

The Obstacles of Teaching Evidence Based Medicine in Iran, from the View Point of Clinical Academics and Medical Students; a Qualitative Study

Narges Khanjani^{1,2,*}, Reza Tabrizi³, Ahmad Maghsoudi³

¹Department of Epidemiology and Biostatistics, School of Public Health, Kerman, Iran

²Monash Centre for Occupational & Environmental Health, School of Public Health and Preventive Medicine, Monash University, Melbourne, Australia

³Department of Epidemiology and Biostatistics, School of Public Health, Kerman, Iran

*Corresponding author: n_khanjani@kmu.ac.ir

Received April 13, 2013; Revised May 3, 2013; Accepted May 21, 2013

Abstract Evidence Based Medicine (EBM) is being taught in many medical universities around the world, however many studies have reported obstacles for effective EBM teaching. In this study we aim to evaluate the obstacles of teaching EBM in Iranian Medical Universities which have made slow progress in EBM. A qualitative descriptive study with content analysis was designed to thoroughly and deeply discuss the obstacles of teaching EBM. Interested academics and students from Kerman Medical University participated in focus groups. Data collection was continued until data saturation was achieved. Then was coded and categorized into main themes. Our results showed 6 main obstacles, which were time constraints and the heavy work load, poor infrastructure, EBM not practiced in general, clinical academics not acquainted with EBM, false believes about EBM and assessment based on memorizing the textbook or class notes. To overcome these barriers, our participants suggested compulsory courses or workshops, proper timing, teaching EBM to clinical academics, strengthening the infrastructure and supervision of a credible body over EBM teaching. Although EBM is taught limitedly in some Iranian Universities, due to several obstacles the progress has been slow and unsatisfactory. Some of these obstacles can be locally alleviated by the universities, but others need the cooperation of higher organizations such as the Medical Council or the Ministry of Health and Medical Education.

Keywords: *evidencebased medicine, iran, obstacles*

1. Introduction

Evidence based medicine (EBM) is defined as systematically finding, appraising, and using up to date research findings integrated with clinical expertise and patient values for clinical decision making [1,2]. This topic mentioned years ago by researchers at the McMaster University of Canada, is now viewed as a rational frame work for decision making in medicine [3], especially in resource-limited countries, which an evidence-based approach can be scientific, cost effective and time saving by minimizing practices that do not have a real benefit [1].

As a result of these advances, EBM requires that students and faculty members develop new skills, such as asking the right clinical questions, conducting efficient computerized searches, critically appraising the evidence, applying the results in their clinical practice, and then evaluating the outcomes [2].

However, at present, practicing evidence based medicine is associated with many challenges such as its inherent complexity, misperceptions, misinformation, absence in routine medical curriculum and rigidity and unawareness of practicing clinical academics which make it actually absent in many clinical settings [1].

Studies have suggested that these obstacles should be overcome by effectively teaching the skills of evidence-based medicine in medical schools, motivating the clinicians, availability of secondary or pre-appraised databases, increasing the accessibility to internet, and disseminating appropriate information through free journals or newspapers [1]. However, the role of strong commitment among the scientific committees familiar with EBM for teaching and applying this subject can never be neglected.

Iran is a country located in the Eastern Mediterranean region with significant scientific progress and increase in the number of published articles in medicine in recent years [4]. There are documents that show ancient Iranian scientists such as Ibn Sina and Zakariya Razi recognized the characteristics of drugs by experiments and therefore applied their medical knowledge based on logical evidence [5,6]. However, it is hard to believe that this country with such rich scientific heritage has not yet seriously adapted and applied the concepts of EBM. Studies from various Medical Universities in Iran have shown that acquaintance with EBM and its application is far from satisfactory [3]. EBM is not a formal part of medical students' curriculum in Iran and is taught mainly in occasional workshops in a limited number of

universities, such as Tehran, Tabriz and Kerman Medical University.

Our search among the medical databases showed that a few studies have been conducted about the obstacles of implementing EBM in clinical settings or the barriers of EBM teaching and none of these studies had been conducted in Iran or even the neighbor countries. Therefore it was interesting to investigate the obstacles of implementing EBM in one of the major (Type 1) Iranian Universities, Kerman Medical University.

Kerman Medical University is located in Kerman, in the south east of Iran, about 100 undergraduate medical students enroll in this university each year and about 140 clinical residents studied in various fields including pathology, internal medicine, general surgery, anesthesiology, gynecology and obstetrics, dermatology, pediatrics, radiology, cardiology, psychiatry, neurology, otorhinolaryngology and orthopedics in 2010 [7].

2. Methods

A qualitative descriptive study was conducted in the summer of 2011 for thorough and deep investigation of the research question that was to find the barriers of teaching EBM in our medical universities. We were interested to hear the comments of our participants (both students and academics) with no restrictions. For recruiting students, the study was advertised through the student research center and other student organizations, and interested students volunteered to participate in our student focus groups. Interested academics with a history of working with EBM were approached and invited to participate personally. Other academics were recruited through snowball sampling and were invited to participate in the academic focus groups.

Students participated in two focus groups with 8 people in each group and academics participated in two focus groups with 12 people in each. The focus groups were conducted at a time and location that was appropriate for all of the participants. All participants signed a written consent form. Each focus group lasted for 1.5 to 2 hours. Open, unstructured questions were asked. The focus groups were finalized when data saturation was achieved. All of the data was recorded and transcribed word by word. The data was read several times, then summarized, coded and classified and the main themes and subthemes in the data were extracted through content analysis. The results were read and confirmed by the researchers, and were then returned to some participants to read and comment on the trustworthiness of the final results.

3. Results

The results were divided into obstacles and opportunities and summarized in Table 1. The students and academics mentioned the following obstacles for learning and teaching evidence based medicine

3.1. The Obstacles

3.1.1. The Huge Volume of Readings and Little Time of Medical Students

One of the important obstacles mentioned in this study was the huge volume of readings that medical students have. Consequently, the students thought about evidence based medicine (EBM) as a new topic which will increase their workload. Students believed that they already have too much reading and if 2 or 3 credit courses of EBM are added; the situation will become worse. Students also thought about EBM as another theoretical subject in which they have to spend hours memorizing the material.

"... If they organize 3 credits of EBM for us ... it will be trouble over trouble. Nobody will [have time to] read it, especially that it is almost theoretical, it will be difficult ..."

Table 1. The obstacles, and initiatives for teaching EBM in Iranian Medical Universities

Obstacle	Initiative
Medical students time limitation and huge volume of studies	Putting aside a specific time for EBM education as a compulsory course, rotation or workshop Proper timing Using secondary or pre-appraised databases Giving priority to the more important questions
Poor infrastructure	Library services and databases made more accessible. High Speed and wireless internet made available More attention toward teaching the bases of EBM which is epidemiology, statistics, research methods and using medical databases
EBM not practiced in general	Senior physicians should learn and apply EBM The Medical Council and/or the Ministry of Health and Medical Education should formally support EBM
Clinical Academics not acquainted with EBM	Academics should learn and apply EBM Recognizing and acknowledging the cooperative clinical academics
False believes about EBM	Establishing a committee or center for supervising EBM education in the university
Assessment of students merely based on memorizing the text book or class notes	Performing EBM based evaluations and OSCEs.

3.1.2. The Knowledge Infrastructure is not Ready for EBM

Unfortunately, despite the increasing attention toward research in Iranian Universities, it still seems that the importance of making the proper knowledge infrastructure available for using up to date medical literature in decision making is still not well recognized. The students confessed that they were not properly taught and do not know how to properly search the medical databases and therefore they do not use these databases routinely.

"For example in a class of 80 people, if you ask them, ... maybe 10 or 15 persons can [efficiently search the databases]... if you ask the rest to search [efficiently, even] in google, for example, they can't do it."

The students also mentioned that they did not learn statistics, research methods and epidemiology seriously and they just passed the courses, also the academics do not evaluate the students in these subjects properly. On the

other hand acquaintance with databases, basic statistics, research methods and epidemiology is essential for learning EBM.

"About ten percent of the students know enough statistics and epidemiology to write a proposal with few mistakes, not more..."

3.1.3. EBM is not Practiced

The students were concerned that EBM will turn into a subject that they will just memorize and forget later, or a subject that they will not be able to practice and apply in clinic in the future and will face resistance from their working environment for practicing it. Obviously, EBM teaching will be efficient if it is applied and practiced step by step in educational environments and supported further in all hospitals and clinical setting, governmental or private.

3.1.4. Clinical Academics are not Familiar with EBM

Regretfully still many clinical academics are not acquainted with even the basics of EBM and therefore cannot provide the proper field for students to practice EBM. Students frequently complained that academics use out of date information in their teaching.

"We read the notes of students from 7 years ago for the exam and we got good grades ...!"

"This is the way it works, academics with white hair give us old information, and academics with black hair give us new information."

"Our academics teach us according to the year they studied at the time of their own residency..."

The academics who participated in our study also confirmed that a limited number of academics are acquainted with EBM and in order to train students in EBM, it is necessary to initially promote all of the academics' knowledge about this field.

3.1.5. False Believes about EBM

Regretfully wrong and uncoordinated information provided by unauthorized sources to students about EBM has made students acquire false believes about EBM and not know it's real values and limitations. For example, some students thought that EBM is only about searching the literature.

"...until now, whenever we went to EBM workshops ... they only theoretically taught us about searching the databases"

Students also commented that some of the academics have told them that there is no use of EBM for general practitioners.

"We spoke with [our] academics about EBM, they said that it is useless for GPs.... If you study and pass the residency [specialist training] exams, then Up to Date is useful, you can download it on your mobile phone ..."

The academics who participated in our focus groups also believed that the realities about EBM have not been presented well and this was one main factor in preventing progress in EBM education and practice.

3.1.6. Assessment of Students Merely Based on Memorizing the Book or Class Notes

The students thought that their success in the exams and their final grade depends on how much they memorize

their class notes or text book and that there is no reason for finding up to date evidence. Meanwhile, academics commented that in world universities that teach EBM, the exam process includes introducing a case and then evaluating the students' method of achieving up to date information and using this information; through Objectively Structured Clinical Exams (OSCE) and this type of assessment should replace the traditional medical exams.

We faced interesting opportunities and initiatives among the comments of the participants for improving EBM education that have been mentioned as below.

3.2. Opportunities and Initiatives

3.2.1. Making it a Compulsory Course

All of the students and academics believed that in order to make EBM wide spread, this topic should be made compulsory for medical students. Students commented that:

"If you make it arbitrary, it is useless, ... many courses were arbitrary for us, but we did not pass them. Why?... We preferred to spend time with our family or do other things, ... in other words we won't ruin our leisure time..."

3.2.2. Establishing a Committee or Center for EBM in the University

The academics suggested, for organizing systematic and structured EBM education and in order to prevent workshops that pretend to teach EBM but are actually imposing the wrong idea, they should better establish a committee or center for EBM in the university which supervises EBM activities.

They also commented that this committee or center should have a routine program for conducting classes and workshops and should have proper supervision and evaluation on EBM teaching and as there already is an Education Development Center (EDC) in all Iranian Medical University, it is better to establish this committee or center as part of the EDC.

3.2.3. Academics Should Learn and Apply EBM

The participating academics believed that the first step in popularizing EBM in universities is to teach the academics about EBM, familiarize them about its importance and make them apply EBM in their settings.

"The EBM culture should be introduced properly for our academics, its importance should be explained in a way that they become ascertained that there is no other right path. We can't achieve this in any other way."

Also it was suggested that each educational department should have an EBM representative, to follow up on EBM related activities in the department and that in 3 or 4 clinical departments that are more interested and cooperative EBM activities can be started as pilot with the support and supervision of the EBM committee, EBM center or EDC.

"... Pressure should be imposed from the university policy makers in order to made academics practice EBM ... because academics are students' role models ..."

Academics also emphasized that up to now we neglected the real value of EBM and we did not spend

enough time for it, we thought about it as a task that was better to do, not something that has to be done. Nowadays because many of the students and residents are interested in EBM, academics need to know more about it.

3.2.4. The Cooperative Clinical Groups Should be Recognized and Acknowledged

The academics commented that unfortunately EBM does not have enough attraction for academics and for example participating in EBM workshops does not have any incentive for the participants. They also mentioned that in some departments, interested academics are already practicing and teaching EBM and therefore should be acknowledged.

3.2.5. The University Should Provide the Infrastructure

The academics mentioned some of the basics that can be and should be provided by the university in order to practice EBM. Their suggestions included, providing wireless internet in all faculties and educational hospitals, organizing virtual and long distance education for EBM on the university web site, enriching the library and making libraries 24 hour accessible and conducting OSCEs for assessing students EBM knowledge.

3.2.6. Proper Timing

Academics and students both commented on the best time for teaching or learning EBM. The eventual conclusion was that the best time for passing EBM courses or workshops for undergraduate medical students is after the pre-internship exam and before starting the internship rotations. The participants believed that before starting internship students should study basic topics and EBM has little practical application for them as they are not involved in patient decision making before internship.

The next suitable time for learning EBM was at the beginning of the residency (specialist training) program, therefore they would be able to properly apply their EBM knowledge in patient decision making afterwards.

4. Discussion

Preparing medical students as critical thinkers, lifelong learners and executors of EBM are challenges faced by educators at Medical Universities [2]. EBM was introduced into the medical curriculum in the last decade in many countries [8]. Now many universities have specific curricula designed and revised for teaching EBM with the objective of assisting medical residents to become competent, self directed, life-long learners and with sufficient skills to keep up to date with the medical literature and properly solve problems they face in everyday practice [9].

However the question persists about to how to best teach and implement evidence-based medicine and its skills; so that it becomes the routine for practice [2]. It is logical that removing known obstacles can have a significant effect on making progress in EBM education.

One of the main obstacles mentioned in studies is time constrains [2,8,10,14]. Time constraints include both the competing study demands and the long time spent for searching the evidence. Studies have reported, because of these time constrains many students felt that for efficiently

using their time, rather than searching for research evidence, they should approach their teachers directly with questions; and looking for evidence to answer each individual clinical question was considered too time consuming. Also despite students' positive attitudes toward EBM, their large study load was a principal barrier to applying EBM [10,11]. In another study from Australia for the three tasks of EBM, which were searching for evidence, appraising evidence and discussing the implications of evidence with patients, lack of time was rated as a very important barrier by significantly more participants than lack of skills [12]. In the current study students mentioned their heavy reading load and little time as a major obstacle.

To overcome the barrier of limited time among clinicians, critically appraised topics should be made available in ready to use formats for physicians [1]. Others have suggested using 'pre-appraised' sources of evidence such as POEMs (Patient-Orientated Evidence that Matters), CATs (Critically Appraised Topics), 'Clinical Evidence', or articles found in abstracting journals [12]. Finally, if several questions are generated for each patient, this can slow down clinicians by trying to address all of them. The questions most important to the patient's well being should be given priority [1].

A top priority for medical students is making progress and acquiring good grades in their assessment. However, exams primarily based on textbook knowledge, not EBM, leave little incentive to spend time looking for research evidence [10]. Studies have mentioned that passing examinations was the students' priority, and, as assessment drives learning, the lack of EBM-based assessment impaired EBM learning [10,11]. In our study participating students mentioned that their assessments are merely based on memorizing the textbooks or class notes and searching for up to date evidence is time wasting and will threaten their grades. Consequently, studies have shown that the main source of information for physicians in Iran is text books [3,15]. To address this barrier, some of the strategies proposed by authors were to encourage assessments that measure EBM learning [2] in both undergraduates and postgraduates. Recommendations in textbooks have repeatedly been found not to be evidence-based [14,16] and out of date.

The importance of faculty development and role modeling to promote students' learning in EBM is well known [9]. The perception that clinical teachers' decisions are experience-based and not evidence-based, discourages students from learning and using EBM. Studies have shown that although attitudes were positive, the application of EBM faced barriers such as lack of knowledge and support from instructors and clinical teachers. Students were seldom asked to provide evidence to support their clinical decisions and a prevalent belief was that teachers expected students to memorize information and would not encourage students to search for evidence. This was worsened by the invisibility of clinical teachers' EBM practices [10].

To address the barriers, some of the strategies proposed by authors were to encourage faculty to act as role models, and provide opportunities to use EBM skills in clinical settings [2]. Consequently, for faculty to be effective role models they needed to learn the skills expected of their students. Faculty are key to the success of implementing

change, both in the classroom and in clinical wards, so there should be attention on developing a dominant mass of faculty who can initiate this change and mentor students. For an EBM approach to become the norm for practice it must be integrated throughout the educational program and reinforced every day when students are providing patient care [2]. The other must do is providing opportunities to practice EBM in clinical settings, with ensuring that all students have the opportunity to follow up and evaluate their management plans.[10] Attending physicians must be enthusiastic and effective role models for the practice of EBM, even in high pressure clinical settings such as ICUs and emergency departments [1].

Studies have reported that especially older physicians find it hard to acquire EBM skills [8]. In our study the students openly discussed the fact that their older academics use out of date information for teaching and decision making. An initiative introduced in Iranian Medical Universities is the regulations for academic's scientific standstill which makes research up to a required standard compulsory for academics and leads to the retirement of academics who contribute little to the universities' scientific progress.

Poor EBM infrastructure has been mentioned as an obstacle in many studies. Authors have reported that despite high needs, there are concerns about weak library infrastructure and few trained staff in Iranian Medical University Libraries [15]. This fact along with unfamiliarity with library services, lack of time, work overload and exhaustion seems responsible for physicians and health personnel not using the library resources properly [15]. A study in occupational medicine practitioners showed that some of the main barriers for EBM were lack of free access to full-text articles, language barriers (most texts in foreign language), and unreliable internet connectivity [8]. A study in Iran showed that less than 30% of medical residents were familiar with the available EBM databases and among those who were familiar many did not use these databases for decision making [7].

In order to prepare the infrastructure, library services and databases should be made more accessible for EBM practitioners. Studies have suggested that online resources and high speed internet connection must be accessible round the clock whenever a clinical question is formulated, there must be many user stations available at strategic points within the hospital and if possible in every ward, required references must be available immediately or within forty-eight hours, journal selection must be maximized and library resources should be expanded, librarians should play a more active role as a team member in the EBM training process [1].

Insufficient evidence and failure to obtain the needed evidence have also been mentioned as obstacles [2]. Insufficient evidence include poor point-of-care access to medical literature, difficulty in locating proper evidence and the perceived low relevance of overseas evidence to local patients [10]. Authors have suggested the developing of localized medical evidence databases to enhance accessibility and applicability [10]. Fortunately resources such as Iranmedex, SID and Magiran are available for local decision making in Iran.

A strong finding from the majority of interviews in a US study was that the use of electronic clinical resources

was considered EBM practice [14]. In our study students openly spoke about the fact that workshops titled EBM have been organized and the only thing taught was a theoretical search of the literature. Thus, it is suggested that a responsible body in each university should monitor EBM teaching and preclude deviations.

Studies believe that problems in understanding the basic aspects of evidence-based medicine (EBM) may form barriers to its implementation into clinical practice [16]. Most clinical doctors seem to lack knowledge of key methodological evidence-based medicine terms and basic understanding of medical statistics and have problems understanding terms such as odds ratios and relative risks [16]. A study from Denmark showed that the majority of clinical doctors at a University Hospital lacked knowledge about key methodological evidence-based medicine terms [16]. A study in occupational medicine practitioners showed that one of the main barriers were little acquaintance with EBM skills [8]. In our study most of the students confessed they only passed and did not learn enough epidemiology, statistics and research methods and cannot write a research proposal independently.

Increased statistics and epidemiology education for physicians may be one of the ways of promoting the use of EBM. Some authors even believe that clinical doctors should be encouraged to conduct and publish a systematic review as part of their postgraduate specialist training[16]. The senior clinicians should also be taught the basic skills of EBM via educational seminars. It should be emphasized that this is not to limit their freedom but to add justification to their decisions. EBM seminars and conferences should be conducted and updated information should be conveyed in these meetings [1]. Literature search and critical appraisal skills should be integrated into clinical training. Conventional teaching and presentations should be replaced by case based journal clubs and seminars. Students can be provided incentives for learning EBM via scholarships or EBM based questions in the final assessment. Fellowships or diploma courses in EBM can be initiated at selected centers to increase awareness and application. [1]

Our participants suggested that the best time for learning EBM for medical students is before starting internship or the beginning of residency. Other studies suggest that early introduction of EBM principles as a short course at the beginning of residency and even to pre-clinical medical students is feasible and practical and can provide the basic skills in EBM [1] A study from Croatia mentioned that teaching the practical use of EBM in the last year of medical education can have an important role in professional development [17]. Also, an interesting study from the US has reported that a 2 week EBM rotation in the residency program led to change in patient care among the residents as well as the faculty [18]. Based on our experience we do believe that a two week EBM rotation for intern and residents can also improve the situation of EBM practice in Iran. The reasons are that the short courses and workshops performed by our team up to now have all inevitably interfered with the students' clinical rotations or duties which mean the students were not capable of fully attending the classes and concentrating on learning due to their clinical responsibilities.

A limitation of our study may be the fact that students and academics from only one university participated in the focus groups. However, the medical education system in all Iranian Universities is pretty similar and is all under the instructions and supervision of the Ministry of Health, Treatment and Medical Education. Thus, we do believe that we have highlighted problems that are common in many Iranian Medical School and the results of our study are transferable, although not generalizable. All qualitative studies have the limitation of not being generalizable.

Despite the world known importance of EBM, there is still deficit in EBM education especially in developing countries and calls for further work in this area. The World Federation for Medical Education has called for new strategies to equip doctors with skills for practicing medicine in the twenty-first century and Evidence-based medicine (EBM) was specifically targeted as an area in which future doctors should acquire special competency [11]. In the Asia Pacific region there are three main challenges for implementing EBM which are linking evidence to practice and policy; developing a strong collaborative network; and lack of sufficient resources and technical expertise to produce evidence [19].

Although EBM is taught in some Iranian Universities, due to several obstacles the progress has been slow and unsatisfactory. Some of these obstacles such as academics lack of knowledge, poor library services, poor research methods and statistics education can be locally alleviated by the universities, but others such as non-friendly EBM environments in general hospitals and clinics, or lack of access of all medical practitioners (in governmental or private sectors) to EBM databases needs the cooperation of higher organizations such as the Medical Council and/or the Ministry of Health and Medical Education. Authors believe that Information on the effectiveness and cost effectiveness of EBM needs to be highlighted for policy makers [19].

While our results are worrisome and show several obstacles of teaching EBM in Iran, the fact that we were able to highlight some of the most important obstacles and suggest practical solutions raises hope that EBM education might gain more popularity in the near future in Iran.

5. Acknowledgement

The authors wish to acknowledge the Education Development Office (EDC) of Kerman Medical University and the interested medical students and academics who participated in this study.

References

- [1] Agarwal R, Kalita J, Misra UK. Barriers to evidence based medicine practice in South Asia and possible solutions. *Neurology Asia*. 2008; 13: 87-94.
- [2] Forrest JL. Treatment Plan for Integrating Evidence-Based Decision Making into Dental Education. *J Evid Base Dent Pract*. 2006; 6 (1):72-8.
- [3] Sadeghi M, Khanjani N, Motamedi F. Knowledge, attitude and application of Evidence Based Medicine (EBM) among residents of Kerman Medicine University. *Iranian Journal of Epidemiology*. 2012; 7 (3).
- [4] Aminpour F, Kabiri P. Science production in Iran: the scenario of Iranian medical journals. *Journal of Research in Medical Sciences*. 2009; 14 (5):313-22.
- [5] Sajadi MM, Mansouri D, Sajadi MM. Ibn Sina and the Clinical Trial. *Annals of Internal Medicine*. 2009; 150: 640-3.
- [6] Zarrintan S, Aslanabadi S, Rikhtegar R. Early contributions of Abu Bakr Muhammad ibn Zakariya Razi (865-925) to evidence-based medicine. *Int J Cardiol*. 2013.
- [7] Sadeghi M, Khanjani N, Motamedi F, Saber M, Sharifi Rad G. Familiarity of medical residents at Kerman Medical University with evidence based medicine databases. *Journal of Research in Medical Sciences*. 2011; 16 (10).
- [8] Hugenholtz NIR, Nieuwenhuijsen K, Sluiter JK, van Dijk FJH. Do knowledge infrastructure facilities support Evidence-Based Practice in occupational health? An exploratory study across countries among occupational physicians enrolled on Evidence-Based Medicine courses. *BMC Health Services Research*. 2009; 9(18).
- [9] Allan GM, Korownyk C, Tan A, Hindle H, Kung L, Manca D. Developing an Integrated Evidence-Based Medicine Curriculum for Family Medicine Residency at the University of Alberta. *Acad Med*. 2008; 83:581-7.
- [10] Lam WWT, Fielding R, Johnston JM, Tin KYK, Leung GM. Identifying barriers to the adoption of evidence based medicine practice in clinical clerks: a longitudinal focus group study. *Medical Education* 2004; 38:987-97.
- [11] Leung GM, Johnston JM. Evidence-based medical education –quo vadis? *Journal of Evaluation in Clinical Practice*. 2004; 12(3):353-64.
- [12] Young JM, Ward JE. Evidence-based medicine in general practice: beliefs and barriers among Australian GPs. *Journal of Evaluation in Clinical Practice*. 2001; 7(2): 201-10.
- [13] McColl A, Smith H, White P, Field J. General practitioners' perceptions of the route to evidence-based medicine: a questionnaire survey. *British Medical Journal*. 1998; 316:361-5.
- [14] Hay MC, Weisner TS, Subramanian S, Duan N, Niedzinski EJ, Kravitz RL. Harnessing experience: exploring the gap between evidence-based medicine and clinical practice. *Journal of Evaluation in Clinical Practice*. 2008; 14:707-13.
- [15] Asaadi Shali A, Bagheri M. The possibility of offering clinician library services in the hospitals of Tanriz Medical University [in Persian]. *Journal of Librarianship*. 2008; 42(47):113-38.
- [16] Oliveri RS, Glud C, Wille-Jorgensen PA. Hospital doctors' self-rated skills in and use of evidence-based medicine-a questionnaire survey. *Journal of Evaluation in Clinical Practice*. 2004; 10(2):219-26.
- [17] Vrdoljak D. Teaching evidence based medicine in family medicine. *Acta Medica Academica*. 2012; 41(1):88-92.
- [18] Thom DH, Haugen J, Sommers PS, Lovett P. Description and evaluation of an EBM curriculum using a block rotation. *BMC Med Edu*. 2004; 4:14.
- [19] Su TT, Bulgiba AM, Sampatanukul P, Sastroasmoro S, Chang P, Tharyan P, et al. Clinical Epidemiology (CE) and Evidence-Based Medicine (EBM) in the Asia Pacific region (Round Table Forum). *Prev Med*. 2013; pii: S0091-7435(13)00118-7.