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Exploring the performance of medical teachers in teaching basic procedural skills for undergraduate medical students: A qualitative research

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Introduction: **Competency of medical students to perform basic procedural skills is low. Among numerous factors, the role of clinical teacher is more prominent. This study was conducted in order to examine more profoundly how basic procedural skills and the underlying conditions are taught.** ***Methods:*** **This descriptive exploratory qualitative study was conducted on 16 academic medical teachers using purposive sampling.** ***Results:*** **findings of this study include three main themes: "supervised teacher training under controlled conditions", "active self-learning in bedside" and "official training course, safe lost opportunity to teach-learn procedural skills" and their subcategories.** ***Conclusion:*** **According to the results, participation and supervision of faculties in teaching basic clinical skills in bedside is not enough in relation to some factors. Therefore, self-learning, in spite of high risk, is recommended to the student. Necessity and course of teaching these procedures to general medical students need to be further investigated. The results of this study can be used for developing basic clinical skills for medical students.**

INTRODUCTION AND OBJECTIVE

Clinical education is central part of medical education; one of the concerns is graduation of medical students without learning the necessary skills (1, 41). The results of studies indicate inadequate competence of medical students and graduate doctors in performing basic procedural skills, non-systematic and unstructured teaching (2, 3-5, 6-8, 42). In many cases, learning skills is one of the self-learning tasks of students and clinical education through trial and error and inadequate supervision on performance of medical students (2, 5, 6); even if bedside training is not given in some cases, practicing and performing is unsupervised (2, 6). This reduces effort and motivation of students as an important factor in learning (1) and involves wrong and harmful interventions (9, 10).

In clinical settings, the main focus is on patient care (11) and education in the next priorities. This may lead to a lack of facilities for education (12). Crowded wards, lack of patient collaboration, time constraints, high number of students, lack of educational standards, and inadequate physical conditions of wards for teaching are inappropriate for clinical education. Meanwhile, the role of clinical teacher is more prominent (13). Knowledge, personal characteristics and quality of teaching of clinical teachers (14,15), and their feedback to the student can compensate for some the disadvantages (16). The teacher's understanding of psycho-motor skills and teaching-learning principles of procedural skills in the bedside is not enough. In medicine, psycho-motor domain has been neglected to cognitive domain. Most doctors are involved in teaching, assuming that knowledge of a subject is enough to teach it (17).

Clinical practitioners, in addition to teaching students, have other duties at the university and they often have no time (18) and are not available (7). According to students, teaching work is not a priority for the teachers, which causes dissatisfaction and feelings of futility in them (7, 19). Teaching procedural skills is at the bottom of the list of educational priorities of professors and medical professors do not pay enough attention to bedside teaching (6, 7, 20-22).

Numerous factors influence clinical education; differences in student capabilities, job description of doctors, formal and hidden curriculum can be effective on learning (13, 23). The existing studies are more about clinical education in general rather than medical procedural skills; in most of the studies, the studied sample did not included medical professors. Therefore, this study was conducted to examine how to teach basic procedural skills and its underlying conditions according to professors in order to create the appropriate knowledge for better planning.

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Table 1 Phases of Analysis Based on Graneheim and Lundman Approach

phase	Activity	Description
Phase 1	Preparation	The collected data by interviews were transcribed and read through several times to become immersed in the data and get a sense of the whole
Phase 2	Extraction meaning units from the text	A meaning unit is considered as words, sentences or paragraphs
Phase 3	Abstraction meaning units to Creating codes	Labeling of the meaning units has been referred to as a code
Phase 4	Abstraction the codes to Creating sub categories	A sub category refers mainly to a code abstraction
Phase 5	Abstraction the sub categories to Creating categories	A category is a group of content that shares a commonality and it refers mainly to a descriptive level of content and can thus be seen as an expression of the manifest content of the text.
Phase 6	Abstraction the categories to Creating theme	Theme is an expression of the latent content of the text.

MATERIALS AND METHODS

Design

This descriptive exploratory qualitative study was conducted in 2017-2018 in Tehran, Mashhad and Gonabad Universities of Medical Sciences in Iran. Using purposive sampling, 16 medical teachers, who were academic members of three medical universities, were selected for this study. In order to obtain rich information and maximum variety, the viewpoint of professors in three universities with different characteristics from the establishment of the university, the use and non-use of traditional and combined curriculum, and also having and not having a postgraduate student in medical data was collected. Sampling continued to saturate data (24).

Data collection

For a deeper insight, an unstructured, in-depth, face-to-face interview began with this general question “how do you train the basic medical procedural skills?” and then probing questions such as why, what, where, when are used to get more information about every answer. The interviews were audio recorded. Each interview lasted for 50–70 min.

Data analysis

The interviews were transcribed by the first author. The transcripts of the interviews were analyzed using qualitative content analysis Based on Graneheim and Lundman Approach (25). The phases of study and activities are shown in Table 1. The data collection and analysis were carried out concurrently and each transcribed interview was analyzed prior to another interview.

Trust worth of data

To establish trustworthiness throughout the study (26), interviews were conducted by the first author, and to increase the rigor of the study, all authors were involved in the data analysis. Member-checking was used for exploring the credibility of results.

Ethical consideration

To consider ethical issues, the study protocol was reviewed and approved by the Ethical Committee of Tehran University of Medical Sciences, as an approved committee by National Ethics Committee in Biomedical Research, Iranian Ministry of Health and Medical Education, under the code IR.TUMS. MEDICINE.REC.1395.1688. Participation in this study was voluntary. Written informed consent was completed prior to the data collection and recording their voices. Interviews were conducted in Persian language and in the consent form we have given the participants a commitment that their voice files will be confidential and will be used anonymously.

The time and location of the interviews were determined by agreement with the interviewees.

RESULTS

The participants had an average age of 39.19 with a minimum of 28 and a maximum of 50 years. Other demographic characteristics of participants are shown in Table 2. The findings were based on three main themes: "supervised teacher training under controlled conditions", "Student abandonment for active self-learning in bedside" and "formal training course, lost safe opportunity for teaching-learning of procedural skills" and their subcategories. The research concept map is shown in Figure 1.

Supervised teacher training under controlled conditions

Based on the results, most professors, despite availability of the environment and actual patient, often use skill lab-based teaching, and in some cases bedside teaching, even in the presence of controlled conditions close to skill lab, such as an unconscious patient without a companion, provided that the student is ready. Some of this can be received from the following quote:

"At the beginning of the entry, we teach the skills they need to learn in skill lab".

Due to limitations of clinical education such as preventing patient fatigue, observing morality and preventing patient injury, preventing distrust of the patient and relatives and practicability, reducing student anxiety and time pressure, better planning and training, they prefer skill lab to clinical environment to teach procedural skills, some of which are explained below:

"It's not possible to explain much in bedside, and it is not possible to do it again by the intern ... Because when the procedure is done, it's done and it cannot be done again on the patient like a molasses. I would prefer to teach in skill lab".

Student abandonment for active self-learning in bedside

Although the professors, according to their time of education, teach skills passively in bedside, they confirm competence for post-graduate professional responsiveness, particularly in emergency situations and do not suffice to learn the theory and practice in skill lab. In addition to skill lab teaching, they consider necessary to practice on actual patient, which is noted in the following quotes:

"Teaching procedural skills on a mannequin is work by off car, it is true that it is safe at first, but it can never be like driving on the road. It is definitely more helpful and ethical to teach in skill lab"."Ultimately, procedure on human should be done with actual tissue, situation and conditions. Therefore, teaching should be on actual patient and in the real environment".

It is hard to achieve adequate opportunity of formal education in bedside supervised by professors in order to achieve capability. The

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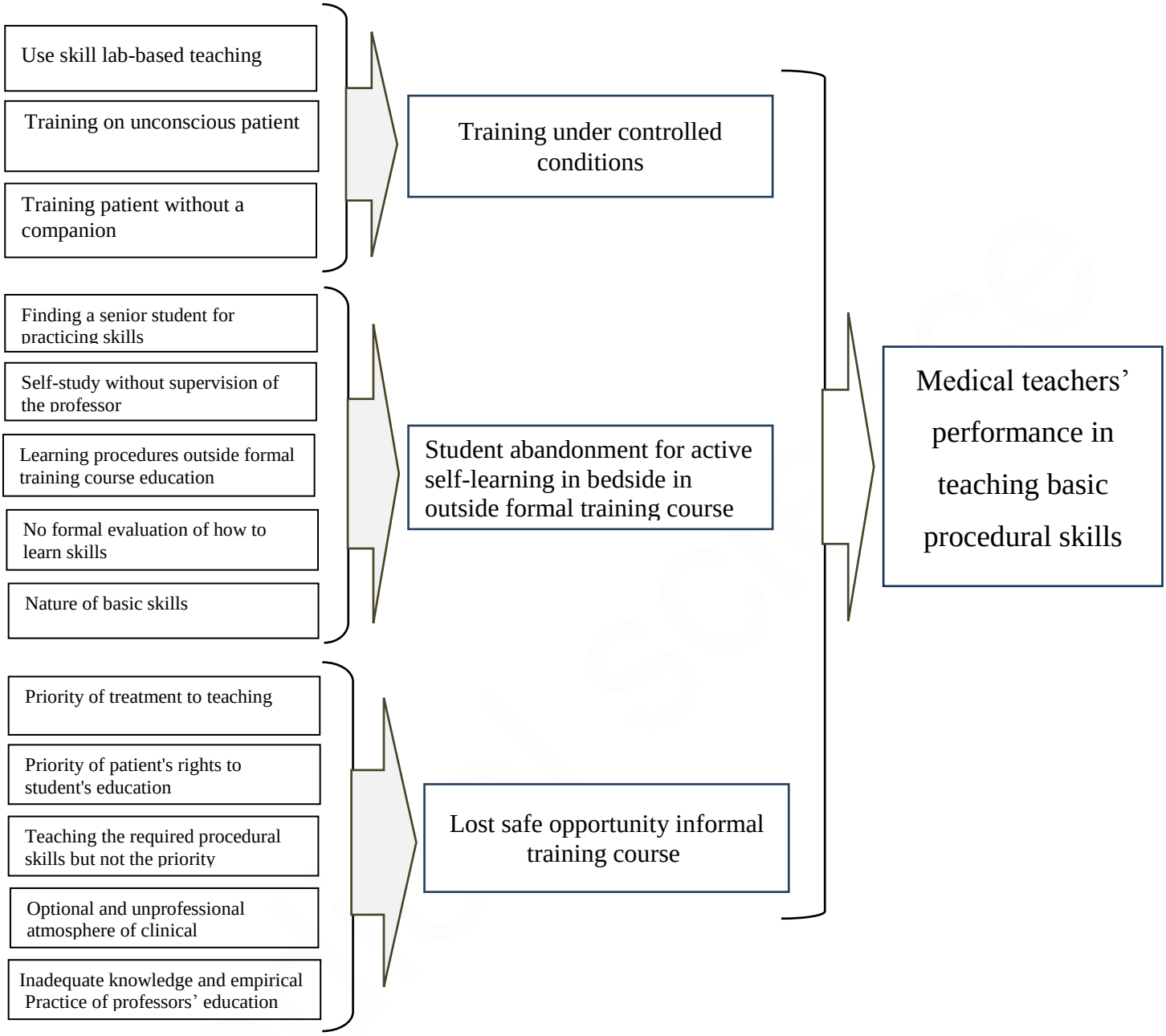

Figure 1 The research concept map

professors consider student activities to use opportunities outside formal education, expecting the student to be supervised by senior students and colleagues and recommending self-study as a way of using opportunities with positive learning outcomes which can be high risk duty of students:

"The opportunity to train interns in bedside is very low, I wonder when was the last time I taught a procedure to an intern, I think it was about a few months ago!"; "not everything a professor can teach. The student should learn a series of skills himself".

"I always say to the stagers that you learn everything, because when you become intern, everyone expects you to do everything no matter you've learned or not." ... of things that help to learn more skills is shift during stager period, particularly in the emergency room, because in an emergency the patient better accepts that the procedure is done by the student".

Because learning is not monitored, it is likely to perform independently without supervision. Therefore, self-study is a "high-risk opportunity" and harmful event for education and patient:

"I gave students the log books and I said that they did not score and really fill them, I saw that they were not analytical! It was a very devastating situation! Everyone who was interested went to someone and learned from him, I took the log books to the meeting and told how bad we teach the procedures."

Self-study without supervision of the professor can be harmful to the patient when the student is free to perform skills:

"I've heard from students that they have learned some of the procedures, such as suture, directly on the patient.""... Do not forget that our educational system in bedside is a trial and error system. Sometimes, due to the lack of time and absence of a professor and student

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Table 2 Demographic characteristics of the participants

Variables	Number(16)	% (100)
Age(year)		
25-30	1	6.25
31-35	3	18.75
36-40	7	43.75
41-45	3	18.75
45-50	2	12.50
Level of education		
High specialist physician	4	25.00
specialist physician	10	62.50
General practitioner	2	12.50
Academic degree		
professor	4	25.00
Associate professor	5	31.25
Assistant professor	5	31.25
Instructors	2	12.50

willingness, the procedure is carried out by a student who is still not well-trained."

Official training course, lost safe opportunity for teaching-learning procedural skills

While students are encouraged and guided into uncontrolled and high-risk self-learning for learning procedural skills in shifts and out-of-curriculum situations in bedside, they lose teaching and learning opportunities in safe conditions. One of the professors says:

"There must be teaching and test, while we do not have systematic training on procedural skills!"

The underlying conditions for this situation are presented in the form of six sub-themes: the nature of basic procedural skills, axial treatment (priority of treatment to teaching), patient orientation (priority of patient's rights to student's education), theory orientation (teaching the required procedural skills but not the priority), optional and unprofessional atmosphere of clinical education system, inadequate knowledge and empirical practice of professors in clinical education.

Nature of basic skills

Professors do clinical rounds to train and practice physical examination, diagnosis, and treatment, but training and performing procedural skills is time-consuming, harmful to the patient and unrepeatable on the patient.

"Skills training is time-consuming, it's not practical, and I have to manage the time, several students can repeat the examination on the patient, but procedures cannot be repeated, for example catheter."

Axial treatment: priority of treatment to teaching

Medical students should receive skill training in teaching hospitals and professors are at the same time clinical specialists in these hospitals. The patients are referred to these hospitals as the most specialized and equipped hospitals in terms of personnel, services and equipment, which are public and cost less, or are sent to these hospitals from other medical centres, in order to receive diagnostic and therapeutic services. Therefore, patients are admitted with priority of treatment rather than teaching; in these conditions, students also need to be trained, but often provide medical services with professors and without sufficient clinical training. These conditions are perceivable in explanations of medical professors:

"We are more involved with treatment; working in the hospital is treatment-oriented using the student .... The student is asked to do routine work, for example, to check vital signs... So the student's education is not a priority. But I want the patient that I am taking to the operating room be ready". "Tonight, I and five residents of different years and five interns should see about 100 patients by the morning; in the morning, I see that I have not practically done any work and all of it was treatment! If the student himself observed and did and learned, he has done it".

Patient orientation: priority of patient's rights to student's education

In this teaching-treatment system, patient is more pivotal than student. In controlling patient-student conflict of interests, the patient's health conditions, which are often emergency and his rights, particularly the right to choose a therapist, satisfaction of the patient and his company for intervention, prevention of injury and fatigue, are systematically prioritized. Patients, regardless of referring to the teaching-therapeutic centre and using the features of these hospitals, expect to receive treatment without teaching use of them to teach students. Therefore, the hospital, professors and patients take the opportunity to teach the students:

"Patients are not satisfied with the students to be taught on them, because they have come for treatment. After all, we are dealing with humans. He may be accompanied, and most importantly, we should be careful about medical errors and human injuries. These concerns do not lead to good and quality education."

Theory orientation: teaching the required procedural skills but not the priority

Although most participants in this study emphasized the importance of clinical education, teaching-learning and evaluation are paramount in theory in clinical education and all of them are concerned with acquiring other medical capabilities, such as decision making, clinical reasoning, and, in particular, diagnosis and treatment interventions as a professional and primary task of physicians and prefer their training to clinical skills:

"Clinical education is the heart of medical education, and in general it has a very important place, but I think our job is to explain the illnesses, their possible abnormalities, and to diagnose them, and we should help students have a proper guide and classifications in their minds for types of diagnosis and intervention".

Optional and unprofessional atmosphere of clinical education system

It seems that in the field of teaching and learning skills, a less-controlled, optional, voluntary and unprofessional atmosphere directs the planning, performing and evaluation process of clinical education:

"The medical education system does not have much effect on learning of procedural skills, someone is responsible for theoretical courses, but for teaching procedural skills in bedside, no one is definitely responsible and there is no clear planning, implementation, monitoring and evaluation system, or it is not practically executed. Now, interns are in many cases free or blindfold in performing procedures".

Therefore, teaching skills is based on personal interests of professors and students and relies on people. Despite the log books and final exams for wards and courses, quantity and quality of learning are not be tracked by professors and the educational system. Moreover, quantity and, in particular, quality of teaching are not controlled, which allowed neglect and even inadequate motivation of professors to teach

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procedures and they delegate this task to colleagues and students themselves:

"The amount of teaching is recorded, for example, morning or teaching round, or the classes we hold, but they are not concerned with their quality, teaching method, etc. The same part of the training for which the forms are filled in are never influential! Therefore, training depends on teacher's interest or regulations of the ward and the manager of the group".

Inadequate knowledge and empirical practice of professors in clinical education

Despite the fact that professors have high degrees in the field of medical specialization, most of them are not specialized in clinical teaching, and this has led to continuation of teacher-student education:

"Many of the professors have not received classical and formulated education for teaching. Teachers and residents teach in a way that their teachers taught, or think that is good."

This limits the ability to use existing opportunities for clinical education and ineffective educational, and in some cases harmful and immoral efforts to create educational opportunities using skill labs, anesthetized and alone patients, emergency conditions of patients, or request for collaboration from senior students and particularly residents and nurses, and reduced feedback, particularly about mistakes in the presence of the patient. For example, a professor says:

"When I go to the patient's bedside, I tell the patient that my colleague wants to get you blood pressure or an ECG, I also tell students that in the bedside, I will not talk about your mistakes, because the patient will not trust you, thus, be careful".

DISCUSSION

This study was conducted to explore the performance of professors in teaching basic procedural skills to general medical students in bedside. The findings were presented in three main themes.

Based on the results, professors often tend to use skill lab or bedside teaching in controlled conditions to teach basic procedural skills. To achieve competency, novice students practice their skills on real patients through informal, unguided, unplanned and unsupervised self-learning and formal clinical teaching is less considered, which is similar to that of other universities (2-6, 27, 41-43). Bedside teaching, which was one of the most commonly used methods of medical education until the 1960s, has been subjected to a gradual decline to classroom-based education (28, 29). Instead of completing bedside teaching, technology and simulator-based skill labs are replacing it and reducing the opportunity to teach students on the patient, and even if there are proper patients, teaching is not done on the patient (20,21,27), for reasons similar to those found in other studies such as ethics, safety and patient health (22, 30), the ability to control time and repeat the appropriate practices (13).The purpose of using simulations is to teach in a safe and proper environment before entering the clinic; often simulations are not real enough and do not show actual consequences of the intervention (27). The professors in this study, similar to other studies, preferred simulation-based teaching while emphasizing the importance of clinical education in actual learning of students. Bedside teaching is an active, less controlled method which requires effort, energy, and time to find the right patient and participation (14). According to Kneebone, learning skills occurs in three stages: 1) learner-centered practice focusing on skill acquisition, goals and steps; 2) patient-focused simulation under direct observation with feedback to develop learning and simultaneous practice of other skills, such as communication; and 3) integration of procedures on the patient to achieve mastery. When using the See one-do one model, these procedure learning stages do not occur; therefore, skill lab teaching or procedural observation cannot be considered as skill learning (31) and cannot provide the necessary confidence and competence to conduct a procedure on the patient (1, 4).

As the professors pointed out in this study, and in other studies, non-structured teaching, accompanied by encouraging students to self-learn skills and abandoning them without guidance, supervision and evaluation is associated with potential injury to the patient and reduces the quality of learning and leads to student dissatisfaction (1, 2).

Among basic practical skills, structured skill training based on bedside with feedback has shown the most effect on learning.

Structured skills training, different instructors, simulation, self-guided learning, multimedia were different types of educational practices. Moreover, teaching by faculties was better than other groups. In general, active structured teaching methods can be more effective than unstructured and observational methods (32). In directed self-guided learning, the learner has a specific plan for learning, and see one-do one-teach one and follow-up and supervising are effective in learning (33, 34, 43).

Participants in this study pointed out some problems that caused the loss of educational opportunities under supervision in bedside at the time of formal education. Procedures are often unrepeatable for patients, and most professors often do not have the tendency to teach them on patients for potential injury (35).

There is treatment-oriented and patient-oriented approach in the teaching hospitals affiliated to the studied universities, which leads to focus of the patient, the teacher and, as a result, the student on treatment rather than education. Although even in educational hospitals, patient care is a priority (36), the patient should expect examination and intervention by the student (8). For professors, patient disagreement is a reason for not teaching the procedures on the patient. It also seems that the professors do not make a serious effort to integrate patient treatment and teaching of procedural skills; in conflict of interests of patients, their fellows and their demands, it seems that the professors support patient interests by avoiding patient-based teaching, in particular, to prevent injury while the professors are responsible for teaching students. But they allow unofficial self-learning without a supervisor and, as noted in other studies, they cause more harm done by unskilled students and graduates (1, 2). One of the main reasons for weakness of clinical education is the professors (37). They consider their primary task as treatment of patients (38). However, if clinical education is conducted in proper conditions and in accordance with patient's and student's rights, both students and patients are satisfied with the training (39). It should be noted that clinical professors are responsible for education, care and treatment of the patient (40). They often do not act professionally in teaching, looking at it as part of the job and not their profession (7).

The need to learn and teach basic skills as a task is a new change; traditionally, medicine has focused on diagnosis and treatment (17). Among the 19 necessary subjects for teaching physicians, medical education is the ninth priority, while promotion and delivery of health services is at the top of the list (38). Teaching skills is at the bottom of this list (4).

An unstructured and optional educational system in which professors and, consequently, students had no certain program and performance is not monitored is likely to weaken the implementation of tasks. In another study, most students were abandoned in performing procedures and students spent many hours in wards with no plan. Students demanded the planned education. Professors also say that they

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are very busy with other tasks than teaching (7). Teachers need to spend time and energy for proper training and teaching procedural skills should be a professional task of professors (37). Lack of learner participation and patient's unwillingness are clinical education problems (14). Since most doctors in hospitals teach students, they have not been taught for teaching. They learned teaching experimentally. A medical teacher should be available at stressful situations and support the student for professional success and monitor and evaluate his activities. At the same time, the teacher should performs his clinical, research and administrative tasks. Clinical and educational tasks should not be competitive, and it is necessary to organize the teaching and avoid assigning tasks to colleagues (15).

Limitations

The results are also based on faculties' experience. Therefore acquiring experiences other participating people in teaching the medical students for creating more comprehensive perception is recommended.

CONCLUSION

According the results, participation and supervising of faculties in teaching basic clinical skills in bedside, is not enough related to some factors in three Universities. Based on the results, the participation and supervision of faculty members in training clinical skills is insufficient in the three studied universities. Self- learning, in spite of high risk, is recommended to the student. Although the necessity and the course of the program of training these procedures to the general medical students need to be further investigated, but the results of this study may be considering for developing teaching basic clinical skills for medical students with similar situations.

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