td>0.370</td>
</tr>
<tr>
<td>No</td>
<td>1430</td>
<td>0.9%</td>
<td></td>
</tr>
<tr>
<td>Unknown</td>
<td>17</td>
<td>0%</td>
<td></td>
</tr>
</tbody>
</table>

**Discussion**

HBV infection is a health problem of global importance in which many people are involved worldwide [17,18]. Countries in the Middle East region are different regarding the prevalence of HBV. Kuwait and Bahrain can be classified as low-endemic countries, whereas Egypt, Jordan, Oman, Palestine, Yemen and Saudi Arabia are high-endemics [19]. Iran is known as a low-to intermediate- endemicity area regarding the prevalence of HBV.

The studies have demonstrated that the prevalence of HBV is not the same in different parts of the country. In the present study, this value was estimated to 1% which is lower than the whole national statistics (2.14%) [20]. Also, these results showed lower values than Todd et al. [21], McQuillan et al. [22], Shahin Merat et al. [23], Erdem et al. [24], Abdolahi et al. [25], Salehi et al. [26], Moezzi et al. [27], Ansari-Moghaddam et al. [28] and Fathimoghaddam et al. [29] studies. Of course, the prevalence value was greater than the values estimated by Wasley et al. [30] and Keyvani et al. [31]. In Ghadir et al. study [32], the prevalence of HBsAg was reported at 1.3%. These differences in prevalence could be due to cultural differences that lead to the vaccination of more people and the avoidance of high-risk sexual behaviors, etc.

The mean age of patients infected with HBV was 30.07 years. HBV prevalence in persons older than 50 years was greater than the younger’s in the works of Wasley et al. [30] and McQuillan’s et al. [22]. In the study of Erden et al. [24], the largest amount of prevalence was observed in the ages between 21 and 40 years. Gogos et al. [33], Salehi et al. [26], and Ansari-Moghaddam et al. [28] showed that the HBV is more prevalent in persons older than 65 years.

In our study, the incidence of HBV in women was more than that of the men, which is consistent with Roshandel’s work [34], but differs from other studies [23-25, 28, 29]. This difference is due to the greater number of women enrolled in this research than men; and the results could change if the equality could change.

The prevalence of HBV was only detected in those people with the education level of less than 15 years, where the amount of HBsAg was of approximately 1.1% This result agreed with the research of McQuillan et al. [22], in which the disease is more common in people with the literacy less than high-school. In Merat’s et al. [23] work, the prevalence of HBV in people with the literacy less than 12 years was 4%, while in others it was 3%. Ghadir [32] showed that the largest amount of HBsAg could be found in the serum sample of illiterate people (2.95%) whereas people with academic degree showed the lowest amount of HBsAg. The reason for the lower prevalence in the well-educated people is their good awareness about the transmission ways of HBV and the avoidance of the high-risk sexual behaviors.

In the present study, the largest prevalence was detected in the students while it was zero in the unemployed people. Failure to provide the entertainment possibilities and thus the tendency to the unhealthy entrainments such as addiction or risky sexual behaviors might cause the mentioned result. Gogos et al. [33]
reported the largest amount of HBV prevalence in farmers. In contrast to our work, Erden et al. [24] and Ghadir et al. [32] have showed that the lowest rate is related to the students. Also, Taeri et al. [35] reported that 90% of the HBsAg positives were unemployed and mentioned that it could be due to their tendency to high-risk jobs such as selling sex and drug trafficking.

We did not see any HBV positivity in the serum sample of individuals with substance infusion history. In the study of Machado et al. [36], the prevalence of 0.4% was detected in those people and in Moezzi’s research [27], this rate was 6%. Another work [37] showed the HBV rate of 1.9% and 9.7% for those with less than 1 year and more than 1 year history of drug injection, respectively. These differences could be due to the different economic, social, and cultural conditions, and also supportive care services and the used tools.

In this research, the HBV prevalence was zero for those people with a sexual contact history which agreed with the Keyvani’s work [31]. McQuillan’s study [22] showed that the greater the number of sex partners, the higher the prevalence of HBV there was, so that those persons with more than 50 sex partners showed a rate of 6.5%, and in Jahani et al. study [38], this rate was 2.5%. Todd [21] demonstrated that the HBsAg prevalence for homosexual men was 4% and for heterosexual persons with the substance infusion it was 2%. The zero-rate in our study could be due to the religious beliefs (in Iran or other Islamic countries) which limit the great number of sex partners.

In the present study, the rate of infection in people with the history of transfusion (2.9%) was more than that of those with no transfusion (0.9%), which disagrees with the study of Jahani et al. [38]. In the researches of Salehi [26] and Fathimoghadam (3.17%) [26,29], the HBV prevalence was more than that in our result. Ghadir [32], Keyvani [31], and Moezzi [27] reported the rates of 1.63%, 1.88%, and 4%, respectively. In the Mirershadi’s research [39], it was shown that there was a direct relation between the times of bleeding and the HBV infection in the thalassemia patients; so that the rate of 8.3% was detected in those patients with more than 20 bleeding times.

Conclusion

The amount of HBV prevalence in Qeshm and its suburbs was 1%; so it classified as a low endemicity area in Iran. In this research, the maximum rate of HBV infection was observed in the household women with literacy of less than 15 years and the history of transfusion or vaccination. Also, for the employed people, the highest rate of infection was estimated for the students.

Acknowledgements

This study was the result of a general physician thesis. We would like to thank all professors, Qeshm inhabitants, health system authorities, and Hormozgan University of Medical Sciences who helped us during this study.

References


Relationship between learning styles and interpersonal communication skills of nursing student in Tehran University of Medical Sciences in 2012

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Abstract

Introduction: Interpersonal communication skills are required for training and represent one of the most important factors affecting the quality of student learning. In other opinions, learning is a continuous process and students prefer a set of learning styles based on their personality and unique experiences. The aim of this study was to assess the relationship between the learning styles and interpersonal communication skills of the nursing student in Tehran University of Medical Sciences in 2012.

Methods: In this analytical descriptive cross-sectional study, 361 students from the School of Nursing and Midwifery were selected through a census method. The data gathering tools were standardized, presenting a questionnaire named Interpersonal Communication Skills Standards Test and VARK Learning Styles questionnaire. Data was analyzed by SPSS software (18th edition) by using Mann-Whitney and Kruskal-Wallis test.

Results: 320 questionnaires were completed. 60.6% of the participants were females. The mean score of the students’ communication skills level was 101.91 ± 10.35. More than half of the samples (58.8%) preferred multi-modal learning styles (Bi-Tri and Quad Modals) and 41.2% of the students preferred single modal learning styles. There were no significant differences between the Interpersonal Communication Skills and the learning styles (P= 0.46).

Conclusion: According to no significant relationship between the communication skills of students with learning style and Demographic variables and Lack of appropriate condition of communication skills, we were able to create new units and courses related to improving the skills’ level.

Keywords: interpersonal communication skills, learning styles, nursing students, Tehran University of Medical Sciences

Introduction

The process of transferring the idea, message, information, and attitudes that provide the possibility of turning these data into action is called communication, which is considered one of the mankind’s basic and essential skills and like so many other skills, some have greater talent in this area [1]. Communication in medical science is a planned or programmed conversation aiming at presenting information to the patient, consulting, treatment, determining and solving problems [2]. In fact, communication is the process of exchanging information, concepts, values, and beliefs between individuals. Therefore, many categorizing procedures have categorized communicative skills. In a classification of cognitive, conceptual and procedure, skills were introduced as basic and an essential part of communicative skills and another classification divided communicative skills in two groups of basic and advanced skills, where interpersonal communicative skills were considered among the basic communicative skills [3]. Achieving an acceptable and knowledgeable behavior and reaching a level of emotional relationship by means of collecting the potential and active communicative skills is called interpersonal [3]. Interpersonal communication happens when people interact with each other. In every communication, at least two individuals should take part, listen and respond to each other by various methods and
it results in sending and receiving a massage to accomplish a specific goal \[4,5\]. Communication is so important in human life that some scholars consider it the basis of all human development, individual damages and mankind development and progresses \[6\].

We should not only consider scientific, academic and technical skills of a student but also the importance of students' communicative skills, and such an issue is essential in regard to considering the patients’ rights and increasing their information \[7\]. Having a daily and normal communication does not free the expert groups from the need of goal-based and skill-based education in advanced levels; in addition proper education is needed to achieve such skills. Among the important factors effecting the students' learning and quality of this learning, a proper usage of communicative skills and considering the fact that communicative skills are educable could be mentioned and a proper basis could be created in order to transfer concepts and information to the students in the most effective way possible \[8\].

Creating a correct and proper connection should be a part of health and medical care section employees' characteristics, this being of such great importance as it has significant effects on the patients’ satisfaction, improving clinical consequences and increasing the patient’s partnership \[9,10\]. In some countries, communicative skills educating lessons are included in the nursing educational program lesson plan \[11\], but this does not include Iran and its clinical education program \[9,10\]. A proper communication between the medical team and the patient increases the patient’s health and decreases the rate of complaints; on the other hand, a study has shown that a weak connection and communication of health and medical care section employees and patients leads to a low satisfaction of patients \[12,13\].

On the other hand, learning is a continuous process and it happens based on various scenarios for various people. Individuals prefer a collection made of learning styles and methods based on their personal personality and experiences \[14\]. The learning style is method for thinking, processing and understanding information that individuals receive, and apply it for learning and solving problems \[15\]. A process that an individual understands and keeps information from it and as a result acquires knowledge and skills, is called learning style \[16\].

As a learner, every student has his/ her personal and unique learning style, and, the education scholars believe that the learner has different learning styles \[17,18\]. Teaching methods and educational guidelines of each learning style have differences compared with the other learning styles too. Creating the proper condition for the students’ learning and, as a result, qualitative and quantitative accomplishment of educational system is dependent on the planners and educational experts (such as teachers and lecturers of universities) knowledge and awareness of the students' learning styles \[19\].

Separated studies have studied the process of determining the nursing students’ learning style and the interpersonal communicative skills level \[20-24\], but yet, there has not been a study to determine the relation between the learning style and the interpersonal communicative skills, and what type of learning style is preferred by each student and what type of connection exists between the learning style and the rate of communicative skills. Therefore, the present research was undergone while aiming to determine the relation between the learning style and interpersonal communicative skills of the third and the fourth year nursing students of Tehran Medical University during the year 2012.

Method

The present research is a descriptive–analytical one, which was done in a sectional or periodic manner on the third and fourth year Nursing students of Tehran Medical University. The research society was made up of third and fourth year nursing students of nursing and topology faculty of Tehran Medical University. They were determined to take part in the study by means of non-accidental simple sampling method and due to the reason that sample volume was close to total sample society. In addition, all third and fourth year students took part in this study in the form of census and students in their first and second educational year did not take part in it. The reason for choosing the third and fourth year students was their far greater clinical experience due to the fact that they passed more traineeship units. Therefore, all the students of these two years, which included 361 individuals, entered the study in the form of census.

The students' cognitive agreement was obtained by presenting a letter of satisfaction including the title and explanations about the research before the work was started. Data were gathered by means of a questionnaire including three parts. The first part included the students' demographic information (educational semester, gender, average grade and the history of taking part in the communicative skills workshop). The second part of the questionnaire included standard learning styles of Warok from the book How Do I Learn Best by Fleming \[25\]. This questionnaire was also used in studies of Hamouzadeh et al., Peiman et al., Bahadori et al. and Salmi et al. \[26-29\]. Based on this questionnaire, visual, hearing, reading/ writing and movement/ motion styles of the learner were determined. This questionnaire included 16 questions and each question placed the learner in a learning condition. The responders chose the item that best presented the explanation in relation to their performance in that situation in every question. If one of the choices was not enough to explain their condition, they could choose more than one item in every question. The third part of the questionnaire also included the Standard Interpersonal Communication Skills test. This questionnaire included 34
five-item questions and its score was based on $34 \text{ to } 170$. Each question choices were presented as almost never, rarely, sometimes, almost always and mostly and it was scored based on Likert points from 1 to 5. This questionnaire was used for stability and admissibility in Peipan et al. study [30]. Data were analyzed by means of descriptive statistics method and Kruskal-Wallis and Mann-Whitney U test which was more suitable to investigate the normal condition of data used in the Cilmograph-Smirnoff test.

**Results**

Totally, 320 third and fourth year nursing students from the Medical University of Tehran were studied (return rate = 88.64%). One fourth of samples (25%) were 8th term students, more than one third (39.4%) were male and less than one fifth (18%) had an average grade higher than 16. Only 57 individuals (17.8%) had a history of taking part in communicative skills workshops (Table 1).

<table>
<thead>
<tr>
<th>Variant</th>
<th>Variant type</th>
<th>Variant (percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Educational</td>
<td>Semester 8</td>
<td>(25)%80</td>
</tr>
<tr>
<td></td>
<td>Semester 7</td>
<td>(22)%72</td>
</tr>
<tr>
<td></td>
<td>Semester 6</td>
<td>(23)%76</td>
</tr>
<tr>
<td></td>
<td>Semester 5</td>
<td>(28)%92</td>
</tr>
<tr>
<td>Gender</td>
<td>Male</td>
<td>(39)%126</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>(60)%194</td>
</tr>
<tr>
<td>Grade average</td>
<td>Less than 15</td>
<td>(24)%78</td>
</tr>
<tr>
<td></td>
<td>Between 15-16</td>
<td>(56)%182</td>
</tr>
<tr>
<td></td>
<td>More than 16</td>
<td>(18)%60</td>
</tr>
<tr>
<td>Workshop</td>
<td>Yes</td>
<td>(17)%57</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>(82)%263</td>
</tr>
</tbody>
</table>

Based on Warok learning styles questionnaire, more than half of the samples (58.8%) used more one style of learning and 42.2% used only one style of learning. More than one third of them (38.1%) used four types of learning simultaneously (Table 2).

<table>
<thead>
<tr>
<th>Warok learning style</th>
<th>Redundancy (percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>visual</td>
<td>(10)%34</td>
</tr>
<tr>
<td>listening</td>
<td>(5)%16</td>
</tr>
<tr>
<td>Reading and writing</td>
<td>(7)%25</td>
</tr>
<tr>
<td>performance</td>
<td>(17)%57</td>
</tr>
<tr>
<td>Two dimensional</td>
<td>(9)%129</td>
</tr>
<tr>
<td>Three dimensional</td>
<td>(11)%37</td>
</tr>
<tr>
<td>Four dimensional</td>
<td>(38)%122</td>
</tr>
</tbody>
</table>

Median and standard deviation of under study students’ communicative skills test’s score was equal to 35 /10 $\pm$ 91/101. Based on Cilmograph-Smirnoff test, communicative skills test’s score did not have a normal distribution. Therefore, in order to determine the relation between the communicative skills test’s score with the other demanding variants, non-parametric tests were applied. The minimum and maximum communication skills test score respectively belong to students who used reading, writing, and two-dimensional learning style. Table 3 presents the median of communicative skills score divided by means of Warok learning styles. As it can be seen, Kruskul-Wallis did not show a significant difference between the communicative skills test score and Warok learning styles ($p=0.46$).

<table>
<thead>
<tr>
<th>Warok learning style</th>
<th>Median and Standard deviation</th>
<th>$p$ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>visual</td>
<td>100/8$\pm$10/8</td>
<td>0/46</td>
</tr>
<tr>
<td>listening</td>
<td>102/5$\pm$5/7</td>
<td></td>
</tr>
<tr>
<td>Reading and writing</td>
<td>98/9$\pm$13/6</td>
<td></td>
</tr>
<tr>
<td>performance</td>
<td>103/1$\pm$10/2</td>
<td></td>
</tr>
<tr>
<td>Two dimension</td>
<td>103/6$\pm$5/9</td>
<td></td>
</tr>
<tr>
<td>Three dimension</td>
<td>103/4$\pm$10/4</td>
<td></td>
</tr>
<tr>
<td>Four dimension</td>
<td>101/5$\pm$5/9</td>
<td></td>
</tr>
</tbody>
</table>

The maximum and minimum score of communicative skills test belong, respectively to nursing students of semesters 5 and 6 where there was not a significant difference between the academic semester and the score of communicative skills test score ($P=0.74$). The median of male and female students grade did not differ much and the difference between their grade was not significant based on Man Withey test ($P=0.79$). The media of communicative skills test score in students whose average grade was between 15 and 16 was less than the one of the other students, while students with an average grade higher than 16, had the highest score in their communicative skills, compared to the students who took part in communicative skills workshops ($P=0.27$).

<table>
<thead>
<tr>
<th>Semester</th>
<th>Academic Semester</th>
<th>Gender</th>
<th>Grade average</th>
<th>Workshop</th>
</tr>
</thead>
<tbody>
<tr>
<td>0/74</td>
<td>101/13$\pm$10/53</td>
<td>Less than 15</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>0/79</td>
<td>101/2/10/53</td>
<td>More than 16</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>0/27</td>
<td>103/10/13$\pm$10/2</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>0/27</td>
<td>103/9/11/29</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>101/59$\pm$10/12</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Discussion

The present research was realized while aiming to determine the relation between the learning styles of the third and fourth year nursing students of Medical University of Tehran with interpersonal communicative skills during 2012.

41.2% of the students used one type of style learning and 38.1% used four styles simultaneously. The median and standard deviation of communicative skills test of students under study was equal to 35/10 ± 91/101 which did not show a significant difference regarding the type of students’ learning style. Meanwhile, students with two-dimensional and four-dimensional style learning had a higher level of communicative skills in comparison with the individuals with one-dimensional style. What should also be mentioned is that the students' communicative skills score was less than the average obtainable score of the questionnaire (102) which was not considered to be a satisfying score.

Maslak Pak also found in studying the communicative skills of final year nursing students that most of students had an average level of communicative skills [24]. The other results of the research showed that nurses and other medical employees were weak in creating a connection and communicating with patients [30-33]. Many researches and studies reported that nurses have great problems in creating a communication with their patients [34,35] which were similar to the results obtained by the present research. Therefore, the essentiality of creating a proper communication should be emphasized as a critical element of nursing services.

No significant difference was observed between the academic semester and the communicative skills test’s score. However, students in all semesters had higher scores in comparison with the first semester students. In a study undergone by Salimi et al., a significant relation was observed between the students' academic year and their level of communicative skills in a way that the third year students had the highest level of communication and the first year students had the lowest level [3]. Therefore, we could say that as the knowledge and experience of the students increased as a result of the theory and practical classes, their ability level and skill to create connection and communication went higher.

Man-Whitney test did not show a significant difference between the students’ gender and their communicative skill ability. Also Hemmaty’s research did not show a significant relation between the nurses’ speech communication performance of special section and their gender [36]. At the same time, a study by Molaeie et al. on students of Ardabil Medical University concluded that the level of desired communicative skills among male and female students was statistically significant and female had a higher level [37]. The reason for such a difference could be related to the student’s study branch, because in Molaeie study, against studies of Hematy et al. and present research, only nursing students were included and various branches’ students took part.

There was no significant relation between the average grade and the communicative skills test’s score of the students, but the median of the communicative skills test’s score in students with an average grade higher than 16, was more than the one of the students with a lower average grade. In Salimi’s study [3], it was also observed that as the students’ average grade increased, their level of interpersonal communicative skills also increased but this increase was significant from the statistical point of view. Despite the lack of a significant relation between the average grade and the communicative skills score, we could say that students who had a higher level of interpersonal communicative skills during their education or academic period, also had a better academic progress condition.

Communicative skills test’s score in students who took part in communicative skills workshops was higher than that of students who did not; still Man-Whitney test did not show any significant difference. Khalifezade et al. research showed that the design of clinical education courses based on clinical monitoring and guideline pattern could improve interpersonal, professional, and communicative skills of nursing students [38]. Therefore, considering that clinical education has a critical role in forming the professional skills of nursing students, it is essential to have such courses.

Taking into account the researchers of the present article, there has not been any similar research or study in relation to the connection between the learning styles and interpersonal communicative skills of nursing students until now. Therefore, it is advisable and suggested to present the researches and studies that consider these two factors to other branches and graduates in the working environment.

Conclusion

The level of students’ communicative skills is independent from their learning style and also to their information about it. On the other hand, the nursing students’ achieved score did not have a satisfactory level. What should be taken into account is that in the recent year, the educating communicative skills have become part of the developed countries nursing education program and meanwhile no special plan has been set for teaching communicative skills to medical students during the clinical education in our country. Therefore, to correct the existing condition, the level of communicative skills among the nursing students and other medical sciences students should be increased. The level of these skills could be improved by creating a new educational plan for the mentioned students in relation to nurses’ communicative skills and also presenting related courses.
References


Epidemiologic and clinicopathologic evaluation of patients with breast cancer referred to Ghaem Hospital from 2005 to 2014

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Abstract
Introduction: Breast cancer is the most common cancer and the first leading cause of cancer deaths in women of 44-40 years old. The prevalence of triple negative breast cancer includes 10-17%. This type of breast cancer is determined by a negative receptor of estrogen, progesterone and HER2 that is much more aggressive than the other types and the prognosis is poorer. Therefore, this study was performed with the aim of evaluating the results of the treatment in patients with a triple negative type of breast cancer in comparison with the other patients with breast cancer.

Method: This retrospective cohort study was performed by referring to the records of all patients with breast cancer whose treatment and follow-up was performed in Mashhad Ghaem Hospital during 2001 and 2010, their ER, PR, HER2 results being recorded in the files. Based on immunohistochemical records (ER, PR, HER2), patients were divided into two groups: triple negative and non-triple negative and the therapeutic outcomes were compared between the two groups in terms of 2 and 5-year disease-free and overall survival by Kaplan-Meier method. P<0.05 was considered significant.

Results: The medical records of 331 patients with breast cancer were analyzed in this study. The number of patients in the Triple negative group was 101 (30.5%) and in the non-Triple negative group was 230 (69.5%). The mean overall survival in the triple negative was 32.48 ± 24.56 months and in the non-triple negative was 29.67 ± 22.36 months and no significant difference was observed between the studied groups (P=0.306). Also, the mean disease-free survival in the triple negative group was 30.57 ± 24.56 months and in the non-triple negative was 28.21 ± 21.72 months and no significant difference was observed between the studied groups (P=0.184).

Conclusion: According to previous conducted studies, among all the types of breast cancer, Triple negative had a poorer prognosis and a shorter survival among the patients in our study, the overall survival and disease-free survival obtained was the same in two groups of Triple negative and non-Triple negative and the cause of this similarity was probably the presence of HER2 + subgroup in the non-Triple negative group which led to the survival of patients in the non-Triple negative group be similar to the Triple negative group.

Keywords: breast cancer, Triple negative, overall survival, disease free survival

Introduction
Breast cancer with an unknown cause has drawn the physicians’ attention in all decades. Despite centuries of scientific theories and practices, breast cancer is one of the most horrific human diseases. Despite all the efforts made for treatment, unfortunately has no satisfactory end in some cases [1,2]. This cancer is a huge problem in the women’s health worldwide. Breast cancer is the most common cancer in women and the second leading cause of death due to cancer in the United States of America [3].

It was predicted in 2009 that breast cancer included 27% of all cancers and 15% of cancer-related death, including 192,370 new cases and 40,170 cases of death [1]. Statistics and evidence indicated an increasing incidence of breast cancer in the middle of the 1940 decade [3,4]. The malignant proliferation of epithelial cells lining the breast ducts or lobules are the cause of this disease [2]. The core needle biopsy and FNA techniques are the most common breast cancer diagnostic techniques which can be used to perform all diagnostic and prognostic tests with reliable results [2]. Today, breast cancer is molecularly divided into four categories including: Luminal A, Luminal B, Her2 +, and Triple negative. However, among all types of breast cancer, the triple negative type contains 10-17%. This type is
diagnosed by negative receptor estrogen, progesterone and HER2 that seems to be more aggressive than other types, and has a poorer prognosis [4,5].

Another study was retrospectively performed by Abu al-Khair and colleagues in Saudi Arabia, in 2012, on 517 patients with breast cancer, who were referred to the medical center of Prince Abdul Aziz from January 2001 to December 2008, the incidence of Triple negative cancer in this region being similar to the studies in the West and having no significant difference between the two groups in 3-year survival rate. However, the aggressiveness and overall survival of the disease in the Triple negative group was higher in the cases of less than 40 years than in those over 40 years [6].

Now, in the case of breast cancer in addition to conventional medical and surgical treatments (chemotherapy, radiotherapy, etc.), treatment based on biological and molecular markers of tumor, and the patient (such as hormone therapy and target therapy) is also recommended [7,8]. The observed above-mentioned elements show the importance of further study of this type of cancer. Therefore, this study was performed with the aim of evaluating the results of treatment in patients with triple negative type of breast cancer with other patients with breast cancer and their comparison with the overall survival and disease-free survival.

**Materials and Methods**

This retrospective cohort study was performed by referring to the records of all patients with breast cancer whose treatment and follow-up was performed in Mashhad Ghaem Hospital during 2001 and 2010 and their ER, PR, HER2 results were recorded in the files. Required data was collected and recorded in the checklist and was analyzed by a statistician. In addition, the patients in the two groups were matched in terms of the disease’s stage and treatment type.

The sample size was calculated at 59 cases according to the study of Zaky et al [9] with respect to the 70% and 90% survival rates in groups with and without Triple negative breast cancer with a confidence of 95% and 80% capacity. The sampling method was the easy Non-probability method.

Inclusion criteria included all patients with breast cancer whose treatment and follow-up were performed in Mashhad Ghaem Hospital during 2001 and 2010 and their ER, PR, HER2 results were recorded in the files. Exclusion criteria included non-carcinoma pathology, the patients who had no regular referring for the treatment and follow-up (at least 6 months), and the metastatic cases.

The studied variables included age, breast cancer type (Triple negative and non-Triple negative), tumor pathology, disease stage, disease grade, the mean and median and percentage of overall survival and disease-free survival in Triple negative and non-Triple negative groups, simultaneous effect of age and disease stage and disease grade in the overall survival and disease-free survival.

The graphs and statistical tables were used to describe the data. Chi-square test was used to evaluate the relationship between the qualitative variables (age < and > 40 years, the tumor pathology, disease stage, disease grade, recurrence) with Triple negative and non-Triple negative (Luminal A, Luminal B, HER2 +). ANOVA test was used to evaluate the relationship between age and Triple negative and non-Triple negative (Luminal A, Luminal B, HER2 +) and Log-rank was univariate used to evaluate the relationship between Triple negative and non-Triple negative (Luminal A, Luminal B, HER2 +), and the overall survival and disease-free survival and the percentage and mean of overall survival and disease-free survival in each Triple negative and non-Triple negative groups (Luminal A, Luminal B, HER2 +) were obtained by the Kaplan-Meier method.

Cox regression was also used to evaluate the simultaneous effects of variables. In all tests, SPSS software version 16 was used and P<0.05 was considered significant.

**Results**

In this study, medical records of 331 patients with breast cancer who referred to the Oncology Center of Ghaem Hospital for treatment and follow-up during 2001 and 2010 were evaluated. According to the immunohistochemistry results available in the file, patients were divided into 2 Triple negative (TN) and non-Triple negative groups according to the immunohistochemistry regarding the ER and PR, the cases of > 1% were recorded as positive and the ones of < 1%, negative, and, about HER2, only the cases of 3 positive were recorded as positive. The number of patients in the Triple negative group was 101 (30.5%) and in the non-Triple negative group was 230 (69.5%). Also, the patients in non-Triple negative group were divided into three subtypes of luminal A, luminal B and HER2 + the number of patients in each group was 142 (42.9%), 36 (10.9%) and 52 (15.7%), respectively.

The mean age of patients in the TN group was 43.50 years and in the non-Triple negative group it was 48.08 years, the result of the one-way tests showing that the distribution of age was not similar in the studied groups and the patients with Triple negative cancer were younger (P=0.001). The number of patients aged <40 years was met in 43 cases (42.6%) in the TN group and of 64 cases (27.8%) in the non-Triple negative group, the result of the Chi-square test showing a significant difference between the studied groups and the distribution of age which was not similar in the studied groups, and the number of patients aged <40 years in the TN group was higher compared to the non-Triple negative group (P=0.008).
The number of patients with carcinoma ductal invasion in the TN group was of 83 cases, medullary carcinoma 8, lobular carcinoma 2, and the other cases 5. The type of cancer was unclear in 3 cases of Triple negative group and 5 in non-Triple negative group, the result of the Chi-square test showing a significant difference between the studied groups and the distribution of various types of cancer was not similar in the studied groups and the subgroup of breast medullary carcinoma was more observed in the Triple negative group (P=0.042).

In the TN group, the number of patients in stage 1 was of 10 cases, in stage 2 it was of 59, in stage 3 it was of 32, the result of the Chi-square test showing that the distribution of stage was similar between Triple negative and non-Triple negative groups (P=0.945).

In the TN group, the number of patients in grade was of 0 cases and in the non-Triple negative group it was of 22 cases. The information related to the grade was not available for 63 patients in the Triple negative group and 131 in the non-Triple negative group, the result of the Chi-square test showing that the distribution of grade was not similar between the Triple negative and the non-Triple negative groups; no patients with Triple negative breast cancer in grade A were observed (P=0.006).

The mean overall survival in patients with TN breast cancer was of 32.48 ± 24.1 months and in the non-Triple negative group it was of 29.67 ± 22.36 months. The overall five-year survival rate in patients with TN breast cancer was 71% and in the non-Triple negative group was 76.5%. The result of Log-rank test showed no significant difference in disease-free survival between the studied groups (P=0.306) (Table 1).

| Table 1. Comparison of the overall survival between Triple negative and non-Triple negative groups |
|-------------------------------------------------|-----------------|-----------------|--------|
| Variables                                       | Groups          | TN              | P-value |
| Mean overall survival                           | Non TN          | 22.36 ±29.67    | 24.1   |
| Median of survival                              |                 | 22.5            | 27     |
| Overall survival                                | 1 year          | 99              | 95.7   |
| (%)                                            | 2 years         | 91.2            | 92.6   |
|                                                 | 5 years         | 76.5            | 71     |

The mean disease-free survival in patients with TN breast cancer was of 30.57 ± 24.56 months and in the non-Triple negative group, it was of 28.21 ± 21.72 months. The five-year disease-free survival in patients with TN breast cancer was 66.7% and in the non-Triple negative group, it was 73.3%. The result of Log-Rank test showed no significant differences in the disease-free survival among the studied groups (P=0.184) (Table 2).

| Table 2. Comparison of the disease-free survival in the Triple negative and non-Triple negative groups |
|-------------------------------------------------|-----------------|-----------------|--------|
| Variables                                       | Groups          | TN              | P-value |
| Mean disease-free survival                      | Non TN          | 28.21 ±30.57    | 21.72  |
| Median of survival                              |                 | 21.72           | 24.56  |
| Disease-free survival                           | 1 year          | 95.9            | 92.4   |
| (%)                                            | 2 years         | 89.9            | 73.8   |
|                                                 | 5 years         | 73.3            | 66.7   |

Cox regression was used to evaluate simultaneous effects of grade, stage, age, and the studied groups on disease-free survival and the result is shown in Table 3.

| Table 3. Results of Cox regression to assess the simultaneous effect of variables on the disease-free survival |
|-------------------------------------------------|-----------------|-----------------|--------|
| Variables                                       | Confidence interval 95% | Risk ratio | Model coefficient | P-value |
| Stage 1                                         |                   |                |                   | 0.620   |
| Stage 2                                         | (0.113, 8.672)    | 0.388          | -0.012            | 0.992   |
| Stage 3                                         | (0.020, 5.611)    | 0.343          | -1.070            | 0.459   |
| Age                                             | (0.394, 5.618)    | 1.488          | 0.397             | 0.558   |
Cox regression results showed that among the factors of age, stage, grade, and the studied groups, none is independently associated with disease-free survival. Also, the Cox regression was used to evaluate simultaneous effects of grade, stage and age on the overall survival rate and the result is shown in Table 4.

Table 4. Results of Cox regression to assess the simultaneous effect of variables on the overall survival

<table>
<thead>
<tr>
<th>Variables</th>
<th>Confidence interval 95%</th>
<th>Risk ratio</th>
<th>Model coefficient</th>
<th>P value</th>
</tr>
</thead>
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<td>Stage 1</td>
<td>(0.167, 11.151)</td>
<td>1.363</td>
<td>0.310</td>
<td>0.773</td>
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<tr>
<td>Stage 2</td>
<td>(0.067, 9.547)</td>
<td>0.797</td>
<td>-0.227</td>
<td>0.858</td>
</tr>
<tr>
<td>Age</td>
<td>(0.266, 3.761)</td>
<td>1.000</td>
<td>0.000</td>
<td>1.000</td>
</tr>
<tr>
<td>Grade 1</td>
<td>(0.000,-)</td>
<td>-1ª</td>
<td>-</td>
<td>0.900</td>
</tr>
<tr>
<td>Grade 2</td>
<td>(0.000,-)</td>
<td>1ª</td>
<td>-12.398</td>
<td>0.979</td>
</tr>
<tr>
<td>Grade 3</td>
<td>(0.216, 2.594)</td>
<td>0.748</td>
<td>-0.290</td>
<td>0.647</td>
</tr>
</tbody>
</table>

Cox regression results showed that among the factors of age, stage, grade, and there were no elements independently associated with the overall survival.

Discussion

Cancer is a major problem regarding the health of the world. Among all types of cancer among women, breast cancer is the most prevalent. Given that half of the world’s populations are women, so many people in the world are at risk of developing this type of cancer. Therefore, further studies in this area are needed. This type of cancer has several subtypes, among these being the Triple negative type which is diagnosed by negative receptor of estrogen and progesterone and -HER2 determined by immunohistochemical techniques, having a very poor prognosis among patients [10,11].

As presented in previous studies, in addition to tumor subtypes, the patients’ age at diagnosis, stage and grade of disease, obesity, menopausal status, race, and lymph node involvement are also important factors in the determination of prognosis and survival of the patients [12,13].

This study tried to include the patients who had performed the treatment recommended by the physician and had at least 6 months of follow-up, the patients not being different at the end of the course of chemotherapy and radiotherapy, the result of the Chi-square test in the evaluation of distribution of these cases in the studied group representing the right selection of the patients. Also there was no difference among patients in this regard and the effect of these cases in the prognosis and survival of patients can be eliminated.

In terms of choosing the type of treatment, only the distribution of hormone therapy was not similar in the studied group, which is due to the negative hormone receptor in the Triple negative group, taking into account that hormone therapy could not be used in the treatment of this group.

In this study, the prevalence of Triple negative breast cancer was 30.5% with a mean age of 43.50 years, which was more common in women compared to a study conducted by Dent and colleagues in Canada. In the study of Dent and colleagues, the prevalence of Triple negative breast cancer was 11.2%, and the rate of recurrence and mortality within 5 years from diagnosis was more than that of the non-Triple negative group [14]. Similarly, in the studies conducted by Lin and colleagues in Taiwan [15], Zaky et al. in Atlanta [16], Davis and colleagues in West Virginia [17], the incidence of Triple negative breast cancer was lower than in our study, but in the study of Sen and colleagues [18] in Calcutta, the incidence of Triple negative breast cancer was reported as 27.78% which was statistically similar to our study in Iran.

In a study by Davis and colleagues in West Virginia reported in 2007, the tumor pathological subgroup of most patients with Triple negative breast cancer was invasive ductal carcinoma, which is similar to our study, meaning that the tumor pathological subgroup of 84.7% of patients with Triple negative breast cancer was invasive ductal carcinoma [17].

In a study by Sen and colleagues in the Department of Surgery, School of Medicine, published in Calcutta in 2013, among patients with Triple negative breast cancer, 75% were in Stage 3 and 80% in Grade 3 of the disease, but compared to our study, this incidence was different. In our study, 58.4% of the patients with Triple negative breast cancer were in Stage 2 and 52.2% were in grade 2 of their disease [18].

In our study, 2 and 5-year overall survival and 2 and 5-year disease-free survival were assessed in the Triple negative and non-Triple negative groups by referring to the patients’ follow-up based on the contents of their medical records, including dates of each visit and checking the status of patients (recurrence, death, good condition) that were evaluated and recorded on each visit by the physician, and were compared among patients by using the Kaplan-Meier test. The results showed no difference between the Triple negative and non-Triple negative groups in terms of overall survival and disease-free survival. The results were similar to a study by Abu al-Khair and colleagues in Saudi Arabia in which 26 patients with at least 3 years follow-up in the Triple
negative group and 33 patients with same age and disease stage in the non-Triple negative group were selected and the result of a 3-year survival was similar in two groups [6]. In our study, most (57.4%) of the patients with Triple negative breast cancer were aged > 40 years, meaning that the distribution between the two groups was not calculated as the same and the patients with Triple negative breast cancer were younger than those with non-Triple negative breast cancer, but based on the results of Cox regression test, there was no significant relationship between age and overall survival and disease-free survival in the studied groups.

In addition, in the study performed by Boyle in France, the highest rate of Triple negative breast cancer recurrence was during three years from diagnosis and the rate of mortality was highly increased during 5 years from diagnosis and the African-American race was a risk factor in this cancer which in this race was 3 times more common than the other types of breast cancer. It can be concluded that perhaps the reason for the difference in determining the overall survival in the patients of our study and the study of Boyle was the effect of race that required further studies in future [19].

In a study performed by Lin and colleagues in Taiwan, the disease-free survival in the two groups of Triple negative and non-Triple negative was similar to the one in our study, but the overall survival in the two groups was reported different [15].

Conclusion

According to previous conducted studies, among all the types of breast cancer, the Triple negative has a poorer prognosis and a shorter survival among the patients in our study, the overall survival and disease-free survival obtained was the same in two groups of Triple negative and non-Triple negative, meaning that the cause of this similarity was probably the presence of HER2 + subgroup in the non-Triple negative group, which has led to the survival of patients in the non-Triple negative group, which was similar to the Triple negative group.

If necessary, treatments effective on HER2 + receptor could be used more in the treatment of patients with non-Triple negative breast cancer. It is also recommended that in future studies, menopausal status and obesity and its effect on the survival of the patients were surveyed and the results were compared with results of previous studies, because in our study, it was not the main objective and it was not evaluated. Also, if more studies were performed on the Triple negative breast cancer in Asia and also the evaluation of the ethnic status, we could have a better comparison of the incidence of this type of cancer in the Asian and Western societies.

References


Prevalence of HIV infection among Qeshm Island population in 2013-2014, Iran

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Abstract

Introduction. Acquired immune deficiency syndrome (AIDS) is represented by a range of disorders of cellular and humoral immune dysfunction caused by human immunodeficiency virus (HIV) infection. Immune deficiency caused by HIV, leads to opportunistic infections and finally the progression of the infections cause the patient's death. That is why we decided to realize this study, in order to evaluate the prevalence of HIV among the Qeshm Island inhabitants.

Materials and Method. This cross-sectional study was conducted on 1500 subjects. The sampling method was the stratify-cluster combination. Ten head-clusters were randomly selected from each center and samples were collected from within the blocks. After completing the questionnaire, including demographic the data and risk factors, blood samples were drawn from the brachial vein. The prevalence of HIV-Ab was assessed by ELISA method. Finally, the statistical analyses were performed by using the Statistical Program for Social Sciences software (SPSS) system version 16.0. The data were analyzed by Chi-square and descriptive statistical tests.

Results. The overall prevalence of HIV infection was zero. Of the participants in this study, 511 (34.1%) were men and 989 (65.9%) were women. The average age was 32.6 years. 88% and 12% of the individuals were married and single, respectively. The education level of most subjects (66%) was the degree diploma. In terms of location, most of the subjects (75.2%) lived in the rural area. 136 (7.9%) had a history of travelling abroad and none of the subjects did not report a history of running away from home.

Conclusion. The majority of the subjects lived in the rural area and were married women with high school education. Although there were subjects who had a history of sexually transmitted diseases (STD) or tattoos, HIV prevalence was zero. This gives hope to the health of our society in terms of HIV disease.

Keywords: epidemiology, HIV infections, Qeshm

Introduction

AIDS stands for acquired immune deficiency syndrome. The disease is caused by the proliferation of Human Immune Deficiency Virus (HIV) in the hosts' body. HIV destructs the immune system of the body [1]. AIDS is a description of a disorder in the cellular and humoral immunity due to the infection with HIV. The main target of this virus is the T lymphocyte, which contains CD4 receptors in their cellular membrane. The disease varies from a mild viremia to a severe immune deficiency along with life-threatening opportunistic infections and even AIDS-related malignancies [2].

The first case of AIDS was reported in 1980 in the United States among a group of homosexual men infected with Kaposi’s sarcoma and pneumocystis pneumonia [3,4]. 15 years after the first AIDS case, pandemic HIV infection increased worldwide and in the late 1995, there were 1.3 million HIV-infected individuals among 193 countries. It is estimated that 24 million adults and 1.5 million children are infected with HIV and about 10000 new cases are added annually. As a result, the rising trend of HIV infection was continued in Sub-Saharan Africa and South Asia. The incidence rate of AIDS disease is of 2.5 million per year worldwide [5] and the incidence rate of HIV infection is of 19 cases per year [6].

HIV is transmitted via heterosexual and homosexual relationship, blood transfusion and products, drug injection, infected pregnant mother, and finally infection of the neonate during childbirth, prenatal period, or breastfeeding. Needle stick injuries or penetration of sharp objects are transmission methods via skin and mucosal ways, and also sprinkle of blood and other body discharges into the eye, nose, and mouth [7-9]. AIDS is the cause of 25 million deaths worldwide and it is estimated that about 40 million affected patients do not have access to anti-retroviral treatment [10].

Assessments demonstrate that several factors can increase the risk of epidemic HIV which is the following: first, the prevalence of sexual transmitted diseases (STD) is partially high, which demonstrate the...
unprotected extramarital sex [11]. Secondly, war, displacement, and migration, which are mostly accompanied by high-risk sexual behaviors that can increase the susceptibility of AIDS. Thirdly, injection drug users (IDUs) are a way for HIV transmission among the public population in several countries [12], and out of other factors, sexual contact with multiple partners, not using condom consistently, lack of information regarding HIV risks, and negative attitudes toward safe sexual function can also be pointed [13].

During the last few years, the disease was on the top of the health emergencies in Iran. According to the World Health Organization (WHO) forecasts, the rate of HIV infection in Iran will be of 10 percent in 2020. Therefore, Iran is recognized as one of the most risky countries in the world [14]. Epidemic HIV is spreading rapidly with different forms among various countries. In the current conditions, the combination of preventive and therapeutic methods that emphasize on convenient access to these methods, are being discussed. So far, limited studies have been conducted on the prevalence of AIDS among the public population in Iran and it seems that the importance of this issue is not considered adequately. According to the high importance of the disease and with reference to what has been said, we aimed to assess the prevalence of HIV among the residents of Qeshm Island.

Method

Using the random, cluster sampling approach, this cross-sectional study was carried out on 511 males and 989 females in Qeshm Island from southeast of Iran during 2013-2014. At the time of the implementation of this study, the total number of people living in this Island according to the latest national capitalation survey was 130000. Our sample size (n=1500) by using the following formula:

\[ n = \frac{z^2 \cdot p(1-p)}{d^2} \]

The Family Registry at public health centers were considered as a sampling frame. Each public health center covered a separate region of the Island. Two trained interviewers then visited the subjects’ homes and provided them with information about the study and its goals. Data were collected by using a check list that was designed according to similar studies and experts’ opinion. The checklist included demographic data (age, gender, marital status, residency, Literacy, travelling to a foreign country and history of running away from home) and risk factors (addiction, sexual contact, imprisonment, STD and Tattooing) for AIDS.

The inclusion criteria consisted of being a Qeshm inhabitant and providing a consent. Subjects who did not give their consent, or those who were not available after two contact attempts have been made, were excluded from the study, and replaced with the next random subjects. Using this approach, a total of 50 clusters with 1500 individuals were included in this survey.

Participants were interviewed in their homes, and a questionnaire on personal information was completed by a trained interviewer, for each subject. Participants were then asked to refer to the Health Promoting Research Center, and they were provided with an introduction letter for blood sampling. One day after the interview, a 10 mL sample of venous blood was collected into ethylene di-amine tetra-acetic acid (EDTA) bottles, after tourniquet application at the Health Promoting Research Center and then transferred to the regional laboratory.

Blood samples underwent qualitative evaluations to assess the repeated blood sampling. After the separation of serum from blood samples in the local laboratory, by centrifugation, serums were frozen in -20°C and transferred to the central laboratory of the Iranian Blood Transfusion Organization. Serum samples were screened for HIV-Ab by ELISA while using a third generation Kit (Biomeriex, Amsterdam). Positive samples were referred for western blot test to be confirmed.

The study was approved by the Ethical Committee of the Hormozgan University of Medical Sciences. A written informed consent was obtained from all of the participants and personal data were kept confidential both during and after the study.

Collected data was entered in SPSS v.16 software and analyzed by using descriptive statistics (frequency, mean, percent, and standard deviation) and chi-square test.

Results

In the current study and in order to assess the seroprevalence of HIV-Ab, serum samples of 1500 subjects were analyzed for positivity by using the ELISA method. None of samples was positive for HIV and all subjects were healthy. The mean age of the participants in this study was 31.35 years. From the studied subjects, 34.1 percent (n=511) and 65.9 (n=989) percent were male and female, respectively. 24.8 (n=372) and 75.2 (n=1128) percent of the participants were living in cities and villages, respectively. 66% (n=990) were under diploma, 21.7% (n=325) had a diploma, 1.9% (n=29) had an associate degree, 8.2% (n=123) had a bachelor degree, and 2.2% (n=33) had a master degree and higher. 136 (7.9) participants had previously traveled to a foreign country and 1364 participants (92.1%) did not travel to a foreign country. None of the participants reported a history of running away from home (Table 1).
Based on the findings in Table 2, three participants had an addiction history and 1497 participants (99.8%) reported no addiction history. 0.3 percent (n=4) had a previous history of sexual contact and 2 participants had a prison history. 2 percent (n=34) had a history of STD and 98 percent (n=1466) reported no STD history. 4 percent (n=69) had a tattoo history and 96 percent (n=1431) of the participants reported no previous tattoo history.

Table 3. Risk factors associated with HIV infection

<table>
<thead>
<tr>
<th>Variable</th>
<th>No.</th>
<th>Percent</th>
</tr>
</thead>
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<td>Opium</td>
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<tr>
<td>Heroin</td>
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<td>Others</td>
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<tr>
<td>None</td>
<td>1497</td>
<td>99.8</td>
</tr>
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<td>History of sexual contact</td>
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</tr>
<tr>
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<td>History of imprisonment</td>
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<tr>
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<td>1498</td>
<td>99.9</td>
</tr>
<tr>
<td>History of STD</td>
<td></td>
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<tr>
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</tr>
<tr>
<td>No</td>
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<td>98</td>
</tr>
<tr>
<td>History of Tattooing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>69</td>
<td>4</td>
</tr>
<tr>
<td>No</td>
<td>1431</td>
<td>96</td>
</tr>
</tbody>
</table>

Discussion

The HIV prevalence was zero in the present study. In a study conducted by Rostamiet al. [15], in 2009, among the health center clients in Andimeshk, the HIV prevalence was also zero. HIV prevalence was also zero in the study of Haghsehnaset al. [16] on prisoners. Similarly, the HIV prevalence was zero in the study of Nabavizadehet al. [17] in 1999 among blood donors of Yasuj. A retrospective cross-sectional was also conducted by Salehiet al. [18] on medical workers during 2002 and 2005 in Isfahan and the results demonstrated that the HIV prevalence was zero similar to the one in our study. In the study of Sharifiet al. [19] on the dentists of Qazvin city, the HIV prevalence was zero. No HIV positive case was reported in the study of Ghafoorian-Broujerdniaet al. [20] on medical documents of thalassemia patients referring to Shafa Hospital of Ahvaz during 1999 and 2004. In another study conducted by Kasraeianet al. [21] on blood donor volunteers of Shiraz Blood Transfusion Organization during 1998 and 2002, the HIV prevalence was 5.5 percent which was not consistent with the results of our study. In the studies of Kolvand [22] in Kermanshah, Taheri [23] in Rasht, and Masaei [24] in Isfahan, the prevalence of HIV was 0.05, 0.008, and 0.018 percent, respectively, which did not match the results of our study. Similar studies were performed in Italy [25] and the United States of America [26], which demonstrated a significant decrease from 1995 to 2002, which could be attributed to the change of lifestyle. There was no positive HIV case among the public population in the present study, which could be due to cultural and religious issues preventing high-risk behaviors.

In the study of Bagheriet al. [27] on 1461 patients with AIDS, 819 (56.5 percent) patients had a previous history of tattooing. This fact implies that tattooing is one of the most common ways for HIV transmission. However, among 69 (4.4 percent) participants of our study with a previous history of tattooing, the HIV prevalence was zero. In the study of Ghanbarzadehet al. [28] on the HIV prevalence among 199 female prisoners of Birjand, the HIV prevalence among 76 (38.2 percent) prisoners with a previous history of tattooing was zero, which was consistent with the results of the current study. In the study of Dolan et al., although the tattooing prevalence was 30.1 percent, HIV prevalence was reported to be zero, which was congruent with the results in the present study. Different tattooing prevalence can be attributed to cultural and religious issues in the study region.

The frequency of prison history among the HIV positive patients in the study of Keramatet al. [29] was 40.4 percent. In the study of Strazzaet al. [30], the HIV prevalence among female prisoners was reported to be 13.9 percent. Consequently, residing in prison was one of the main risk factors due to inappropriate health conditions, malnutrition, higher affinity to drug abuse through injection, high-risk sexual behaviors, and as a result a higher probability of HIV transmission. In the current study, two participants had a previous history of being in prison; however, they were not HIV positive. Those participants with a previous history of being in prison, which was one of the main risk factors for HIV was limited in our study, which implied an ethical health of our community and was consistent with the studies of...
Nokhodian [31] and Mohamed [32] who reported the HIV prevalence to be equal to zero among prisoners.

In the study of Robinson et al. [33], 90 percent of the HIV positive cases were also affected by other STDs. Laga et al. [34] demonstrated that the STD is an important risk factor for HIV and the annual HIV incidence was 9.8 percent before the STD control, which approached to 4.8 percent following the STD control. Ghyset al. [35] revealed that the HIV incidence rate decreased from 16.3 percent to 6.5 percent following the STD control. The results of these studies verified that the STD is another important risk factor for the HIV transmission. The HIV prevalence was zero in the present study, although 34 (2 percent) participants reported a previous history of STD. In the study of Ghanbarzadehet al. [28] on female prisoners of Birjand, the HIV prevalence was reported to be zero despite the high prevalence of STD, which could be due to the early visits to physicians, rapid diagnosis, and appropriate and timely treatment. As mentioned before, the HIV prevalence can be reduced through STD control.

Moradiet al. [36] conducted a study in 1998 which assessed the seroepidemiology of AIDS in Iran. Medical documents of 1953 patients with AIDS were assessed and results demonstrated that 30.1 percent of them had previously traveled to a foreign country. HIV prevalence was zero in the current study, although 136 (7.9 percent) participants had previously traveled to a foreign country. This can be due to the fact that most of the participants in the present study were married, which can be a reason for preventing high-risk sexual behaviors.

Conclusion

The majority of participants in the present study lived in rural areas and were married women with below diploma education level. The prevalence of HIV was zero, despite the previous history of STD and tattooing. Collectively, more efforts are needed to raise the public awareness regarding the risks of tattooing and the education regarding the prevention of AIDS and other sexually transmitted diseases.

Limitations

The following are the limitation of this study:
1. Lack of cooperation the studied society in presenting the required information
2. Unavailability of scientific resources
3. Cost

Acknowledgements

This study was the result of a general physician thesis. We would like to thank all professors, Qeshm inhabitants, health system authorities, and Hormozgan University of Medical Sciences who helped us during this study.

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Old age satisfaction regarding geriatric home services in Erbil city

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Abstract
Background and objectives: Life satisfaction is a vital imaginary situation in the psychosocial study of aging. Life satisfaction is a multi-dimensional issue that depends on many objective and subjective characteristics. In this study, the achievements are based on socio-demographic characteristics and old age satisfaction toward services in Geriatric home.

Methods: It is a cross sectional study which had been conducted in Geriatric home service in Erbil city during the period from 27/6/2014 to 4/2/2015. A questionnaire was made including sections for demographic characteristics, satisfaction with living conditions utilizing a face-to-face interview format. 25 males and females of old ages were interviewed. Each interview was used as method of data collection.

Results: Twenty-five old aged persons participated in this study in the geriatric home center in Erbil governorate. The majority of them were males; age group was 52-70 years and single. The average duration of staying was of 1-6 years (68%). Most of them did not have friends outside the geriatric home and could not get in contact with their family.

Conclusion: Interventions need to be planned to improve life satisfaction among old people. Appropriate old age policies containing important solutions to the problems of the old people are important to make them feel the element of culture.

Keywords: old age, life satisfaction, geriatric home services, Erbil

Introduction
Life satisfaction continues to be an important construct in the psychosocial study of aging. It is one of the subjective conditions of quality of life, which is the most commonly approved and seems to be one of the facets of victorious aging, both of them being key concepts in aging.

The economic structure, the erosion of societal values, weakening of social values, and social institutions such as the joint family were changed according to the urbanization, modernization, and globalization. Research reports were about life satisfaction, which is strongly related to socio-demographic and psychosocial variables [2].

Changes in the human body might cause difficulty in life. Often, that is why people enter long-term care communities. For some residents, aging was very dangerous or depressing. Others adapted well. The way you work with residents can make them feel better about themselves—and can make your work more pleasant [5].

The ageing process is of course a biological situation, which has its own dynamic; largely, it is not under the human’s control. However, it is also subject to the constructions by which each society makes sense of old age. In the developed world, the chronological duration plays a paramount role. The age of 60 or 65, is roughly equivalent to retirement ages in most developed countries where it is said to be the beginning of old age [3].

Most of the developed countries have accepted the chronological age of 65 years as a definition of “elderly” or older person, but like many westernized concepts, this does not adapt well to the situation in Africa. While this definition is somewhat arbitrary, it is many times associated with the age at which one can begin to receive pension benefits. At the moment, there is no United Nations standard numerical criterion, but the UN agreed cutoff is 60+ years to refer to the older population [4,6].

Older people who are not able to manage the daily life by themselves may have a different view of life satisfaction than those with preserved self-care capacity. It may well be that the transition from being healthy and independent of help self-care capacity alters the view of aspects contributing to the activities of daily living to having to live with a reduced life satisfaction [1].

The modern socio economic system makes old age a serious social problem. Planned and purposeful activities, which will constructively engage older persons according to their capacity, must be organized. Those aged who are suffering from illness need special services in their old age homes [7,8].

There is no huge geriatric home service in each city in Kurdistan. There is only one public Geriatric home in Erbil. The aim of the study was to identify the socio-
demographic characteristics and old age satisfaction toward services in geriatric home in Erbil city.

Methodology

A cross-sectional study design was adapted to identify the socio demographic characteristics and home care services satisfaction by older age. The duration was from September 1, 2014 to June 5, 2015. Half of the old age persons in the geriatric home center were excluded because most of the disabled were not able to participate in the study. A total sample size of 25 was selected to use a face-to-face interview format.

A questionnaire which covered demographic characteristics of the older age (gender, age, education, religion, having children, children, duration, number of friends in the same room, having a friend outside the geriatric home, in-touch with family member) was designed by the researchers and the second part of the questionnaire covered the satisfaction of the home care services.

Permission was taken by the manager of the geriatric home center, then a verbal consent was taken from all the old aged persons who were able to participate in the study before starting the interviews.

An interview was used as a method of data collection from both old aged genders. In addition, the study was approved by the ethical committee of the college of nursing in Erbil. Data were analyzed by using the statistical package for social sciences (SPSS, version 19).

Results of the study

Table 1 shows the majority of the sample, 56% (n=14), were between age group 52-70 years old. Regarding the sex, most of the participants, 88% (n=22), were male, in terms of marital status, the majority of the participants, 48% (n=12), were single/ never married, the majority of them, 84% (n=19), did not have children. With regard to the address, 52% (n=13), were from the city, regarding the duration of staying in the geriatric home centre, 68% (n=17) of them were between 1-6 years. 52% (n=13) were the participants who never attended school.

44% (n=11) of them, of 4-6 years old were living together in same room, 72% (n=18) did not have friends outside the home center and 64% (n=16) did not have any contact with their family.

Table 1. Socio demographic characteristics of the old age

<table>
<thead>
<tr>
<th>Sociodemographic data</th>
<th>n=25</th>
<th>F</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>33-51</td>
<td>2</td>
<td>8.0</td>
<td></td>
</tr>
<tr>
<td>52-70</td>
<td>14</td>
<td>56.0</td>
<td></td>
</tr>
<tr>
<td>71-89</td>
<td>9</td>
<td>36.0</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>22</td>
<td>88.0</td>
<td></td>
</tr>
</tbody>
</table>

Table 2 shows that 64% of participants were satisfied, 32% were fairly satisfied and 1% of them were poorly satisfied with the health care services in the home center. With regard to the nutrition program stratification, 76% of them were satisfied, 20% of them were fairly satisfied and 4% were poorly satisfied. Most of them, 76%, were satisfied with the room services and 24% of the participants were fairly satisfied.

With regard to the geriatric home environment, 56% of them were fairly satisfied, 28% of the elderly people were poorly satisfied with the environment. Regarding the availability of having bathing services, 88% of them were satisfied, 12% of the participants were fairly satisfied with all the services and 84% of them were satisfied with the general hygiene services and 60% of the elderly people in the geriatric home center were satisfied with the clothing services.

Most of the elderly people, 80%, had a good relationship with the health workers and the administration services.

At the same time, 60% of the elderly people were fairly satisfied with the general social activity and entertainment program in the geriatric home center. With regard to the safety measure, 48% of them were fairly
satisfied, 40% of them were poorly satisfied and 12% of the elderly people were satisfied.

Regarding the stratification from the transportation for the geriatric home resident for daily needs, 56% of them were fairly satisfied, 36% of the participants were poorly satisfied and 8% of the elderly people were satisfied with the services.

Table 2. Geriatric home services. Satisfaction according to residents:

<table>
<thead>
<tr>
<th>Items</th>
<th>N=25</th>
<th>Good F %</th>
<th>Fair F</th>
<th>Poor F</th>
<th>MS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Services</td>
<td>16</td>
<td>64.0</td>
<td>8</td>
<td>32.0</td>
<td>1.40</td>
</tr>
<tr>
<td>Nutrition Program</td>
<td>19</td>
<td>76.0</td>
<td>5</td>
<td>20.0</td>
<td>1.28</td>
</tr>
<tr>
<td>Room services</td>
<td>19</td>
<td>76.0</td>
<td>6</td>
<td>24.0</td>
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</tr>
<tr>
<td>Geriatric home environment</td>
<td>4</td>
<td>16.0</td>
<td>14</td>
<td>56.0</td>
<td>2.12</td>
</tr>
<tr>
<td>Bathing</td>
<td>22</td>
<td>88.0</td>
<td>3</td>
<td>12.0</td>
<td>1.12</td>
</tr>
<tr>
<td>Hygiene</td>
<td>21</td>
<td>84.0</td>
<td>3</td>
<td>12.0</td>
<td>1.20</td>
</tr>
<tr>
<td>Clothing</td>
<td>19</td>
<td>60.0</td>
<td>8</td>
<td>32.0</td>
<td>1.48</td>
</tr>
<tr>
<td>Relation with Health workers</td>
<td>20</td>
<td>80.0</td>
<td>4</td>
<td>16.0</td>
<td>1.24</td>
</tr>
<tr>
<td>Relationship with administration services</td>
<td>20</td>
<td>80.0</td>
<td>5</td>
<td>20.0</td>
<td>1.20</td>
</tr>
<tr>
<td>Social activity/ Entertainment</td>
<td>3</td>
<td>12.0</td>
<td>15</td>
<td>60.0</td>
<td>2.16</td>
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<tr>
<td>Safety measures</td>
<td>3</td>
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<td>12</td>
<td>48.0</td>
<td>2.28</td>
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<tr>
<td>Transportation</td>
<td>2</td>
<td>8.0</td>
<td>14</td>
<td>56.0</td>
<td>2.28</td>
</tr>
</tbody>
</table>

Discussion

Traditionally, in Iraqi Kurdistan, as in many other Mediterranean countries, older people in need have often lived with other family members, but nowadays the situation is beginning to change. This includes migration, urbanization, war, changing culture and increasingly divergent values between young and old generations, and social and economic deprivation.

According to the policy of Geriatric Home Center in Erbil, the age of elders who attend the home center for females should be 55 years and above, and males 65 and above but sometimes, there is some exclusion depending on the situation of the elder.

The current study showed that the majority of them were between the group age 52-70 years, which represented, males, who never got married. This result agreed with the study done in Jordan in which 29.3% of the elders in the nursing home were single [8].

Education has an important role in designing the future of the community. Regarding the elders’ education level, most of them, 52%, were illiterate. This result agreed with the study which showed that the majority of elders, 25 (35.2%), did not receive any formal education. Illiteracy was 19.7% in women subjects, and 15.5 % in men [9].

From the city center and Muslim, most of them did not have children, nearly 84%, while most of them had friends in the same room and outside the home and most of them were in touch with family, and the longest duration of stay of old adults in the Geriatric home was between 1-6 years, 68%, so, the interpretation of these results is the following: the standard age of old males was 65 years and because most of them did not have children to follow them up, they came to that home, the study being in agreement with study of [10,12,14], who mentioned that the elderly men came to the geriatric home to see the services and because there was no one to supervise and follow them up in their life.

Some results indicated that the majority of them were satisfied with most health services such as (Nutrition Program 76%, Room services 76%, Bathing services 88%, Hygiene 84%, Clothing 60%, and Relationship with the administration services 80%) so, these services were good. These results were in agreement with the studies done by [13,15], who mentioned that services were more important to satisfy the elderly men and women in the Geriatric home.

Other results indicated that there were poor services in the geriatric home, such as Geriatric home environment, Social activity/ Entertainment, Safety measures, and Transportation services, so, these results were in agreement with the study done by [11,16,17], who mentioned that poor services, and the quality of food and socialization were an effect on satisfaction among residents in the Geriatric home.

Providing comfortable and clean bedroom, treating residents with respect, providing sufficient and suitable food, having an in-geriatric home specialist physician, an adequate number of nurses and having more recreational activities in the geriatric home are important for all the elderly. These actions developed the need for the geriatric homes to improve their quality of service. The engagement in daily activities is important for the residents in the geriatric homes. Other than the usual leisure activities, it is necessary to encourage the public to visit the geriatric home center. School, university/ college students, and volunteer people can arrange for their
members to visit the geriatric home and have some programs for the elderly. Thus, the community will be more aware of the issues related to the support and care of the elderly.

**Conclusion**

Interventions need to be planned to improve life satisfaction among old people. Appropriate old age policies containing important solutions to the problems of the old people are important to make them feel the element of culture. Most of the elders are satisfied with the Geriatric home services including (nutrition, room services, bathing, hygiene, clothing, and relationship with staff in the home) while they are not satisfied with some items of services such as environment, social activities, entertainment, safety measures and transportation.

**Recommendation**

Encouragement of the Ministry of Work and Social Affairs to improve services in the Geriatric home especially regarding environment, social activities, entertainment, safety measures and transportation services as it was concluded in the result of study.

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Effect of evidence-based approach on the customer orientation
(Case study: Physicians Health Centers in Isfahan province in 2014)

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Abstract
Introduction: The aim of this study was to investigate the evidence-based approach to customer-orientation care physicians in the province, them being the target group.

Research method: This is a descriptive-analytical and cross-sectional design, which was performed in 2014. The statistical society in this study comprised 212 doctors in the health centers. The employed physicians selected 200 patients through a simple random sampling. The measurement tool was the researcher made questionnaire whose validity and reliability were confirmed. In this study, the structural equation modeling and partial least square method were used to test the assumptions and fitness model and the structural model was fit as acceptable.

Findings: The results indicated four cases related to attitude, a behavior which was intended to treat; common sources of evidence were used to retrieve information according to the best evidence and the lack of barriers to the performance of customer orientation approach of evidence-based effects were significant. Two dimensions of the doctor's knowledge, the lack of barriers, and the finding of the evidence of dimensions regarding the customer orientation approach were based on evidence that had no significant effect.

Conclusion: The use of evidence-based education not only improved knowledge, attitude, and skills of the doctors, but also enabled them to respond to the needs of clients in making better decisions and providing a higher quality of care, by reducing treatment costs for patients, attracting patients' satisfaction, and ultimately having a better efficacy for patients and organizations.

Keywords: approach based on evidence, customer orientation, knowledge management, medicine based on evidence

Introduction
Since the first contact doctors are in health centers, therefore, patients in public centers are considered one of the most important groups in providing a key role in the use of the evidence-based approach in their daily activities and clinical decision-making [1]. Combining the best scientific evidence, needs and values, the environment, corporate resources, as well as human resources, can provide appropriate evidence-based decisions [2]. The job of the employees is the involvement and training in providing effective services to the needs of the customer satisfaction [3].

Theoretical literature research:
A. Evidence Based practice: Evidence can be information or facts that show the definition of default or a belief that is true, valid, or not valid (Concise Oxford). The amount of funds required for the regional evidence is relevant and specific issues should also be. UNFPA is an evidence-based approach that is defined as a “systematic effort to provide the best empirical evidence in decision-making for planning, implementation, and monitoring and evaluation program” [4]. David Lawrence Sackett described evidence-based medicine as an integrating clinical expertise with the best clinical evidence from systematic research available to the best possible management of foreign patients [5]. Firstly, the need to learn the skills of Evidence-Based Medicine (EBM) is represented by a very high volume of medical information and is rapidly increasing. Secondly, physicians may need less time to devote to study. In addition, studies showed that the efficiency workshops are common, so they need to learn methods in order to continue education during lifetime [6].

B. Customer orientation: with the competition in the global arena and in this period, the correct use of resources is regarded as one of the most challenging elements of management and the relationships between the employees and customers are regarded as one of the organization's resources. The organizations should try new concepts of modern marketing, which means the art of finding, keeping and developing customer needs and new demands created for customers in order to avoid the exercise of power, but also using participation and understanding to manage relationships with customers and provide them to ensure their profitability [7].
Managers should find the time and tools available to their employees to an evidence-based approach in their daily activities application. Managers should be able to structure and culture the evidence-based practice in their own organization [8]. Customer relationship management by using information technology and organizational changes tries to re-engineer processes and turn them into customer-centric processes [9].

C. The relationship between the evidence-based practice and the customer orientation on knowledge management strategy, total quality management and customer focus have a special place. The purpose of this strategy is to achieve a superior service that seeks to create a culture of customer orientation with the identification of the needs and expectations of customers and measure their satisfaction to the knowledge, attitudes, skills and behaviors that the employees nurture to achieve its ultimate goal of customer orientation [10].

By providing the necessary resources and evidence, removing barriers to employment, promoting the culture of participation and sharing of staff, staff training encourages and motivates doctors to switch to the use of EBM, to take the appropriate decisions in the treatment; the same customer satisfaction being the ultimate goal which can be achieved. Therefore, the main hypothesis of this study was determined: an evidence-based approach of the doctors on the effective customer orientation.

History of research

The results of the study of Heiwe et al. in the field of attitudes, knowledge and behavior of health care professionals, showed that the groups have a positive attitude towards the evidence-based practice in their decision making and clinical practice. The majority of them had the power to analyze and evaluate the existing evidence, guidelines, and instructions that were available. Most of the obstacles regarding their performance problems were expressed. Finally, the researcher supported the Chief Executive Officer concerning the factors affecting the evidence-based performance, evidence-based and outcome performance and satisfaction of patients and contributed to productivity [11].

In a qualitative study performed in the field of evidence-based understanding of nurses, it was concluded that the evidence from research was used in nursing. Nurses needed to understand the value and importance of the research and the application of its results was difficult, the addition to the emphasis on the concept of evidence-based care being suggested, as well as the production of methods, recovery and the evaluation of research evidence in nursing education programs. Incentive policies for nurses with evidence-based practice, the improvement of their knowledge, skills, and the quality of care should also be considered [12].

In a study of Kermanshahi and Parvinian, the nurses’ views on barriers of implementing evidence-based care were examined and the results showed that nurses had barriers in implementing the evidence-based care for management and included the insufficient number of staff and managers’ awareness of the importance of evidence-based care. In the personal-care dimension, the lack of enough time of nurses to study the research was one of the most important barriers [13].

The results of the study of Salehi and Abedi regarding the implementation of evidence-based performance on the nurses showed that in terms of performance in the field of evidence-based nursing, the majority of the staff working in this area was weak, the researchers were motivated and the organization supported this weakness [14].

In a semi-experimental study entitled “The impact of evidence-based clinical training on the quality of the patient care and satisfaction”. It was found that the evidence-based education was used to promote knowledge, skills and enhance the quality of patient care [15].

There are a few studies performed on the physicians’ knowledge about EBM in the Middle East. In 2004, a study of AL Baghil and AL Almaie showed that only 40 percent of Saudi Arabia primary health care physicians have learnt something regarding EBM [16].

In another study conducted in the UK, it was reported that 40% of the general physicians had information about the search methods based on evidence and 71 percent of the time, they lacked the most important factor in the decision of not having to use evidence-based medicine [17].

Other studies showed that physicians need a clear understanding of the terms used in evidence-based medicine. In a study in the field of awareness and the use of evidence-based medicine among residents of Shiraz University of Medical Sciences conducted by Amini et al., it was shown that residents with positive attitudes toward medicine based on evidence and the access to Internet for clinical decision making, practically did not use evidence-based medicine and were unaware of specific websites. The reason may be that they were not trained in this field [18].

A study of Dalheim et al. on the factors affecting the development of evidence-based practice of working nurses concluded that the nurses and colleagues’ experience was used in evidence-based practice. However, because of the obstacles, evidence from research was rarely used. The most important obstacles in Evidence-Based Practice lacked time and skills to search, records management, research, nursing age, and a number of years as far as the working nurses were concerned [19].
In a study of MacDermid and Graham on a group of practicing midwifery profession after a period of training in EBP, it was found that participants in the study were extremely excited regarding the EBP, at the same time believing that this approach enhanced the critical thinking skills, increased confidence and a better care of the patients [20].

In a study of Morris and Maynard in the field of evidence-based care in midwifery, it was proved that the overall objective was the one of empowering the evidence-based care in identifying and understanding the needs of patients, clients, and midwifery practitioners, in decision-making and the application of scientific findings in the final midwifery care [21].

According to rows 1, 3, 6, 7 and 11 in Table 1, it can be said that in previous investigations, the relationship between evidence-based and customer-oriented approach was proven, but none of them specifically investigated the relationship between these two variables. Therefore, we considered the causal relationship between the two variables in this study.

### Research hypotheses

**Hypothesis 1:** Attitudes of physicians in the field of evidence-based approach, which have a significant positive effect on customer satisfaction.

**Hypothesis 2:** The behavior of physicians based on evidence-based approach, which has a significant positive effect on customer satisfaction.

**Hypothesis 3:** The lack of barriers in investigating and finding evidence of a significant positive effect on customer satisfaction.

**Hypothesis 4:** Getting familiar with the evidence-based approach to customer focus and a significant positive effect.

**Hypothesis 5:** Lack of barriers in the performance of the best evidence of a significant positive effect on customer satisfaction.

**Hypothesis 6:** Sources of evidence commonly used to retrieve customer information have a significant positive effect.

### Table 1. Benefits of using evidence-based practice based on qualitative and quantitative results of studies from 2000 to 2010

<table>
<thead>
<tr>
<th>Evidence-Based Practice Benefits</th>
<th>Row</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improving the quality of services and health care and finding the need [4-22]</td>
<td>1</td>
</tr>
<tr>
<td>Increasing public participation and teamwork and brainstorming skills among staff [3-25]</td>
<td>2</td>
</tr>
<tr>
<td>In response to the client’s decision-making skills and power to serve the needs of clients and evidence into the best performance [3-22]</td>
<td>3</td>
</tr>
<tr>
<td>Reduce the gap between theory courses passed in the university and practical work [23]</td>
<td>4</td>
</tr>
<tr>
<td>Increase the power of critical thinking and problem-solving skills and services (knowledge, skills and performance) [3-22]</td>
<td>5</td>
</tr>
<tr>
<td>Reduce the cost of treatment, reduce the length of hospital stay (time management) [4,26]</td>
<td>6</td>
</tr>
<tr>
<td>Increased patient satisfaction regarding the care [24]</td>
<td>7</td>
</tr>
<tr>
<td>Increased sense of confidence and flexibility in staff [25,27]</td>
<td>8</td>
</tr>
<tr>
<td>Increase accountability of employees [22,24,26]</td>
<td>9</td>
</tr>
<tr>
<td>Increase learning skills, use of information technology, especially the use of the Internet [22,28]</td>
<td>10</td>
</tr>
<tr>
<td>Skills increase training and transfer of scientific information to clients [23]</td>
<td>11</td>
</tr>
</tbody>
</table>

According to rows 1, 3, 6, 7, and 11 in Table 1, it can be said that in previous investigations, the relationship between evidence-based and customer-oriented approach was proven, but none of them specifically investigated the relationship between these two variables. Therefore, we considered the causal relationship between the two variables in this study.

### Research method

In terms of nature and purpose, the present study is functional and in terms of method of data collection, it represents a descriptive survey of the relationship between the causal variables. Doctors working in the health centers of the province 1 and 2 represented the statistical society studied in this research. The sample was random, the sampling method giving the
minimum requirements for 200 physicians working in health centers 1 and 2 of Isfahan province. 200 questionnaires were distributed between respondents and the same 200 questionnaires were suitable for analysis, identifying a numerous statistical analysis and evidence-based practice to measure the customer satisfaction questionnaire prepared. The first part of the questionnaire included demographic characteristics and the second part evidence-based practice, which consisted of 30 questions. The evidence-based practice consisted of six levels, attitudes and behavioral intention (5 items), behavior of physicians on evidence-based practice (5 items), lack of barriers regarding the performance based on the best evidence (4 items), knowledge (4 items), lack of barriers regarding investigation and evidence (5 questions), sources of evidence common for data recovery (4 items). The third part of the questionnaire was related to customer questions (3 items) [1-30].

In Table 2, the number of measures designed to measure variables, Cronbach’s alpha coefficient, and reliability of combined variables were presented.

<table>
<thead>
<tr>
<th>Reliability</th>
<th>Cronbach alpha</th>
<th>code</th>
<th>Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.909</td>
<td>0.875</td>
<td>ATI</td>
<td>Attitude toward evidence-based practice</td>
</tr>
<tr>
<td>0.785</td>
<td>0.676</td>
<td>BHV</td>
<td>Behavioral intention and behavior</td>
</tr>
<tr>
<td>0.799</td>
<td>0.663</td>
<td>EVI</td>
<td>No obstacles regarding the investigation and evidence</td>
</tr>
<tr>
<td>0.821</td>
<td>0.736</td>
<td>KNO</td>
<td>Introduction to Evidence-Based Practice</td>
</tr>
<tr>
<td>0.818</td>
<td>0.717</td>
<td>PER</td>
<td>No barriers related to change based on the best evidence</td>
</tr>
<tr>
<td>0.761</td>
<td>0.616</td>
<td>RES</td>
<td>Evidence sources commonly used for data recovery</td>
</tr>
<tr>
<td>0.713</td>
<td>0.604</td>
<td>CUS</td>
<td>Customer Orientation</td>
</tr>
</tbody>
</table>

As it could be observed from all the variables in this study, Cronbach’s alpha coefficient was of at least 0.6, 0.65, remarkably higher. To assess the validity (convergent), the exploratory factor analysis was used for factor analysis, index KMO, Bartlett test, and convergent validity [4-32].

<table>
<thead>
<tr>
<th>Sampling criteria KMO</th>
<th>Approximate χ2 value</th>
<th>Freedom degree</th>
<th>Bartlet significance</th>
<th>Factorial loading</th>
<th>Items</th>
<th>Name of variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.837</td>
<td>545.506</td>
<td>15</td>
<td>0.000</td>
<td>0.674</td>
<td>ATI1</td>
<td>Attitude toward evidence-based practice</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.634</td>
<td>ATI2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.784</td>
<td>ATI3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.692</td>
<td>ATI4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.520</td>
<td>ATI5</td>
<td></td>
</tr>
<tr>
<td>0.676</td>
<td>212.308</td>
<td>15</td>
<td>0.000</td>
<td>0.3</td>
<td>BHV1</td>
<td>Behavioral intention and behavior</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.350</td>
<td>BHV2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.579</td>
<td>BHV4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.454</td>
<td>BHV5</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.408</td>
<td>BHV6</td>
<td></td>
</tr>
<tr>
<td>0.613</td>
<td>210.630</td>
<td>6</td>
<td>0.000</td>
<td>0.662</td>
<td>PER1</td>
<td>Lack of barrier relates to change based on the best evidence</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.661</td>
<td>PER2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.482</td>
<td>PER3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.377</td>
<td>PER4</td>
<td></td>
</tr>
<tr>
<td>0.664</td>
<td>210.226</td>
<td>6</td>
<td>0.000</td>
<td>0.375</td>
<td>KNO1</td>
<td>Introduction to Evidence Based Practice</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.597</td>
<td>KNO2</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>0.602</td>
<td>KNO3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.678</td>
<td>KNO4</td>
<td></td>
</tr>
<tr>
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<td></td>
<td>0.330</td>
<td>EVI2</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.425</td>
<td>EVI3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.506</td>
<td>EVI4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.353</td>
<td>EVI5</td>
<td></td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td>0.464</td>
<td>EVI6</td>
<td></td>
</tr>
<tr>
<td>0.609</td>
<td>264.172</td>
<td>28</td>
<td>0.000</td>
<td>0.481</td>
<td>RES1</td>
<td>Evidence sources commonly used for data recovery</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.426</td>
<td>RES2</td>
<td></td>
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<tr>
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<td></td>
<td></td>
<td></td>
<td>0.456</td>
<td>RES4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.335</td>
<td>RES5</td>
<td></td>
</tr>
</tbody>
</table>
Bartlett and KMO test results showed that the index values were desirable. KMO standard variable rate of more than 0.5 and less than 0.05 for the CLS was also determined by Bartlett test. Items that amounted less than 0.03 and which were not compatible with other items were excluded from the analysis. To check the validity of the (credit) converge in the PLS model, the mean-variance extracted (AVE) was used. As it can be seen in Table 4 below, all the average variance extracted was of more than 0.5, therefore, an appropriate model of convergent validity was highlighted [33-35].

Table 4. Convergent validity of the constructs of research variables

<table>
<thead>
<tr>
<th>RES</th>
<th>PER</th>
<th>KNO</th>
<th>EVI</th>
<th>CUS</th>
<th>BHV</th>
<th>ATI</th>
<th>Validity</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.654</td>
<td>0.637</td>
<td>0.548</td>
<td>0.502</td>
<td>0.557</td>
<td>0.532</td>
<td>0.667</td>
<td>(AVE) Average of extracted variance</td>
</tr>
</tbody>
</table>

To assess the reliability of each of the markers in the latent variable PLS model, the load factor of each indicator was determined. The value of each hidden variable load factor markers had to be greater than or equal to 3.0.

Table 5. The value of latent variables load factor markers

<table>
<thead>
<tr>
<th>P values</th>
<th>CUS</th>
<th>RES</th>
<th>PER</th>
<th>KNO</th>
<th>EVI</th>
<th>BHV</th>
<th>ATI</th>
<th>Variable marker</th>
<th>Row</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;0.05</td>
<td>0.840</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ATI1</td>
<td>1</td>
</tr>
<tr>
<td>&lt;0.05</td>
<td>0.797</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ATI2</td>
<td>2</td>
</tr>
<tr>
<td>&lt;0.05</td>
<td>0.904</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ATI3</td>
<td>3</td>
</tr>
<tr>
<td>&lt;0.05</td>
<td>0.824</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ATI4</td>
<td>4</td>
</tr>
<tr>
<td>&lt;0.05</td>
<td>0.707</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ATI5</td>
<td>5</td>
</tr>
<tr>
<td>&lt;0.05</td>
<td>0.477</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>BHV1</td>
<td>6</td>
</tr>
<tr>
<td>&lt;0.05</td>
<td>0.543</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>BHV2</td>
<td>7</td>
</tr>
<tr>
<td>&lt;0.05</td>
<td>0.844</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td>BHV4</td>
<td>8</td>
</tr>
<tr>
<td>&lt;0.05</td>
<td>0.693</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>BHV5</td>
<td>9</td>
</tr>
<tr>
<td>&lt;0.05</td>
<td>0.666</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>BHV6</td>
<td>10</td>
</tr>
<tr>
<td>&lt;0.05</td>
<td>0.625</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>EVI2</td>
<td>11</td>
</tr>
<tr>
<td>&lt;0.05</td>
<td>0.796</td>
<td></td>
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<td>EVI3</td>
<td>12</td>
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<tr>
<td>&lt;0.05</td>
<td>0.775</td>
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<td></td>
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<td></td>
<td>EVI4</td>
<td>13</td>
</tr>
<tr>
<td>&lt;0.05</td>
<td>0.620</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>EVI6</td>
<td>14</td>
</tr>
<tr>
<td>&lt;0.05</td>
<td>0.752</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>KNO1</td>
<td>15</td>
</tr>
<tr>
<td>&lt;0.05</td>
<td>0.854</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>KNO2</td>
<td>16</td>
</tr>
<tr>
<td>&lt;0.05</td>
<td>0.622</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>KNO3</td>
<td>17</td>
</tr>
<tr>
<td>&lt;0.05</td>
<td>0.684</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>KNO4</td>
<td>18</td>
</tr>
<tr>
<td>&lt;0.05</td>
<td>0.882</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PER1</td>
<td>19</td>
</tr>
<tr>
<td>&lt;0.05</td>
<td>0.818</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PER2</td>
<td>20</td>
</tr>
<tr>
<td>&lt;0.05</td>
<td>0.610</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PER3</td>
<td>21</td>
</tr>
<tr>
<td>&lt;0.05</td>
<td>0.576</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PER4</td>
<td>22</td>
</tr>
<tr>
<td>&lt;0.05</td>
<td>0.774</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>RES1</td>
<td>23</td>
</tr>
<tr>
<td>&lt;0.05</td>
<td>0.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>RES2</td>
<td>24</td>
</tr>
<tr>
<td>&lt;0.05</td>
<td>0.801</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>RES4</td>
<td>25</td>
</tr>
<tr>
<td>&lt;0.05</td>
<td>0.465</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>RES5</td>
<td>26</td>
</tr>
<tr>
<td>&lt;0.05</td>
<td>0.555</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CUS1</td>
<td>27</td>
</tr>
<tr>
<td>&lt;0.05</td>
<td>0.758</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>CUS2</td>
<td>28</td>
</tr>
<tr>
<td>&lt;0.05</td>
<td>0.697</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CUS3</td>
<td>29</td>
</tr>
</tbody>
</table>
As it could be seen in the above table, all the measures related to the latent variable that housed more than 40%, were marked as shaded. Therefore, the model could measure latent variables that were indicators of reliability in the field. All the amounts of the indicators were likely to be less than 0.05 and the validity of research tools were appropriate.

Findings

100 respondents in the Health Center of Isfahan city [1] and 100 [2] of the city health center were employed (95 males and 105 females). 193 respondents' education level was Ph.D. and 7 were experts. Regarding the position, the organization was responsible for 63 health centers, 120 health care centers and 17 family physicians. Fig. 2 showed the relationship between the 2 variables, the path coefficient of performance evidence-based approach and customer of 0.303 respectively.

Given the probability (p-value), it had a less significant level of 0.05. In fact, a significant number was out of range (1.96, -1.96) (Fig. 3). It can be concluded that the path coefficients were significant, at a significant level of 0.05, meaning that the approach of evidence-based practice had a significant impact on customer satisfaction. With respect to the second hypothesis of the study, the coefficient of correlation between the two variables of tracking customer behavior and behavioral intention was calculated to be of 0.510 (Fig. 1).

Given the probability (p-value), it had a less significant level of 0.05. In fact, a significant number was out of range (1.96, -1.96) (Fig. 3). It can be concluded that the path coefficients were significant, at a significant level of 0.05, meaning that the purpose and behavior of the customer impact were significant. In connection with the third hypothesis study, the coefficient of correlation was calculated between the two variables, no obstacles being encountered on the path of finding evidence and customer orientation and being of -0.067 (Fig. 2).

Given the probability (p-value), it had a significant level of more than 0.05. In fact, a significant number was in the range (1.96, -1.96) (Fig. 3). It can be concluded that this was not a significant factor (0.05) path error, meaning the lack of barriers regarding investigation and finding no evidence of a significant impact on customer orientation. In connection with the fourth research hypothesis, the path coefficient was calculated for the relationship between two variables Introduction to Evidence Based Practice and customer orientation and its value was -0.072 (Fig. 2).

Assessment of the indices model fitting

To check the quality or reliability of the model, which included a credit check share index and index credit check, redundancy was used. In Table 8, the values of each of the indicators of the independent relationship between two variables was based on the best evidence and the lack of barriers to changing customer orientation, being of 0.496 (Fig. 2).

Given the probability (p-value), it had a less significant level of 0.05. In fact, a significant number was out of range (1.96, -1.96) (Fig. 3). It can be concluded that the path coefficients were significant, having errors of 0.05; meaning a lack of barriers in investigating and finding evidence of a significant impact on customer orientation. In connection with the sixth research hypothesis, the path coefficient for the relationship between two variables common sources of evidence used to retrieve customer orientation information, was 0.016 [2].

Given the probability (p-value), it had a significant level of more than 0.05. In fact, a significant number was out of range (1.96, -1.96) (Fig. 3). It can be concluded that the path coefficients were significant; having errors of 0.05, meaning that the most common sources of evidence used to retrieve customer orientation data had a significant influence.
variables were affiliated mediators. As it can be seen, the indicators were positive and higher than zero.

Table 7. Share indices (CV Com) and redundant index (CV Red)

<table>
<thead>
<tr>
<th>CV Red</th>
<th>CV Com</th>
<th>Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.504</td>
<td>0.504</td>
<td>Attitude toward evidence-based practice</td>
</tr>
<tr>
<td>0.174</td>
<td>0.174</td>
<td>Behavioral intention and behavior</td>
</tr>
<tr>
<td>0.185</td>
<td>0.185</td>
<td>No obstacles to the investigation and evidence</td>
</tr>
<tr>
<td>0.247</td>
<td>0.247</td>
<td>Introduction to Evidence Based Practice</td>
</tr>
<tr>
<td>0.265</td>
<td>0.265</td>
<td>No barriers related to change based on the best evidence</td>
</tr>
<tr>
<td>0.135</td>
<td>0.135</td>
<td>Evidence sources commonly used for data recovery</td>
</tr>
<tr>
<td>0.376</td>
<td>0.035</td>
<td>Customer orientation</td>
</tr>
</tbody>
</table>

Discussion and Conclusion

According to the results of the study, a hypothesis of a causal relationship between the attitudes of the physicians on evidence-based practice was accepted by the customer orientation. The study results showed that physicians have a positive attitude towards evidence-based practice and believe in the physicians’ submission of evidence-based practice in high-quality services to provide better and faster health services, giving the best response to the needs of the recipients of health care services and satisfaction customer orientation impact that made up the health care system. The results of the previous research also indirectly suggested that this approach was based on evidence-based practice to have an impact on the customer orientation [11,18].

According to the second hypothesis regarding the impact of behavioral intention, the behavior based on evidence-based practice to customer orientation was evident, the physicians were studied, and the behaviors were associated with evidence-based practice in order to give the best answer to the clients. These behaviors included problem-solving skills, filling gaps in professional performance by using the best evidence, using guidelines and instructions in response to the client needs and skills of the professional practice due to new evidence. As a result, the number of previous researches also indirectly referred to the issue of the treatment based on evidence-based practice which affected the customer orientation [11,15].

Amini and colleagues research results were different from the findings of the current study, and, the researchers concluded that the residents in the study had a positive attitude towards evidence-based medicine and the access to the Internet for clinical decision making, practically of evidence-based medicine, and, they did not use it because they did not consider a systematic training in this field [18].

The results of the study of Salehi and colleagues regarding the implementation of evidence-based performance on the nurses, were different from the findings of this study. In terms of performance, the majority of staff in the field of evidence-based nursing was weak, the research staff was motivated, and the organization supported this weakness [14].

Unlike the model that predicted a causal relationship, there was no research that examined the related barriers and found no evidence of measures rejected by the customer orientation. With regard to the measures used in this section, such as having enough time to find the evidence needed to have the confidence, having the necessary skills in the field of evidence-based practice, facilities, proficiency in English, it could be concluded that the existence of these barriers would be the best evidence that doctors can access. A large number of respondents and lack of time was the most important factor in the decision of not using evidence-based medicine. In 2004, Hanson and colleagues noted that only 1.9 percent of the physicians and other doctors use specific methods to find the evidence they need to learn to evaluate the evidence [36].

The previous researches noted other similar obstacles such as lack of time, lack of skills to search, the age of employees, level of experience, lack of a systematic training, their motivation and lack of an organizational support personnel [11,13,17,19].

Unlike the model, a causal relationship between practitioners in the field of evidence-based practice and customer orientation was observed and the fourth hypothesis was rejected. The study results also showed that the awareness of target groups used the low knowledge of employees in different job categories in this area [2,8-16].

It can be concluded that physicians studied the need for spending programs and training courses based on approach evidences, the importance of the work and being familiar with the advantages of using evidence-based approach. Therefore, it was recommended through workshops and educational meetings and the creation of an interaction with the care centers based on evidence and past experience with regard to the facilities given to this important issue. According to the findings of the fifth research hypothesis, the absence of barriers in the performance of the best evidence was accepted by the customer. According to the results and outcome of Heiwe et al. study, it can be stated that despite some obstacles, such as the lack of time, the approach based on evidence in the clinical practice, the conclusion that the best evidence will be able to take better decisions and provide a better quality of care was reached [11].

The sixth hypothesis, regarding the existence of a positive relationship between the sources of evidence commonly used to retrieve the information on the customer, was accepted. The provision of the evidence resources needed such as manuals and instructions for access to the Internet, studying the data, training courses and intelligence information from colleagues shared a very important role in the use of evidence-based
approach in the study group. The organization will provide the conditions and resources so that employees are directed towards the use of this approach.

The results of this study showed that there is a significant causal relationship between the dimensions such as “attitude”, “intent to conduct and behavior”, “lack of barriers to change based on the best evidence”, “the current evidence sources used for information retrieval”, and the evidence-based approach to “customer” in the group. However, there was no significant causal relationship between the 2 dimensions, “lack of barriers and finding the evidence” and “Introduction to Evidence Based Practice”, the evidence-based approach to “customer orientation” in the group of physicians studied. By providing the necessary training so that the staff could provide the facilities to encourage and motivate the staff, the use of evidence-based approach could be used and it would facilitate a greater efficiency and ultimately improve the organization and attract customers and clients. As physicians base their actions on the scientific evidence in the health area, they will be able to make better decisions and provide a higher quality of care, so as to reduce the cost of treatment, patients gaining the satisfaction and the effectiveness of the organization. The results of this research showed that physicians make an evidence-based, customer-focused approach of the organization.

Recommendations

In the end, it was suggested that similar studies in different working groups in the health care system, were appropriate and compatible with the circumstances in our country, the development of care being based on the achieved evidence-based practice.

References


Noise pollution effect in flour factory on workers' hearing in Lamerd City

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Abstract
Introduction: Noise pollution is one of the most important problems in industry that has an effect on the auditory system and other physiological parameters, as well as persons in noise exposure situations. While noise-induced hearing loss is preventable, once acquired, hearing loss is permanent and irreversible.

Methodology: In this research, noise in different parts of Flour Factory in Lamerd were measured by the audiometer, which showed that the workers' exposure was higher than the state standard; therefore, the hearing test (audiometer) was done on the workers and its results were analyzed by using SPSS version 16.

Findings: Overall, Pearson correlation $r = 0.453$ was established between work records and the hearing loss among all workers with meaningful level $p\leq 0.05$. Furthermore, T-test was used to investigate noise influence on workers involved in noisy halls (average more than 85 db) and mean=26. 71 and standard deviation=11.72 were obtained ($p\leq 0.05$), which was higher than 25db (as the normal threshold of hearing).

Conclusion: The results of audiometry and T-test showed that the noise pollution has an effect on the hearing of people working in noisy halls.

Keywords: air pollution, workers' exposure, hearing rate, flour factory

Introduction

The need for industry in various communities has led to constructing different production factories and industries [1]. Environment pollution is a secondary and unwanted product of different industrial activities that has exposed the environment to further danger [2]. Noise pollution is one of the most important problems of the industries that influence the auditory system and other physiological parameters of the human's body, as well as persons in noise exposure situations [3]. This effect and its rate are different based on the individual and environmental characteristics. Important individual characteristics are age, work experience, race, nutrition, and diseases [4]. In addition, the exposure to noise can cause social and psychological problems [5]. While noise-induced hearing loss is preventable, once acquired, the hearing loss is permanent and irreversible [6]. About 30 million workers in the USA are exposed to dangerous noise level [7,8] because of which hundreds of million dollars per year have been estimated for the hearing loss due to noise pollution [9]. Statistics of the World Health Organization estimates 4 million dollars as daily damage [10].

One of the industries in which workers are exposed to noise pollution (noise over-limit) due to the presence of noisy machines, is the flour production factory. The existence of mills and huge suction and blower machines made a lot of noise and naturally, it seems that this noise affects the workers' hearing.

The position, control, and reduction in the exposure time are regarded as necessary measures. Performing proper control methods can hold the noise of workplace at a standard level [11].

Mac Donald’s consulting engineers group investigated the noise pollution in Tehran city in 1977 for the first time, based on which, the noise rate in Tehran city was reported at 55- 85 db [12].

Investigating the workers' hearing status in noisy halls of Tehran Azmayesh Factory [13], showed that noise has a significant influence on the workers' ears, especially in 4000 Hz frequency; such that only 48.3% of the workers had a normal hearing.

In addition, in a study conducted by Qotbi et al. [14,15] on noise exposure rate and permanent noise-induced hearing of workers of Shadri spinning factory in Yazd city, the results showed that noise and work records had a positive relationship with their hearing loss.
In a research done on the workers of Taban loom factory in Yazd city, it was revealed that the hearing loss due to NIHL, assuming a constant work record, for a unit increase in the intensity of sound, noise induced hearing loss (NIHL) increased by an average of 0.18.

Methodology

At first, resources producing further noise were determined by doing field and library studies about the flour production process in the factory. Then all parts of the factory were zoned according to the area and center of each zone, and were determined as a station for measuring noise. Next noise intensity of each station was measured and recorded in network A by using an audiometric device modeled TES-1351 which was calibrated by a calibrator device TES-1352 and totally 234 areas were measured. The average noise of halls and halls with noise over-limit was characterized.

To do the audiometric test, a screening audiometric device marked Pejvak Ava model ASA 84 was used. Personnel were visited three times and before entering the work shift.

Among 29 working persons, an individual was excluded from the study due to having hearing problems related to war, to prevent improper research results. Hearing measurement test was performed for 28 workers while observing the following conditions:

- Visiting an in and anti acoustic noise room
- Measuring the hearing rate after rest and before beginning the next work shift
- Audiometric test in frequencies 500, 1000, 2000, 3000, 4000, 6000, 8000 Hz

NIHL was calculated for each ear separately and for both ears.

\[
\text{NIHL}_t = \frac{(\text{NIHL}_{lb} \times 5) + (\text{NIHL}_{lp})}{6}
\]

\(\text{NIHL}_t\): general and permanent loss of both ears
\(\text{NIHL}_{lb}\): permanent loss of strong ear (db)
\(\text{NIHL}_{lp}\): permanent loss of weak ear (db)

Statistical analysis was done by using SPSS version 16.

Findings

Among 234 measured sections, 41.4% (97 stations) were placed in a hazardous zone (more than 85 db) and 34.1% (80 stations) in a precaution zone (65-85 db), 24.3% (57 stations) in a secure zone (lower than 65 db). All the stations of hazardous zone were placed in both production and sifter halls, since there were noisy machines like mills, suction machines, and air compressors.

Since the legal exposure rate to noise was 85 db for 8 work hours according to the Iran technical protection and professional health committee (obtained from American standard ACGIH) and workers of the factory worked for 8 hours every day. Stations in which noise intense rate was of more than 85 db were determined as areas with noise over-limit (having noise pollution).

Among 28 people, who have done the hearing test (audiometer), 14 people were exposed to noise over-limit level in two production halls and sifter halls and the rest were exposed to noise over-limit level in other sections.

Measuring the results of noise for different units in Nasr-e- Lamerd Flour Factory was highlighted in Table 1 according to the normal limit of noise in Iran.

![Fig. 1 Moment of measuring noise in production hall](image)
Table 2. Age, work experience, noise severity, and rate of hearing loss related to noise (NIHL) information regarding the workers of the Flour Factory in Lamard

<table>
<thead>
<tr>
<th></th>
<th>Age (years)</th>
<th>Work experience (years)</th>
<th>Noise intensity (db)</th>
<th>NIHL Right ear of all workers</th>
<th>NIHL Left ear of all workers</th>
<th>NIHL two ears of all workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>24</td>
<td>3</td>
<td>56</td>
<td>1.5</td>
<td>0.5</td>
<td>0.9</td>
</tr>
<tr>
<td>Maximum</td>
<td>59</td>
<td>21</td>
<td>99.5</td>
<td>48.5</td>
<td>42.5</td>
<td>42.7</td>
</tr>
<tr>
<td>Mean</td>
<td>35.8</td>
<td>9.5</td>
<td>82.3</td>
<td>19.3</td>
<td>17.8</td>
<td>17.1</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>7.69</td>
<td>5.4</td>
<td>11.9</td>
<td>14.6</td>
<td>13.6</td>
<td>13.5</td>
</tr>
</tbody>
</table>

To investigate the effect of work record on NIHL, the regression relation was obtained as it follows, with the significance level p value≤0.05:

NIHL = 3.407 + 5.247 * work record

In studying the relationship between the work record and NIHL, it was determined that among 5 people worked in very noisy units with work records for less than 10 years, 4 persons had a normal hearing and 1 person had a partial loss. It seemed that, the noise effect on that person was more intense than on his coworkers because of his age (49 years old). It is worth mentioning that the effect of age on hearing was considered in calculating the NIHL.

Another point was that, among 9 people working in noisy units (production and sifter halls) with 10 years experience and more, 7 people (78%) had a partial hearing loss and 1 person (11%) had a normal hearing level. During the study, we found that a person with a normal range of hearing used earplug regularly; however, the other workers of these two units did not use earplugs regularly.

In sum, the Pearson correlation r=0.453 was done between the work record and the hearing loss among all workers with a significance level p≤0.05.

The studies showed that, there was a meaningful correlation between the age of all workers and NIHL. Pearson correlation coefficient was r = 0.394 in p≤0.05.

The Pearson correlation coefficient was r=0.646 between the age and NIHL in workers of production unit with a significance level p≤0.05, in whom the average noise was of 85 db for 8 working hours.

The Pearson correlation coefficient was r=0.552 between the age and NIHL in workers of production and sifter units with a significance level p≤0.05 in which the average noise was of 85 db for 8 working hours.

To investigate the noise effect on the working personnel in noisy halls (average of more than 85 db), t-test was used and the mean 26.71 and standard deviation of 11.72 were obtained (p≤0.05). These figures represented more than 25 db (minimum average of people that did not experience any hearing damage) and this showed the noise effect on hearing of people working in noisy halls. Also, this average was of 7.08 in other workers who worked in units with an average noise of less than 85 db.

Discussion and conclusion

The maximum noise rate was in production and the sifter halls and other halls were less noisy according to the distance from these two halls. The audiometric results showed that the average of hearing loss in workers of two noisy units was higher than the other units and the total average, which indicated the relation between the increase of environment noise intensity and reduction of hearing rate. In addition, there was a
significant relationship between age and work record of people working in the Flour Factory of Lamrard and NIHL; while the comparison of its results with the other researches in this area supported this matter. Researches done by Mohammad Heydarian Moghaddam [16] showed that, there was a direct relationship between age, work record, and daily work hours with a reduction in the hearing rate. Parviz Pookhazanzadeh [17] also showed that there was a significant relationship between the hearing loss and the rise of noise intensity and increase of exposure time, which our research results supported. In a study by Santana and Ferrite, a positive significant relationship was obtained between age, hearing loss, and occupational exposure to noise [18]. A study of Hong and Kim showed that, there was a meaningful relation between the occupational exposure to noise and the hearing loss [19]. The relation between the hearing reduction and age and work experience has been proven in a study done in Ethiopia [20], but in the study of Fariba Asghari et al. [21], no strong relationship was seen between the hearing loss and work experience and there may be different reasons according to various elements in noise effect.

This study is the result of M.A. thesis in Islamic Azad University of Bandar Abbas.

Acknowledgement

Finally, we deem it necessary to thank the manager and workers of Nasr-e-Lamerd Flour Factory and the experts of the Health Center in Lamerd for their cooperation and sincere assistance in doing this study.

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Population attributable risk of congenital heart defects. 
Risk factors among newborns in Yazd, Iran

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Abstract
Background: Congenital heart defects are cardiac problems that develop prior to birth and influence the structure and function of the newborns’ heart. Different types of defects can range from mild (e.g. a small hole between the heart chambers) to severe (like a flaw or weakness in a part of the heart).
Material & Method: This case-control study was conducted to determine PAR congenital heart defects risk factors among newborns from 2012 to 2013 in Yazd hospitals. The defects were identified through echocardiography and recorded according to the 10th Revision of International Classification of Diseases (ICD10). The total number of patients was 96, of whom 14 were excluded due to the lack of cooperation or insufficient data. One hundred and sixty five sex and region matched controls selected through random sampling were included in the study, as well. Population Attributable Risk (PAR) was used to evaluate and measure the priorities of the risk factors. Finally, the Levin formula was used to calculate the adjusted population attributable fraction.
Result: Adjusted odds ratios were calculated for the risk factors. The results showed that the highest odds ratio belonged to the maternal history of stillbirth, lack of multivitamin use before pregnancy, maternal obesity, and overweight. The calculation of the adjusted Population Attributable Fraction in risk factors showed that the highest proportion of the causes of congenital heart malformations was associated with overweight and obesity.
Conclusion: This study showed several factors that could affect the congenital heart defects. It was observed that although overweight and obesity had a weaker association than the other two factors, they had a higher prevalence and a greater attributable risk.

Keywords: Population Attributable Risk, congenital heart defects, Yazd, Iran

Introduction
Congenital heart defects are cardiac problems that develop prior to birth and influence the structure and function of the newborns’ heart. Different types of defects can range from mild (e.g. Atrial Septal Defect) to severe (e.g., hypoplastic left heart syndrome) conditions [1].
Depending on the type and severity of congenital heart defects, they can be asymptomatic or symptomatic discoloration of the nails, lips, tachypnea, respiratory distress, or poor feeding [1].
The cause of congenital heart defects in newborns is unknown; some of the defects occur due to genetic or chromosomal changes; they could be caused by a combination of genetic defects and other cardiovascular risk factors such as exposure to environmental factors, maternal nutrition, and maternal drug use [1,2].
Congenital heart defects are related to the genetic status in 15% of the cases [3,4]. It is well known that almost 20 to 30% of the people who suffer from congenital heart diseases also suffer from physical problems [5,6]. Although a small percentage of the defects are attributed to genetic issues [3,4], there is little evidence that non-genetic factors cause the defects [7], and no studies have focused on the factors influencing the disease, that is why prevention of congenital heart defects has almost been stopped due to the lack of data on modifiable factors [7]. However, various studies have shown the effect of conditions such as maternal diabetes, maternal febrile illness, congenital rubella, maternal epilepsy, folic acid, vitamin A, various drugs, age of the mother, age of the father, parental education level, history of stillbirth, maternal obesity, Turner syndrome, oral cleft, age at birth, and maternal phenylketonuria.

In USA, the disease is the most common birth defect which claims the lives of about one percent of the live births or 40,000 births each year [2,8,9]. The incidence of some types of congenital heart defects, particularly mild, has grown while the other types have remained constant, Ventricular Septal Defect being the most common case [10]. A study in 2002 showed that
650,000 out of 1.3 million adults lived with congenital heart defects. In this estimation, the prevalence at birth and the number of the surviving cases without treatment was used [11].

Eighteen in every 10,000 births in the United States suffer from severe cardiac abnormalities [12]. During the years 1999 to 2006, 41,494 deaths were reported due to congenital heart defects; nearly half of the deaths occurred before one year of age [13]. More than one year survival rate in patients with myocardial injury has improved over time but its mortality is still high [14]. The highest rate of death in children under one month old and approximately 2.40% of the total deaths are due to congenital heart defects in the first 27 days of life [15].

In 2004, $1.4 billion were spent on congenital heart defects and nearly $511 million on the severe forms in the US, which was about 37% of all hospital costs [16]. In 2005, the medical care of a child with congenital heart defects cost about $100,000 with medical insurance; the costs being even higher in severe types [17]. Several prevalence rates of this disease have been reported worldwide [2,18,19], but the generally accepted estimate was about 8 in every thousand live births [20]. The prevalence has increased in time, from 6 cases per 10,000 live births (95% CI, 4-8) during 1930 to 1934 to 9.1 cases per thousand live births after 1995. Since then, this prevalence did not change until 2011. For this reason, public health costs due to this disease are on the rise [19].

Among the continents, Asia has the highest and Africa has the lowest incidence with 93 (95% CI, 89-93) and 19 cases per 10,000 live births (95% CI, 11-35), respectively [19]. There is a significant association between the incidence of the defects and the economic status; the highest incidence rates have been reported in high-income countries (8 per thousand live births) (95%CI 7.9-8.1) [21]. People who suffer from this disorder require special expertise and long-term care [22].

Given the importance of these anomalies and their effects on the economic and psychological factors and costs of the community, the health system, and the families, and also due to their impact on the one-year mortality rate (IMR), which is an important indicator of health and community development, and since no study has investigated the factors influencing these disorders, we decided to design a study to evaluate the effect of known environmental factors on the disease and calculate the contribution of each of these factors.

Materials and Methods

This case-control study was conducted to determine the population attributable risk of congenital heart defects risk factors among newborns during 2012 and 2013 in Yazd hospitals. The defects were identified through echocardiography and recorded according to the 10th Revision of International Classification of Diseases (ICD10). The total number of patients was 96, of whom 14 were excluded due to the lack of cooperation or insufficient data. One hundred and sixty five sex and region matched controls selected through random sampling were included in the study to compare the risk factors.

A self-administered checklist approved by experts was used to ensure the validity of the information. The data was collected via the records of neonates born in the hospitals, family health records in urban health databases, and contact with the neonates’ parents by collaborators working in hospitals and health care centers.

Demographic characteristics such as sex, and congenital problems including cleft lip and cleft palate were identified according to the clinical presentation of the neonates admitted to the hospitals.

Demographic characteristics of the mothers such as age at conception were extracted from family health records and classified according to age classifications in similar articles (under 18, 18-35, and over 35 years). Paternal age at conception was extracted from family health records and classified according to the similar articles (below 40 and above 40 years).

BMI was calculated by using the height and weight based on information that was recorded in the family health records (up to the first two weeks of pregnancy) and was calculated and classified according to the international classification (less than 18.5 = underweight, 24.9 to 18.5 = normal, 29.9 to 25 = overweight, more than 30 = obese) [23]. Family health records were used to evaluate social factors including occupation (housewife, employed), education (illiterate and elementary, middle school, high school diploma, associate degree, or higher), reproductive characteristics including diabetes according to IGT and OGTT test results (yes, no; type 1, type 2, and gestational diabetes), and multivitamin use during pregnancy (yes, no; before pregnancy, during pregnancy).

Chi-square was used to compare the prevalence of risk factors between cases and controls. To determine whether the examined risk factors had significant effects on congenital heart defects, logistic regression was used. The factors controlling the misrepresentation of all factors were entered into the logistic regression models.

Population Attributable Risk (PAR) is one of the most important factors in public health that is closely associated with epidemiological evaluations and measures and priority risk factors in the society were calculated. Population Attributable Fraction (PAF) is a proportion of disease in the population attributed as a risk factor potentially preventable by elimination of exposure to that factor [24] and finally to calculate the adjusted Population Attributable Fraction, Levin formula given below being used.
\[ \text{Pop AR\%} = \frac{P_e \times (OR-1)}{P_e \times (OR-1) + 1} \]

where OR indicates the odds ratio adjusted for all risk factors and \( P_e \) represents the associated prevalence risk factors in the control group.

### Results

Between 2012 and 2013, a total of 21,867 births occurred, including 96 neonates suffering from congenital heart malformations with an incidence rate of approximately 4 per 1000 births per year. About 43.9% of the newborns with these anomalies were girls and the remaining were boys.

As for registered defects, ventricular septal defect (19.5%), patent ductus arteriosus (12%), patent ductus arteriosus + atrial septal defect (7.3%) had the highest frequency, respectively. Moreover, 10 (12.2%) patients had oral cleft type (cleft palate, cleft lip or both). Seventeen patients died before one year of age.

The mean maternal and paternal age at the time of conception was 28.71 ± 5.43 and 33.54 ± 5.73 years in the case group and 26.81 ± 4.76 and 30.73 ± 5.39 years in the control group, respectively.

To assess the social factors related to parents of newborns with congenital malformations, the following results were obtained: 95.1% of the mothers were housewives and the rest were employed, which was almost similar to the occupational status of the mothers in the control group (91% were housewives and 9% were employed). Also, 28% of the fathers were workers, 22% were employed, and 50% were self-employed in the case group; the results were similar in the control group (23% were workers, 18.8% were employed, and 58.2% were self-employed) (Table 1).

### Table 1. Distribution of congenital heart defects according to ICD-10 codes

<table>
<thead>
<tr>
<th>Abnormalities according to ICD-10 code</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q21 (ventricular septal defect)</td>
<td>16</td>
<td>19.5</td>
</tr>
<tr>
<td>Q21/ Q25.6 (ventricular septal defect/ Stenosis of Pulmonary Artery)</td>
<td>3</td>
<td>3.7</td>
</tr>
<tr>
<td>Q21/ Q25 (ventricular septal defect/ Patent Ductus Arteriosus)</td>
<td>3</td>
<td>3.7</td>
</tr>
<tr>
<td>Q25 (patent ductus arteriosus)</td>
<td>10</td>
<td>12.2</td>
</tr>
<tr>
<td>Q25.1 (Coarctation of Aorta)</td>
<td>4</td>
<td>4.9</td>
</tr>
<tr>
<td>Q23 (Congenital Stenosis of Aortic Valve)</td>
<td>5</td>
<td>6.1</td>
</tr>
<tr>
<td>Q21.1 (Atrial Septal Defect)</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>Q24.9 (Congenital malformation of Heart, Unspecified)</td>
<td>5</td>
<td>6.1</td>
</tr>
<tr>
<td>Q25.6 (Stenosis of Pulmonary Artery)</td>
<td>4</td>
<td>4.9</td>
</tr>
<tr>
<td>Q24.9/ Q21 (patent ductus arteriosus/ atrial septal defect)</td>
<td>3</td>
<td>3.7</td>
</tr>
<tr>
<td>Q25/ Q21.1 (patent ductus arteriosus/ Atrial Septal Defect)</td>
<td>6</td>
<td>7.3</td>
</tr>
<tr>
<td>Q21.3 (Tetralogy of Fallot)</td>
<td>3</td>
<td>3.7</td>
</tr>
<tr>
<td>Q21.1/ Q25 / Q21 (Atrial Septal Defect/ patent ductus arteriosus/ ventricular septal defect)</td>
<td>1</td>
<td>1.2</td>
</tr>
<tr>
<td>Q21.2/ Q21.2/ Q25 (Atrioventricular Septal Defect/ Atrial Septal Defect)</td>
<td>1</td>
<td>1.2</td>
</tr>
<tr>
<td>Q21/ Q21.1 (Atrial Septal Defect/ patent ductus arteriosus)</td>
<td>2</td>
<td>2.4</td>
</tr>
<tr>
<td>Q25/ Q25.1/ Q21.1 (ventricular septal defect/ Coarctation of Aorta/ patent ductus arteriosus)</td>
<td>1</td>
<td>1.2</td>
</tr>
<tr>
<td>Q21/ Q21.2/ Q22 (Atrial Septal Defect/ Patent Ductus Arteriosus)</td>
<td>1</td>
<td>1.2</td>
</tr>
<tr>
<td>Q24.5 (Malformation of Coronary Vessels)</td>
<td>1</td>
<td>1.2</td>
</tr>
<tr>
<td>Q22.1/ Q21.1 (Congenital Pulmonary Valve Stenosis/ Patent ductus arteriosus)</td>
<td>1</td>
<td>1.2</td>
</tr>
<tr>
<td>Q25/ Q25.6 (ventricular septal defect/ Stenosis of Pulmonary Artery)</td>
<td>1</td>
<td>1.2</td>
</tr>
<tr>
<td>Q21.2/ Q22.4 (Atrioventricular Septal defect/ Congenital Tricuspid Stenosis)</td>
<td>1</td>
<td>1.2</td>
</tr>
<tr>
<td>Total</td>
<td>82</td>
<td>100</td>
</tr>
</tbody>
</table>

In the case group, 37.1% of the mothers had a cesarean section and 62.2% had a normal vaginal delivery versus 71.5% a normal vaginal delivery and 28.5% a caesarean section in the control group.

It was reported that 13.4% of the mothers in the case group and 8.5% of the mothers in the control group used medications during the pregnancy.

Based on the results of the univariate logistic regression, the odds ratio of the risk factors was calculated, which showed that the highest proportions were a history of stillbirth in mothers, maternal obesity, lack of multivitamin use before pregnancy, and maternal age at conception (Table 2 and 3).

### Table 2. Risk factors of congenital heart malformations in the case and control groups

<table>
<thead>
<tr>
<th>Risk factors</th>
<th>Exposure</th>
<th>N (%)</th>
<th>Case</th>
<th>Control</th>
<th>Total (%)</th>
<th>Chi square</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>History of stillbirth in</td>
<td>No</td>
<td>76 (92.7)</td>
<td>163 (98.8)</td>
<td>239 (96.8)</td>
<td>6.514</td>
<td>0.011</td>
<td></td>
</tr>
</tbody>
</table>
Table 3. Crude odds ratio of the risk factors of congenital heart defects

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>Odds Ratio</th>
<th>95% CI</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>History of stillbirth in mother</td>
<td>6.34</td>
<td>2.69-12.620</td>
<td>0.025</td>
</tr>
<tr>
<td>Maternal Diabetes</td>
<td>2.865</td>
<td>1.24-6.054</td>
<td>0.059</td>
</tr>
<tr>
<td>Not taking multivitamins before pregnancy</td>
<td>4.543</td>
<td>1.64-12.592</td>
<td>0.004</td>
</tr>
<tr>
<td>Overweight</td>
<td>2.011</td>
<td>1.08-3.719</td>
<td>0.26</td>
</tr>
<tr>
<td>Obesity</td>
<td>4.625</td>
<td>1.87-9.669</td>
<td>0.006</td>
</tr>
<tr>
<td>Mother’s age at conception (over 35 years)</td>
<td>4.444</td>
<td>1.48-13.472</td>
<td>0.008</td>
</tr>
<tr>
<td>Father’s age at conception (over 40 years)</td>
<td>3.267</td>
<td>1.12-9.520</td>
<td>0.030</td>
</tr>
</tbody>
</table>

Then, the adjusted odds ratios were calculated for risk factors. The results showed that the highest odds ratios belonged to a history of stillbirth in mothers, lack of multivitamin use before pregnancy, maternal obesity and overweight.

The calculation of adjusted Population Attributable Fraction of the risk factors showed that the highest proportion of the causes of congenital heart malformations was associated with overweight and obesity (Table 4).

Table 4. Adjusted odds ratio and population attributable risk fraction of congenital heart defects

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>Odds Ratio</th>
<th>95% CI</th>
<th>P value</th>
<th>PAF%*</th>
</tr>
</thead>
<tbody>
<tr>
<td>History of stillbirth in mother</td>
<td>7.846</td>
<td>1.24-49.563</td>
<td>0.028</td>
<td>8.5</td>
</tr>
<tr>
<td>Maternal Diabetes</td>
<td>1.978</td>
<td>.53-1.649</td>
<td>0.281</td>
<td>-</td>
</tr>
<tr>
<td>Not Taking multivitamins before pregnancy</td>
<td>4.381</td>
<td>1.46-13.077</td>
<td>0.008</td>
<td>7.6</td>
</tr>
<tr>
<td>Overweight</td>
<td>2.091</td>
<td>1.09-3.994</td>
<td>0.026</td>
<td>19.7</td>
</tr>
<tr>
<td>Obesity</td>
<td>3.015</td>
<td>1.23-7.365</td>
<td>0.015</td>
<td>24.8</td>
</tr>
<tr>
<td>Mother’s age at conception (over 35 years)</td>
<td>3.084</td>
<td>.82-11.562</td>
<td>0.095</td>
<td>-</td>
</tr>
<tr>
<td>Father’s age at conception (over 40 years)</td>
<td>.061</td>
<td>.13-2.791</td>
<td>0.516</td>
<td>-</td>
</tr>
</tbody>
</table>

*Population Attributable Fraction

Discussion

In this study, the risk factors reported in other studies were assessed and our results were compared with their findings. Several risk factors were simultaneously examined and the adjusted population attributable risk index was calculated.

The results showed that the mean age of the mothers was higher in the case group than the control group. Then, after categorizing the mothers into two groups, 30 years and younger, significant differences were observed between the cases and the controls. Consistent with these results, other studies, such as a study conducted by Jenitta Reefhuis et al. in 2000 (OR=1.12, 95%CI 1.03-1.22) [25] and another study performed by Kathy J. Jenkins et al. in 2007 (OR=1.7, 95%CI 1.1-2.7) reported similar results. These results suggested that the maternal age was a potential risk factor for a child with congenital heart defects [7].

In our study, the majority of the mothers were housewives in both cases and controls. A study conducted by Lynnk Cary et al. in 2002 showed that the majority of the mothers in both cases and controls were employed (about 63.3% of the cases and 83.3% of the controls). Generally, occupation did not seem to be an important risk factor.

Although the maternal history of stillbirth was assessed in a few studies, it was one of the factors examined in our study and the results indicated a relatively strong association between this risk factor and the disease (OR=6.43, P=0.025). Moreover, a study conducted by Kathy J. Jenkins et al. in 2007 showed that
a history of stillbirth in mothers might be a risk factor for subsequent abnormal childbirth (OR=5.61, 95%CI 1.94-16.2) [7].

The next evaluated risk factor was the lack of the use of multivitamin supplements containing folic acid before pregnancy. It was observed that the odds ratio of the lack of multivitamin use before pregnancy had a significant relationship with giving birth to a child with heart defects (OR=4.54, p=0.004). As we sought to calculate the adjusted population attributable risk, this factor was considered as “lack of use” against mothers who used multivitamin supplements containing folic acid. Several studies assessed the impact of multivitamin use and found that taking multivitamins can be a protective factor against the risk of congenital heart defects. For example, a study conducted in 2009 by Raluca Lonsecuittu et al. showed that the fortification of agricultural products with folic acid significantly reduced the risk of congenital heart defects (RR=0.94, 95%CI 0.90-0.97) [26].

The study performed in 2007 by Kathy J. Jenkins et al. showed that taking folic acid would prevent congenital heart defects (RR=0.42, 95%CI 0.319-0.98) [7]. Another study by Lorenzo D. Botto in 2000 found that taking multivitamin supplements could help prevent congenital heart defects [27].

The reason for not using multivitamin before pregnancy in most of the mothers in this study was the lack of information on its benefits or unintended pregnancy.

Overweight and obesity was an important risk factor in most non-infectious diseases, and this defect was not an exception. In the present study, overweight and obese mothers in the first two weeks of pregnancy were identified by using the International Classification of BMI, which showed a significant association between overweight and obesity and birth defects. The intensity of association was calculated for overweight (OR=2.01, P=0.26) and obesity (OR=4.62, P=0.000). Consistent with these results, a meta-analysis conducted in 2009 by Katherine J. Stothard showed that maternal obesity had a significant relationship with heart defects in children (OR=1.2, 95%CI 1.09-1.3) [28].

Another study conducted in 2002 by Margaret L. Watkins also showed that overweight (OR=2, 95%CI 1-3.8) and obesity (OR=2.9, 95%CI 1.2-3.1) were the risk factors of heart defects in children [29].

The findings of a study by Janes L Mills in 2001 were in line with these results, as she reported overweight (OR=1.15, 95%CI 1.07-1.23) was a risk factor for congenital heart defects [30].

It seemed that diabetes also served as a risk factor for congenital heart defects. Our study showed that maternal diabetes could result in the birth of a child with heart defects. The reason why this finding was not statistically significant could be the small number of the subjects (OR=2.86, P=0.059). However, other studies showed a significant relationship between the cardiac defects and maternal diabetes. A study conducted in 1992 by Ramos Attroyo showed a relationship between congenital heart defects and insulin-dependent diabetes (OR=5.5, 95%CI 1.2-24.8), diabetes type 2 (OR=2.9, 95%CI 1.2-7.2), and gestational diabetes (OR=1.9, 95%CI 1.1-3.4) in the mothers [31].

A survey carried out by Becerra JE et al. in 1990 showed diabetes mellitus as a risk factor for heart defects (RR=20.6, 95%CI 2.5-168.5) [32].

The mean paternal age at the time of conception is associated with congenital heart defects; hence, we assessed this factor and our hypothesis was accepted (OR=3.267, p=0.030). Consistent with this finding, a study conducted in 2000 by Bassili et al. showed that paternal age above 40 years was associated with congenital heart defects (OR=2.7, 95%CI 1.5-4.85) [33].

The above-mentioned results were obtained from the crude odds ratios. After this analysis, all variables were entered into the logistic regression model and the adjusted odds ratios were calculated with the Enter method. Four risk factors from the above-mentioned variables including obesity, overweight, lack of the use of multivitamin supplements containing folic acid, and a history of stillbirth were statistically significant. The results suggested that other factors might exist due to the confounding factors or the impact that these factors had on each other.

The calculation of the population attributable risk, which is an indicator of public health closely related with epidemiology, indicated that four factors together were responsible for 60.6% of the congenital heart defects in the society. The highest population attributable risk belonged to obesity, (24.8%), overweight (19.7%), history of stillbirth (8.5%), and lack of the use of multivitamin supplements containing folic acid (7.6%). Since PAR is associated with the intensity of the relationship between risk factors and the outcomes as well as the prevalence of risk factors, it was observed that although overweight and obesity was associated with a weaker intensity than the other two factors, they had a higher prevalence and higher attributable risk.

It should be noted that the attributable risk is a theoretical concept, mostly used for planning and prioritizing preventive interventions. In practice, risk factors can never be eliminated in the community. In other words, it is not possible to eliminate the effect of one factor while the other factors are kept constant.

Conclusions

This study showed that several factors could affect congenital heart defects. Odds ratio is an indicator
that demonstrates the strength of the association between exposure and outcome while the prevalence of risk factor has a significant and positive impact on the PAR.

References


Exploring the religious and spiritual coping experience of patients with cancer: A qualitative study in the Iranian context

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Abstract

Background and Aim: Lately, the religious and spiritual (R/S) aspect of health care has been receiving an increased attention in the scientific literature. The study aims to explore the components of R/S coping in cancer patients in Iran.

Materials and Methods: The design of this study was based on a qualitative research using content analysis. Sixteen patients with different types of cancer participated in the study. Data was generated through in-depth interviews and the content analysis was used to determine themes and sub-themes.

Results: Three themes emerged from the data analysis: 1) Maintaining/improving self-esteem, 2) Positive appraisal/Being optimistic, and 3) Self-sustaining. In the participants' view, the general theme was found to be the "improving calmness".

Conclusions: Positive R/S coping strategies were used by the patients and most cancer patients tried to achieve calmness through R/S coping. The results of the study can be used to plan medical and nursing approach towards increasing the quality of R/S care both in the acute and the long-term settings.

Keywords: spiritual coping, oncology care, cancer patients, religion

Introduction

There is a growing interest towards the role and importance of religion and spirituality in the context of health, illness, and healthcare practice [1]. There is a mounting evidence that R/S aspects of life are associated with health and wellness. Researchers have attempted to understand the effect of protective resources such as R/S beliefs and practices on health behaviors [2]. Spirituality is considered a great experience of harmony in which the organism functions with the greatest possible perfection [3]. This represents a holistic human characteristic which is essential for the human health and wellbeing [4]. The term “spiritual” has multiple meanings and applications, and often the R/S dimensions are conflated, engendering the risk of superficial or doctrinaire approaches to spirituality [3]. Spirituality represents one’s ability to seek purpose and meaning, to make the connection, and to pursue a transcendental value [5]. Religion is an expression of spirituality and can be regarded as the set of values, beliefs, and practices that people adapt to meet spiritual needs [6]. Terms such as religiosity, religiousness, and spirituality are often used interchangeably [7]. The R/S issues are obviously important to adolescents, it is estimated that 95% of the adolescents believe in God while 85–95% of them state that religion is important in their life [8].

Studies examining the religious coping in medically ill patients have found that between 34% and 86% of the patients have reported using their R/S cognition and activities in coping with their illness [1]. In addition, between 50% and 95% of the cancer patients consider religion and spirituality personally important and have experienced spiritual needs [9]. One group, for whom spirituality is an important aspect requiring a deeper understanding consists of the cancer patients [10]. Most cancer patients receiving a diagnosis of cancer had an appalling experience [11]. In a qualitative study of cancer patients, it was found that most of the patients had an experience of personal disturbance, describing a feeling of hopelessness and unclear picture of the disease in future [12]. In fact, faced with the ambiguity of the present and the numerous uncertainties concerning the future, many cancer patients rely on their spiritual beliefs as a source of strength [3]. Psychological distress occurs frequently at the end of life. Therefore, maintenance or development of a sense of spiritual well-being might be considered a crucial aspect of coping with terminal illness [13]. Spirituality is associated with human strength to improve coping with pain, stress, and cancer [14].
Religious coping is defined as “the use of cognitive and behavioral techniques, in the face of stressful life events, that arise out of one’s religion or spirituality” [1].

Although physicians and nurses have begun to consider a person’s spirituality a meaningful and important aspect of holistic care, they often fail to recognize this aspect of their patients’ needs [10]. The role of spirituality as a process of adjustment and a means of coping is important; it is an important component of responsibility for health care providers in modern medical rehabilitation [15]. Despite a demand for spiritual care that is present in every health care setting, rehabilitation patients often have significant spiritual care needs related to their conditions [16]. The studies on spirituality in the nursing literature are obtained from empiricists who focus on perceptions and practices of patients concerning spiritual needs or care [4]. Quantitative studies involving cancer patients and investigating religiousness have yielded mixed results [17]. Thune-Boyle and col. (2006), mentioned that the importance of religious coping with cancer, especially across different cultures remains unclear [1]. In a qualitative study by Taleghani and colleagues (2006), on coping strategies in Iranian cancer patients, it was found that the patients used a religious approach to deal with cancer and the authors concluded that religious faith plays a major role facing a diagnosis of cancer [18]. This finding was congruent with the research performed by Howard and col. (2007), who showed in their qualitative meta-synthesis research that cancer patients cope with cancer through spirituality [19]. The majority of cancer patients receiving palliative care consider themselves spiritual and religious [20]. These findings suggest the need for a more detailed investigation into the dimensions of religious coping in cancer patients. Further research is required to determine the best ways of identifying spiritual needs and providing support to patients in different settings and at different stages of the disease [21]. In their international survey, Selman and col. (2014) indicated that there is a worldwide tendency for research in the domain of spiritual care [22].

The present research further explains the current debate on the placement of the cancer patients’ spiritual care through the exploration of spiritual coping constructing concepts from the views of these patients in the Iranian context.

Materials and Methods

Study Design

This qualitative study involves the content analysis method for the ability to offer a systematic coding and categorize an approach by which exploring a large amount of textual information is possible and the reader is provided with a particular view [23]. From this position, the researcher is able to make valid inferences from the data in their context, with the purpose of providing knowledge and novel insights [24]. Graneheim and Lundman’s (2004) approach was used for analyzing data as it provided a clear insight about the concepts related to qualitative analysis and proposed measures throughout the steps of the research [25].

Sample

The sample consisted of 16 patients (11 females and 5 males) who voluntarily participated in the study and had a diagnosis of cancer. The participants were between 27 and 77 years of age (Table 1), all patients were recruited by purposive sampling from one subspecialty hospital, one subspecialty cancer clinic and one cancer patients aid center, affiliated to Mazandaran University of Medical Sciences, Sari, Iran, during the time interval of May to October 2013.

The inclusion criteria for the patients were: (a) diagnosed with cancer, (b) older than 20 years, (c) able to answer the questions and express their experiences and (d) willing to participate in the research. During the initial contact, participants were informed of the nature and purpose of the study and the potential risks and benefits, and after having their verbal consent for participation, the place and time of the interview were arranged. The recruited patients were assured that they can withdraw at any time and confidentiality was preserved.

Table 1. Demographic characteristics of the study participants

<table>
<thead>
<tr>
<th>Participants number</th>
<th>Gender</th>
<th>Age (year)</th>
<th>Type of cancer</th>
<th>Time since diagnosis (Month)</th>
<th>Marital status</th>
<th>Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>F</td>
<td>35</td>
<td>Breast</td>
<td>6</td>
<td>Sp</td>
<td>BS</td>
</tr>
<tr>
<td>2</td>
<td>M</td>
<td>67</td>
<td>Stomach</td>
<td>8</td>
<td>M</td>
<td>Diploma</td>
</tr>
<tr>
<td>3</td>
<td>F</td>
<td>39</td>
<td>Breast</td>
<td>12</td>
<td>M</td>
<td>Diploma</td>
</tr>
<tr>
<td>4</td>
<td>M</td>
<td>51</td>
<td>Colon</td>
<td>9</td>
<td>M</td>
<td>Diploma</td>
</tr>
<tr>
<td>5</td>
<td>M</td>
<td>32</td>
<td>Lymphoma</td>
<td>8</td>
<td>M</td>
<td>AA</td>
</tr>
<tr>
<td>6</td>
<td>F</td>
<td>58</td>
<td>Leukemia</td>
<td>4</td>
<td>M</td>
<td>AA</td>
</tr>
<tr>
<td>7</td>
<td>F</td>
<td>77</td>
<td>Lymphoma</td>
<td>7</td>
<td>W</td>
<td>Diploma</td>
</tr>
<tr>
<td>8</td>
<td>F</td>
<td>27</td>
<td>Thyroid</td>
<td>11</td>
<td>M</td>
<td>Diploma</td>
</tr>
<tr>
<td>9</td>
<td>F</td>
<td>75</td>
<td>Colon</td>
<td>8</td>
<td>W</td>
<td>Elementary</td>
</tr>
<tr>
<td>10</td>
<td>F</td>
<td>52</td>
<td>Colon</td>
<td>10</td>
<td>M</td>
<td>Diploma</td>
</tr>
<tr>
<td>11</td>
<td>F</td>
<td>40</td>
<td>Liver</td>
<td>9</td>
<td>M</td>
<td>Diploma</td>
</tr>
<tr>
<td>12</td>
<td>F</td>
<td>42</td>
<td>Breast</td>
<td>2</td>
<td>M</td>
<td>AA</td>
</tr>
<tr>
<td>13</td>
<td>M</td>
<td>33</td>
<td>Testis</td>
<td>5</td>
<td>M</td>
<td>Diploma</td>
</tr>
</tbody>
</table>
Data collection
After obtaining the ethical approval of Mazandaran University of Medical Sciences, the investigators gained access to the potential participants. At the beginning of each interview, simple questions were asked to obtain the participants’ demographic data and to prepare the atmosphere for the following questions. An interview guide was developed by the researchers, which included the following questions: Do you want to tell me how you manage your illness, what things have helped you deal with your illness? Follow-up questions were generated to explore the patients’ experience regarding the R/ S aspects of coping during the in-depth interviews. Most interviews lasted for 40-80 minutes and were audiotaped for a later transcription. Patient recruitment was continued until data saturation.

Data Analysis
The audiotaped recordings were transcribed verbatim. Data analysis commenced after the data were obtained from the initial interviews. Each transcribed interview was read and reread several times to obtain a sense of the whole interview and analyzed line-by-line, word by word to determine code units. Similar codes were assigned to the related sub-theme and each sub-theme was allocated to the related themes in order to manifest the content of the text. The general theme was developed to link the underlying meanings in the themes [25].

Trustworthiness
The criteria of Lincoln and Guba (1985) were used in this study to ensure trustworthiness. Credibility was established toward variations in the participants’ age, type of cancer, occupation, gender, and education, in order to provide a broad description of the phenomena. The researchers had a prolonged engagement with the study fields and the writing field notes contributed to data quality. Peer checking was conducted by two experts who verified the coding and categorization process. There were members who checked nine interview drafts. These were returned to the participants to confirm that the researchers were presenting their actual perceptions.

Ethical considerations
The study was approved by the Research Ethics Committee of Mazandaran University of Medical Sciences in Sari, Iran. Permission was obtained prior to the enrollment in the study fields. All participants were informed about the aims and nature of the research as well as the possibility to withdraw from the study at any stage, without being penalized. Consent for participation in the study and audiotape recordings were obtained. All the participants were assured that their confidentiality would be protected in the study.

Results
The data analysis of all sixteen interviews evidenced results in the three themes of R/ S coping: (1) Maintaining/ improving self-esteem (2) Positive appraisal/ being optimistic (3) Self-sustaining (Table 2). These three themes were explained separately with evidence of examples from the data. All participants were identified by numbers, which were assigned in a chronological manner.

Table 2. Results of interviews content analysis including general theme, themes, sub-themes

<table>
<thead>
<tr>
<th>Theme 1: Maintaining/ improving self-esteem</th>
<th>Theme 2: Positive appraisal/ being optimistic</th>
<th>Theme 3: Self-sustaining</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reinforcing communication with self</td>
<td>Gaining hope to self</td>
<td>Performing religious rituals</td>
</tr>
<tr>
<td>Reinforcing communication with God</td>
<td>Positively reframing of the disease</td>
<td>Avoiding intrusive thoughts</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Theme 1: Maintaining/ improving self-esteem
A cancer patient’s R/ S coping strategy through maintaining or improving self-esteem refers to the patients’ attempt to strengthen communication both with self and God.

Reinforcing communication with self.
Most of the participants spoke of their striving to talk to themselves to gain assurance.

“I told myself never mind, if God doesn’t want, anything will happen. They (doctors) tell someone that you’ll live a hundred years, but he won’t be living one day and they tell to another one that you’ll live one day, but he will be alive a hundred years”. (Participant #6, female, 30 years old).

“I told myself that all human beings die one day, any person might get sick and I got sick too” (Participant 12, female, 75 years old).

Reinforcing communication with God


All the participants referred to communication with God. Several declared that they talked directly to Him and sought help from God.

“I really talk to God very much. When I am alone, I talk to God in my loneliness, which gives me a lot of comfort. Now, I have more communication with God, very much” (Participant #5, female, 42 years old).

“Telling, ‘my God, my God’, became more frequent compared with the past. I talked to my God. Now I have more attention towards God, maybe three times or maybe ten times more” (Participant #3, female, 52 years old).

“I am only paying attention to God. I am asking those who do not believe in God, what do they do on this occasion and how can they tolerate this situation?” (Participant #16, female, 53 years old).

Theme 2: Positive appraisal/ being optimistic
A large number of participants added that they tried to cope with their disease by means of positive appraisal and being optimistic. They strived to give hope to themselves and interpret the disease positively.

Giving hope to self.
Some of the participants had a dream of remedy and most of them gave hope to themselves.

“That night I said, show me yourself Imam Reza (a holy person in Islamic history). The same night I dreamt Imam Reza who called me ‘go and do your surgery’” (Participant #3, female, 52 years old).

“I make my effort as far as I can, on my feet, the rest remains to God, whom He knows”. (Participant #10, female, 77 years old).

Positively reframing the disease
A few small numbers of participants had a positive interpretation of their disease.

“I say that maybe God has closed a door against me, but he will open hundreds of doors for me”. (Participant #7, female, 27 years old).

“I said that God offered this disease to me to go to a doctor and have a surgery”. (Participant #15, female, 50 years old).

Theme 3: Self-sustaining
In the opinion of the majority of the participants, performing religious rituals and avoiding intrusive thoughts are two instruments to cope with the cancer disease.

Performing religious rituals
All participants mentioned that performing religious rituals such as praying, going to the religious ceremony, visiting shrines, reading the Quran and religious words, had an alleviating effect for them. Several of these religious rituals were also performed by the patients’ family members.

“I pray days and nights, everyone prays for me” (Participant #1, female, 58 years old).

“My daughter always prays for me, she said ‘Mum, I pray for you’”. (Participant #8, female, 27 years old).

“I went to Qum and Mashhad (two holy cities in Iran with two famous shrines) to visit the shrines. I read a religious lament for one month”. (Participant #2, male, 67 years old).

“You know, praying, reading the Quran and performing Namaz (a kind of Islamic praying) day and night do not get me fed up. I perform my Namaz on time” (Participant #4, female, 40 years old).

Avoiding intrusive thoughts
Several participants expressed that the religious belief helped them evade irritating feelings and thoughts.

“I left myself with God; everything that happens would be my fate, everything that God wishes” (Participant#10, female, 77 years old).

“Reading the Quran calms me and I felt that God helped me more. This makes me feel well”. (Participant #8, female, 27 years old).

“I understood that doctors are only tools. Everything is in the hand of God, I left everything to God”. (Participant #9, male, 30 years old).

Improving calmness
Enhancing calmness is the general theme as emerged from data analysis. All the participants used their own way of spiritual coping strategies to reach a satisfactory level of calmness. Trying to reach calmness has been mentioned by the participants directly or indirectly.

“I enjoy communicating with God; it is very effective; it had a direct influence on the disease”. (Participant #9, male, 30 years old).

“I have always wanted God to make me better, to make me well. Reading the Quran helped me forget what I have (cancer)”. (Participant #8, female, 27 years old).

“I told God, You gave pain and you provided a cure, and then do not delay my cure. In spite of this, I am pleased with his content”. (Participant #12, female, 75 years old).

Discussion
In this study, the participants expressed their experience of R/ S coping strategies. The process analysis and the interpretation of their narratives revealed that cancer patients believed that they were able to reach calmness through their religious aspect of spiritual coping that included: Maintaining/ improving self-esteem, Positive appraisal/ Being optimistic and Self-sustaining. It was evident that coping with cancer was a multi-dimensional process and the results of the present study showed that spiritual coping was also multi-dimensional and involved values, belief, and a variety of activities.

The findings revealed that the majority of the participants tried to cope with their disease through maintaining/ improving self-esteem. Strengthening communication with self and with God were two major strategies that helped them deal with their disease.

Self-esteem is an important personal resource, strongly associated with the psychological functioning
Evidence suggests that self-esteem is a primary indicator of health and illness coping [27]. In cancer patients, self-esteem may buffer the stress they experience.

However, because most studies on cancer patients studied self-esteem as an outcome variable, little is known about the role of self-esteem in patients’ psychological adjustment [26] and coping. Self-esteem plays a central role in the ability of breast cancer survivors to thrive and continue to live “normal” lives [27]. The opportunity to engage in guided discussions about the current and future impact of cancer in one’s life may provide a buffer against the adverse effects associated with the arduous treatment and management of cancer [28] and this discussion can be done inside the person’s mind and with God. In a qualitative study conducted by Rahnama (2012), spirituality from the cancer patients’ point of view was defined as the relationship with God, including “mentioning God”, as well as an inner relationship with God and the self [29]. In their qualitative research on breast cancer patients, Lynn Gall and Cornblat (2002) found that the majority of participants with breast cancer described a relationship with a higher entity, usually identified as God, that had an important and active role in their adjustment to cancer and most of these patients had actively turned to and relied on God for support and guidance [30]. Afifakseir and Coleman (2011) also believe that religious teachings in an Islamic context encourage people to trust and turn to God in times of need and for guidance [31].

Surbone and Baider (2010) believe that reflecting on spirituality is similar to reflecting on “self-identity”. In the process of self-development, an accomplished person or persons still in search for their identity may all ask similar spiritual questions and draw strength from spiritual sources, often kept private and hidden from others. Through spirituality, we connect with something located both within and beyond us [3]. In their qualitative research, Thomas and Retas (1999) showed that cancer patients tried to “create meaning” and “discover self” in their experience giving them a sense of empowerment and confidence [10]. In contrast with this positive view towards a relationship with God and self, the “spiritual struggle” was described as “the expressions of conflict, question, and doubt regarding matters of faith, God, and religious relationships” which were of three types: interpersonal, intrapersonal, and divine. Intrapersonal spiritual struggles were characterized by questions and doubts about spiritual beliefs and issues. Finally, divine spiritual struggles included tensions in the individual’s relationship with the divine (or God). Moreover, spiritual struggles tended to be less common than the positive religious coping [32].

Based on the findings of this study, positive appraisal/ being optimistic were recognized as spiritual coping strategies. In agreement with the present study, in the study of Kurtz et al. (1995), cancer patients who had a positive philosophical/spiritual outlook were more likely to have good health habits [33]. This condition can be the key to long-term cancer adjustment [34]. According Gall’s (2000) research results, religious coping behavior was found to correlate with various cognitive appraisals of the current cancer situation, and the God facets of benevolence, challenge, and presence were positively related to perceiving the illness as having some gain and importance/meaning to life. Optimistic coping styles included the use of positive thinking, maintaining a positive outlook, and making positive comparisons [35]. Optimism acted as a resource that maintained a positive mood, protecting individuals from the potential negative effects of cancer and cancer treatment [36]. Lauver and Tak (1995) found that optimism was associated with a less delay and anxiety in care seeking and with expectations of desirable outcomes of care seeking in cancer patients [37]. Studies of optimism in cancer patients have shown that it was positively related to emotional well-being [38,39]. Hope was described as an essential element in human life. Having things to hope for was an important coping strategy for terminally ill cancer patients [40].

Aquino and Zago (2007) asserted that their study participants had the “hope for the second opportunity” and the religious beliefs fulfilled the need for hope in the future [41].

Rahnama et al. claimed that their study participants mentioned that religious beliefs about the possibility of improvement by God’s will and miracles were also among the religious resources – fueling their hope of survival [29]. Irving and colleagues (1998) found in their study that hope is a means of maintaining a “fighting spirit” for coping with cancer [42].

Cognitive reframing (the ability to reinterpret problems as manageable and as sources of opportunity rather than a threat) may lead to a more positive mood state [43]. According to Lutendoza and al. (2002), cancer patients who coped with their disease using positive reframing reported better functional, emotional, and physical well-being, and higher overall quality of life [44]. Thornton and Perez (2006) also reported that for cancer survivors, coping by using positive reframing was associated with higher levels of posttraumatic growth. Concomitantly with the passage of time since cancer treatment initiation, several patients learnt to reframe the uncertainty of survivorship into an opportunity for personal growth [45].

According to the results of the present study, nearly all the participants used self-sustaining strategies to cope with their disease. According to a self-sustaining model that was initially introduced for young adults, adolescent patients adapt to the difficulties of the cancer experience (cognitive discomfort) by initiating certain behavioral and cognitive coping strategies (distraction). The self-sustaining process was defined as a natural progression through which adolescents who are
experiencing serious health threats move to comfort themselves and to achieve competence in resolving health threats [46]. Although this phenomenon was first introduced for youngsters with cancer, it seems that more research is needed to clarify the role of this element in adults who suffer from cancer.

Similarly to the current study, in a study conducted by Rahnama (2012), the participants described that they had done religious activities including “saying prayers (Namaz)”, “visiting the shrines and holy places”, “mentioning God” [29]. Guz and colleagues (2012), mentioned in their research findings that cancer patients engaged in several religious and spiritual activities such as praying and visiting a tomb [47]. Aquino and Zago (2007), revealed in their research that the cancer patients emphasized the religious behavior such as collective or individual pray, praying the rosary, going to church, talking to the minister [41].

Re-exposure to cues associated with cancer diagnosis and treatment can result in strong aversion responses that include intrusive thoughts, nightmares, and avoidance of reminders of diagnosis and treatment [48]. The intrusive thoughts experience has been linked to greater psychological distress and poorer quality of life in cancer patients both during treatment and during post-treatment [49]. It was also found that more intrusive thoughts about death were associated with increased symptoms of depression [48]. Lepore and Helgeson (1998) showed that there is a strong negative relation between intrusive thoughts and mental health among prostate cancer patients who felt socially constrained in talking about cancer compared to patients who felt unconstrained [50].

We found that improving calmness is the main theme that emerged from our data analysis.

Compatible with the present research, the research result of Lundberg and Trichorb (2001) showed that the most common feelings of cancer patients of both genders at first knowledge about their treatment were “acceptance and calmness” [51]. According to Lynn Gall and Cornblat (2002), the R/S belief in a higher power appeared to be a relatively stable resource for most cancer patients that were intricately intertwined in the fabric of the way they understood and approached cancer. The relationship with God served a variety of functions for these patients, including increasing calmness [30]. In their review article, Visser et al. (2010) mentioned that typical R/S practices such as meditation and prayer were found to be associated with decreased blood pressure, increased immune functioning, increased heart rate variability, and most important in this context, a general sense of calmness and relaxation [52].

Patients with cancer in rehabilitation settings require hope and support to help them improve their well-being. The R/S issues seem to be very significant in the process of coping for many cancer patients. The participants’ experience in the present study demonstrated that all of them put stress on the positive aspects of R/S coping strategies that helped them cope with their disease. The results of this report appeared to be remarkable, as they described positional R/S components of coping with cancer in patients. Furthermore, health practitioners, especially rehabilitation nurses could assist their cancer patients cope with their life-threatening illness through delivering the needed conditions and providing suitable environments for using those R/S resources to deal with their disease.

Although this research was done on Muslim Iranian patients with no emphasis on a particular type of cancer, the results have the potential to be considered a source of promise in both research and practice fields and it is recommended to do similar studies on a particular type of cancer and in other religions and contexts.

Acknowledgments

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Prevalence of Methylenetetrahydrofolate Reductase C677T Polymorphism in women with Polycystic Ovary Syndrome in southeast of Iran

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Abstract
Background: Methylenetetrahydrofolate reductase is an important regulatory enzyme in folate metabolism that is necessary for some biological mechanisms. Mutations in the MTHFR gene could reduce the enzyme activity.
Aim: The aim of this study was to assess the prevalence of the most common polymorphism, C677T, in women with polycystic ovary syndrome in the southeast of Iran.
Methods: This case–control study was performed on 112 PCOS women and 196 healthy controls. Single nucleotide polymorphisms were genotyped by using the polymerase chain reaction–restriction fragment length polymorphism (PCR–RFLP).
Results: We found that for C677T, the prevalence of C/ C, C/ T, and T/ T genotypes was 54.5%, 34%, and 11.5%, respectively. The frequency of TT genotype was significantly higher in PCOS women compared to controls.
Conclusions: the presence of 677T allele could be a risk factor for PCOS susceptibility in the southeast of Iran.

Keywords: Methylenetetrahydrofolate reductase, C677T polymorphism, Polycystic Ovary Syndrome

Introduction
Polycystic ovary syndrome (PCOS) is one of the most common endocrine disorders affecting 5% to 10% of the women in reproductive age according to the Rotterdam criteria. PCOS is characterized by two of the following abnormalities: hyperandrogenism, oligomenorrhea or amenorrhea and polycystic ovaries. PCOS is associated with obesity, type 2 diabetes, metabolic syndrome, heart disease, and endometrial cancer risk [1,2]. The exact etiology and pathophysiology of PCOS has not been completely identified. However, there is strong evidence for a genetic base for it [3]. Several studies were performed on the association between PCOS and genetic factors. There are several reports about the association between MTHFR polymorphisms and PCOS in which their results are inconsistent [4-7].

MTHFR is an important regulatory enzyme in folate metabolism that is necessary for some of the biological mechanisms. This enzyme catalyzes the reduction of 5, 10-methylenetetrahydrofro-late to 5-methyltetrahydrofolate. The MTHFR gene, located on the short arm of chromosome 1 (1p36.3), is composed of 11 exons. Two common allelic variants in MTHFR gene are C677T (A222V, rs1801133) and A1298C (E429A, rs1801131). Both these polymorphisms could reduce the enzyme activity. The C677T (Ala222Val) polymorphism in exon 4 causes an Alanine to Valine substitution in the N-terminal catalytic domain. This variant results in a thermlabile protein with enzymatic activity which is decreased by 70% in the homozygote state (TT genotype) and 35% in the heterozygote state (CT genotype) [8,9]. The A1298C (Glu429Ala) substitution is in the regulatory domain of the MTHFR enzyme and may alter the enzyme function [10-11].

In the present study, the prevalence of MTHFR C677T polymorphism in PCOS patients in the Southeast of Iran was analyzed and compared with healthy controls.

Materials and methods

Subjects characteristics
In this case-control study, 308 women including 112 patients with polycystic ovarian syndrome and 196 healthy individuals from Obstetrics and Gynecology Center of Emam-Ali Hospital in Zahedan, Iran, were recruited. This survey was approved by the Ethics Committee of Tarbiat Modares University and the consensus forms were collected for all the individuals. PCOS was defined according to the Rotterdam criteria.
The control group included 196 unrelated age-matched normal women. All PCOS patients and healthy controls were nonsmokers. Patients who suffered from diabetes mellitus, thyroid disorder, hyperprolactinemia, hypertension, Cushing’s syndrome, premature ovarian failure, acromegaly, virilising, adrenal, or ovarian tumors were excluded from the study.

**Genotype analysis**

Blood samples were collected in tubes containing disodium-EDTA as anticoagulant and stored at -20°C until DNA extraction. Genomic DNA was extracted by standard kit. The C677T variant of MTHFR was amplified by using a forward primer 5'-GGTCAGAAGCATATCATCATGAG-3' and a reverse primer 5' – CTGGGAAGAACTCAGCGAACTCAG - 3' by the polymerase chain reaction (PCR). PCR conditions were denaturation at 95°C for 5 min, 30 cycles at 95°C for 30s, 62°C for 30s, and 72°C 30s followed by extension at 72°C for 7 min.

The PCR products (494bp) were digested with Hinf I in 37°C overnight and electrophoresed on a 2% agarose gel. The two fragments, 100bp and 394bp showed the homozygosity for the C allele, the three fragments, 100bp and 165bp and 229bp showed homozygosity for the T allele, and the four fragments, 100bp, 165bp, 229bp and 394bp showed heterozygosity for the T allele and the C allele. Genotypes were expressed as CC for homozygous normal, CT for heterozygous, and TT for homozygous mutant.

**Statistical analysis:** all statistical analyses were performed with SPSS V-20. Demographic and clinical differences between the two groups were examined by independent Student’s t-test, Mann Witney u test, or Fisher exact test whenever appropriate. Allele frequencies were estimated by the gene counting method. The odds ratio (OR) and 95% confidence intervals (CI) were also estimated. The χ2 test was used for the deviation of genotype distribution from Hardy-Weinberg equilibrium.

**Results**

308 women including 112 (36.4%) patients with polycystic ovarian syndrome and 196 (63.6%) healthy individuals, were recruited. The demographic characteristics of PCOS women and controls were shown in Table 1. The PCOS patients and controls did not differ significantly with respect to age and ethnicity. The alleles and genotypes frequency of MTHFR C677T polymorphism are presented in Table 2. No deviation from Hardy-Weinberg equilibrium was observed in the PCOS women and control group.

**Table 1.** Demographic characteristics of PCOS women and controls

<table>
<thead>
<tr>
<th></th>
<th>PCOS women (n=112)</th>
<th>controls (n=196)</th>
<th>P value</th>
<th>OR (95% CI)</th>
<th>P value *</th>
<th>OR (95% CI)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (Years)</td>
<td>25.4 ± 5.2</td>
<td>26.4 ± 5.6</td>
<td>0.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race, n (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fars</td>
<td>43(69)</td>
<td>142(72)</td>
<td>0.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balouch</td>
<td>19(31)</td>
<td>54(28)</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Table 2.** Alleles and genotypes frequency of MTHFR C677T polymorphism

<table>
<thead>
<tr>
<th>MTHFR (C677T)</th>
<th>PCOS women (n=112)</th>
<th>controls (n=196)</th>
<th>P value</th>
<th>OR (95% CI)</th>
<th>P value *</th>
<th>OR (95% CI)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC, n (%)</td>
<td>61(54.5)</td>
<td>136(69.4)</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CT, n (%)</td>
<td>38(34)</td>
<td>51(26)</td>
<td>0.055</td>
<td>1.7 (1–2.8)</td>
<td>0.06</td>
<td>1.7(1–2.8)</td>
</tr>
<tr>
<td>TT, n (%)</td>
<td>13(11.5)</td>
<td>9(4.6)</td>
<td>0.01</td>
<td>1.8 (1.1–2.8)</td>
<td>0.02</td>
<td>1.7(1.1–2.7)</td>
</tr>
<tr>
<td>CT+TT, n (%)</td>
<td>51(45.5)</td>
<td>60(30.6)</td>
<td>0.009</td>
<td>2(1.2-3.1)</td>
<td>0.01</td>
<td>1.9(1.2-3.1)</td>
</tr>
<tr>
<td>Allele C, n (%)</td>
<td>160(71)</td>
<td>336(82)</td>
<td>&lt;0.0001</td>
<td>2.4(1.6-3.6)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>T, n (%)</td>
<td>64(29)</td>
<td>56(18)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Adjusted for age and ethnicity

Although the frequency of the CT genotype of MTHFR C677T polymorphism was not statistically different between PCOS and control women before and after adjusting age and ethnicity, the frequency of TT genotype was significantly higher in PCOS women compared to controls before and after adjusting age and ethnicity and risk of PCOS was 1.7 fold higher in women with TT genotype after adjusting age and ethnicity [OR, 1.7 (95% CI 1.1 to 2.7); P = 0.02]. In addition, the frequency of 677T allele was 29% and 18% in PCOS women and control groups respectively, which was statistically different (p<0.0001). Moreover, the overall frequency of individuals with 677T allele (CT and TT genotypes) were significantly higher in the PCOS patients compared to controls (45.5 vs. 30.6%,) and the presence of T allele could be a risk factor for PCOS susceptibility (OR, 1.9 [95% CI, 1.2 to 3.1]; P = 0.01).
Discussion

Different gene polymorphisms have been recognized related with increased susceptibility for PCOS but due to the ethnic and environmental differences in populations, conflicting results have been obtained. Some authors have hypothesized the association of MTHFR variants, such as C677T and A1298C polymorphisms, with PCOS [12-14]. The present study tried to assess the association of MTHFR C677T polymorphism with PCOS in the southeast of Iran.

308 women including 112 patients with polycystic ovarian syndrome and 196 healthy individuals were recruited. The results of the present study revealed that patients with PCOS, had significantly higher frequencies of TT in comparison with the healthy individuals. In a similar observation by Qi Q et al., a significant association was revealed between MTHFR gene C677T polymorphism with PCOS, for which CT and TT genotypes can increase the risk of PCOS [15]. Another study indicated that the 677T allele increases the PCOS susceptibility, and this relevance seemed to be more intense in Europeans than in Asians [16]. In other societies, varying results were found. Our findings were in contrast with the results of Kazeruni et al. on the Iranian population. Based on their results, the prevalence of C677T polymorphism was not found to be significantly different between the study groups [17]. In a case control study, Jain et al. showed that no homozygous mutation (TT) was found in the study population. Even if not statistically significant, there was a slightly higher prevalence of heterozygous (CT) genotype in women with PCOS [6]. In a study by Karadeniz et al. [15], the MTHFR 677 CC genotypes had significantly higher proportions in the control group compared to the PCOS patients in the Turkish population [18]. In another study by Choe et al. among the Korean population, the C677T polymorphism of MTHFR gene was not associated with PCOS. The conflicting results regarding the associations between MTHFR C677T polymorphisms and risks for PCOS may be due to differences in racial and environmental factors.

References

Phenol degradation by Periodate in combination with Ultrasonic Irradiation


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Abstract
In this study, a successful degradation of phenol was achieved by a combination of processes, ultrasonic irradiation and periodate. The effect of pH, dosage of IO₄⁻, dosage of initial phenol and ultrasonic irradiation time on the phenol degradation were examined. Furthermore, the effects of ion intensity on phenol degradation were examined. The results showed that the degradation rate increased in acidic conditions and a higher degradation was achieved in combination processes. This novel study also investigated the effect of ion intensity and the results showed that the principal intensity of solution is an inactive variable on phenol degradation with these systems. A comparative study between IO₄⁻/US system and IO₄⁻ and US separately determined the COD removal and showed that an integrated approach of IO₄⁻/US system had the best execution.

Introduction
Industries generate a considerable amount of polluted wastewater and they have recently produced a variety of concerning problems in the aqueous solutions as a result of inadequate treatment operations [1]. Organic compounds have been used extensively in the manufacturing processes. The presence of organic pollutants in aquatic solutions is one of the major social and environmental awareness. Groundwater and surface waters are vulnerable to contamination by industrial wastewaters. Scientists have been concerned about the nature of organic compounds and their harmful effect in water sources. Therefore, governments have authorized hard and fast laws to protect the environment in the last decades [2].

Phenol, one of the most common compounds, has been consumed in several industries such as pharmaceuticals, pesticides, paint and dye industries, organic chemicals manufacturing, etc. As a consequence, it was found in the effluent of these industries [3]. The effect of this organic compound was investigated in aqueous solutions and according to the EPA declaration, it is a priority pollutant. Accordingly, the standard concentration of phenol in the effluent stream is less than 1 ppm [4]. According to the recent research, many methods have been studied to destroy phenol residuals in the aqueous solutions albeit most of them have a variety of limitations. Therefore, it is important to find an efficient process to remove or degrade phenol residuals before the discharge to water sources. Advanced Oxidation Processes (AOPs) have been studied as efficient methods in last decades [5,6]. Methods like Fenton, radiolysis, photo catalytic oxidation, sonication, periodate oxidation, ozonation, etc., are expedient because of their potential to generate hydroxyl radicals in aqueous solutions [7-9]. Of these methods, the Ultrasonic method is one of the most important approaches because it has a low cost and it is easy to handle. The basis of ultrasonic reaction is on hydroxyl generations that are produced by reactor and depend on the power of the reactor that makes numerous frequencies [10]. The aquatic cavity bubbles have been grown and impulse collapsed all molecules of gases and water vapour from the aqueous similarly, the variety of radicals being generated according to Eq1 to Eq3 [11].

$$\begin{align*}
H_2O(\text{g}) & \rightarrow OH^+ + H^+ \quad (1) \\
O_2(\text{g}) & \rightarrow 2O^0 \quad (2) \\
OH^+ + O^0 & \rightarrow OO \quad (3)
\end{align*}$$

These phenomena caused the degradation of organic compounds such as phenol in aqueous solutions. The degradation proceeds mainly by two reaction mechanisms: direct pyrolysis in and around the collapsing bubbles, and oxidation by OH⁺ radicals [12]. Whether, phenol is one of the stable organic compounds, the rate of sonodegradation of that is obviously low. There are some reports in recent studies that imply the combination processes like periodate oxidation to achieve the aim [13].

Iodine oxide anionic species formed through the bonding of the iodine atom with a different number of oxygen atoms are the hypoiodous anion (IO⁻), the iodic anion (IO³⁻), the periodate anion (IO₄⁻), the mesoperiodic
anion \((\text{IO}_3^{3-})\) and the paraperiodic anion \((\text{IO}_6^{2-})\). The most stable ones in their salts and acids are the periodate and paraperiodic anions. The periodate ion is available in sodium salt (readily soluble) and in potassium salt of limited solubility \([14]\). The periodate anion reacts with various chemical compounds such as organic compounds. The oxidation reaction pathway depends on the chemical reaction variables \([15]\).

Periodate has a good power to oxidize the organic compounds, especially in the presence of hydroxyl, once this substance is activated, it changes into stronger radicals such as \(\text{IO}_4^0\) and \(\text{IO}_6^0\). These radicals were produced in two stages: in the first stage, one of the chemical bonds \(\text{OH}\) was attacked to one of the chemical bonds \(\text{OH}\), and then in the second stage, the chemical bonds have formed a ring \([16]\). For these reasons, the combination of sodium periodate with ultrasonic process have more power to remove the organic compounds such as phenol in aquatic solutions.

Saidmohammadi et al. \([17]\) investigated the degradation of 2,4 dichlorophenolindophenol by periodate, persulfate and hydrogen peroxide in the presence of US. They predicted that in the presence of US, periodate is a good catalyst which enhanced the degradation.

Rashmi et al. \([10]\) investigated the phenol degradation with ultrasonic reactors and with hydrogen peroxide, ozone and zero valent metals. Studies clearly showed that the degradation of phenol is intensified the presence of the catalyst.

In this study, the enhancement in the rates of ultrasonic degradation of phenol in the aqueous solution with sodium periodate, to activate periodate, was studied. Eventually, the kinetics of oxidations in all systems was analyzed. Phenol removals in the reactions were determined by using the Spectrophotometer. The COD test was also used for the analysis of phenol.

### Experiment

#### Materials

Phenol (163 g/mol) was obtained from MERCK, sodium periodate from MERCK, potassium Ferrocyanide \((\text{K}_3\text{Fe(CN)}_6)\) and all the other regents were obtained from MERK and used as received. The analytical regents grade or better chemicals as well as Milli-Q water were used in the experiment.

#### Apparatus

The following equipments were used in the study:

1. Ultrasonic equipment: LUC405 model, range of temperature 0 to 50°C, made in Korea. The system is schematically presented in Fig. 1.

2. Spectrophotometer: model UV/Vis, made by Perkin Elmer.

#### Us/ \(\text{IO}_4\) system

Batch experiments were performed in a rotary shaker at 25°C and 125 rpm. The stock solution of phenol 1000 mg/l and periodate (213.89g/mol) were prepared in deionized water prior to each batch experiment. The pH values of all solutions were set with (0.5N) sodium hydronized \((\text{NaOH})\) or sulfuric acid \((\text{H}_2\text{SO}_4\text{ 95%})\). Several sets of the experiments were conducted to determine the effects of various parameters on phenol degradation. In order to determine the effect of time on the phenol degradation, it was studied at every 15 min, from 15 min to 120 min. To investigate the effect of \(\text{pH}\) on the phenol degradation, three \(\text{pH}\) regimes of aqueous solution at 3.0, 7.0, and 11.0 were studied. In the remaining experiments, the optimized \(\text{pH}\) was adjusted. To determine the effect of \(\text{IO}_4\) on phenol degradation, from 1 to 7 mM\(\text{IO}_4\) in the specific phenol concentration (50 mg/l) and to determine the effect of the initial phenol on this degradation skirt, 25 to 200 mg/l phenol were used. In order to investigate the effect of \(\text{US}\) on phenol degradation, amounts of calcium chloride of 1.03, 0.52, and 0.13 were used. To determine the effect of ultrasound, the solution was irradiated with ultrasound for 120 min; this process was continued until the solution was irradiated for a predetermined period. The temperature of the solution was kept constant \(\pm 2^\circ\text{C}\) by using cold water circulating around the beaker.

#### Analytical techniques

Phenol removals in the reactions were determined by using the Spectrophotometer at 500 nm. COD tests were also used for the analysis of phenol \([18]\).

### Results and discussion

#### Effect of \(\text{pH}\)

In all the chemical reactions, \(\text{pH}\) is one of the major factors that directly affect the whole chemical operation \([19]\). Therefore, a set of experiments was designed to investigate the effect of \(\text{pH}\) on phenol degradation in \(\text{IO}_4\)/US system. Experiments were carried out at a \(\text{pHs}\) of 3.0, 7.0, and 11.0. The results are shown in Fig. 2, and indicated that the phenol degradation was...
obviously increased at a pH of 3 and results showed that the efficiency was of 85.20% after 120 min, nevertheless after 90 min the phenol degradation efficiency was almost constant and at 90 min, the efficiency was 83.80%.

This fact happening due to hydroxyl radicals was caused by the generation by ultrasound in an acidic condition; subsequently more IO₄⁻ and IO₃⁻ generated Eq4 to Eq7 [20].

\[
\begin{align*}
2\text{IO}_3^- & \rightarrow 2\text{IO}_2^- \tag{4}
\end{align*}
\]

\[
\begin{align*}
2\text{IO}_3^- + \text{H}_2\text{O} & \rightarrow \text{IO}_3^- + \text{IO}_4^- + 2\text{H}^+ + \text{O}_2 \quad \tag{5}
\end{align*}
\]

\[
\begin{align*}
2\text{IO}_5^- & \rightarrow 2\text{IO}_6^- \tag{6}
\end{align*}
\]

\[
\begin{align*}
2\text{IO}_6^- + \text{H}_2\text{O} & \rightarrow \text{IO}_3^- + \text{IO}_4^- + 2\text{H}^+ \quad \tag{7}
\end{align*}
\]

Effect of periodate concentration
Experiments were conducted to determine the most effective periodate dosage for the degradation of phenol in the presence of ultrasound waves. The concentrations of periodate of 1, 2, 3, 4, 5, 6 and 7 mM were applied. The results are shown in Fig. 3 and announced that phenol degradation efficiency was of 10%, 87.80%, 72% with IO₄⁻; 1, 3 and 7 mM respectively after 90 min. The phenol degradation efficiency was low at little periodate concentrations as if at higher concentrations. These observations can be explained by the fact that periodate directly reacts with the hydroxyl in the solution, in low dosage less periodate reacts with hydroxyl; instead in high dosage, hydroxyl engages in the interfering reactions of Eq. 8 [21].

\[
\text{OH}^- + \text{IO}_4^- \rightarrow \text{OH}^+ + \text{IO}_4^2^- \tag{8}
\]

Effect of initial phenol concentration
The study continued under an identical IO₄⁻ concentration at an optimized pH was carried out in the same ultrasonic frequency at an initial phenol of 25, 50, 100, 150, and 200 mg/l. During sonication, the efficiency was 92, 87.8, 41.6, 36.6 and 10 after 90 min, as shown in Fig 4. With the mount up of the phenol concentrations, the efficiency decreased, whose reaction needed more periodate dosages and hydroxyl radicals [22].

Effect of ultrasonic and periodate solely
Firstly, the rate of phenol degradation was investigated by using just ultrasonic at 50 mg/l concentration of the phenol and the obtained results were shown in Fig. 5. As the figure illustrates, the rate of degradation was 14% after 90 min. Secondly, the rate of phenol degradation was investigated just in presence of peridate of 3 mM at 50 mg/l concentration of phenol, and the results were shown in Fig. 5; the rate of degradation was 19.6%. These experiments showed that the application of sonication and periodate alone is not capable of a full degradation of the phenol. Therefore, in order to catch higher removal efficiency, the combination of the oxidants and ultrasonic must be applied [23].

Effect of pH on the degradation of phenol by IO₄⁻/ US system. IO₄⁻ 5mM, phenol 50 mg/l

Effect of initial phenol concentration on the degradation of phenol by IO₄⁻/ US system. pH =3, IO₄⁻ 3mM, time 90 min

Effect of ultrasonic and peridate solely and the combination on degradation of phenol. pH =3, phenol 50 mg/l, IO₄⁻ 3mM, time 90 min
Effect of ion intensity on the degradation of phenol by IO$_4^-$/ US system

For this system, three sets of experiments were done in this investigation. In this case, 0.13, 0.5, and 1.03 g/ l of CaCl were used and served as additions to aqueous solutions. The study continued under identical IO$_4^-$ concentrations at optimized pH and was carried out in the same ultrasonic frequency at 90 min for this system at initial phenol concentrations of 50 mg/ l.

The results shown in Fig. 6 indicated that the phenol degradations were obviously increased at 1.03 g/ l CaCl, as compared to 0.13 g/ l CaCl. This can be explained by the ion effect created by CaCl, hence this caused the movement of phenol molecules to the interface of the cavities created by the sonication [3]. Nevertheless, the maximum rate of phenol degradation in presence of CaCl in IO$_4^-$/ US was 83.6%, as compared to the maximum rate of phenol degradation in the absence of CaCl; in IO$_4^-$/ US it was 87.8%, provided that the ion intensity of solution is an inactive variable in both systems in phenol degradation.

Conclusions

This study showed that the use of ultrasonic frequency with periodate, separately degraded phenol in aqueous solutions. Nevertheless, the rates of phenol degradation in combination with systems like IO$_4^-$/ US are more than separate systems. The study also showed that the system required an acidic pH for effective phenol removal and the phenol degradation enhanced in low concentration of the initial phenol. This study also showed that COD reduction was decreased since time pass. Moreover, IO$_4^-$ was an effective substance that enhanced the phenol degradation in IO$_4^-$/ US system. Furthermore, the study showed that the use of simple additives such as CaCl did not have any obviously positive effect on the phenol degradation.

Acknowledgments

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