A qualitative study about critical appraisal of medical literature learning among medical students

Une étude qualitative à propos de l'apprentissage de la lecture critique d'articles médicaux chez les étudiants en médecine

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Abstract

Introduction: Skills in critical appraisal of medical literature are compulsory to achieve in medical practice. This step is the third step of the evidence-based medicine process whose main role is to bridge a gap between scientific evidence and practice. Acquiring skills in critical appraisal of the literature has been reported to be challenging for the trainees with different limits according to their levels, backgrounds or specialties.

Aim: To assess the limits and factors influencing the practice of appraising literature of different students from the same faculty. This faculty included training of biostatistics and preventive medicine in the curriculum during the first 2 years of medical education without linking this learning to the evidence-based medicine practice.

Methods: The authors performed a qualitative study including volunteers who attended voluntarily the same training about critical appraisal of medical literature. The study was based on a satisfaction questionnaire fulfilled by all the participants at the end of the training and on an individual semi-structured interviews programmed 3 months after the training. The satisfaction questionnaire was rated by the authors. The authors proceeded also to a content analysis of the interviews following 3 steps: pre-analysis, treatment of the results, and interpretation.

Results: All the participants (95) fulfilled the questionnaire. The satisfaction's mean score revealed a general moderate satisfaction. Eleven students agreed to be interviewed: Five students from the third year of medical education, 2 students from the second year of medical education, 2 postgraduate students and 2 family doctors. The main themes discussed by the interviewees consisted of training organization, the assessment, the impact on research and the impact on the care process.

Conclusion: To promote EBM learning, medical students first need to actively participate to interactive learning, introduced early and gradually into the curriculum and integrating all specialties including postgraduate students.

Key words: Critical appraisal of medical literature, evidence-based medicine, qualitative study

Résumé

Introduction: Acquérir des compétences en lecture critique d'articles médicaux est obligatoire dans la pratique de la médecine. Cette étape est la troisième étape de la médecine basée sur le niveau d'évidence qui a pour principale mission d'établir un lien entre les preuves scientifiques et la pratique. Acquérir des compétences en matière de lecture critique d'articles médicaux a été décrit comme étant difficile par les apprenants avec des limites dépendantes de leurs niveaux, pré-requis ou spécialités.

Objectif: Mettre en évidence les facteurs influençant la pratique de la lecture critique par des étudiants de la même faculté. Au sein de cette faculté, l'enseignement des bio-statistiques et de la médecine préventive a lieu essentiellement pendant les 2 premières années sans établir de liens évidents entre cet enseignement et la pratique de la médecine basée sur le niveau d'évidence.

Méthodes: les auteurs ont colligé une étude qualitative incluant des apprenants volontaires qui ont assisté à la même formation centrée sur la pratique de la lecture critique d'articles médicaux. Tous les participants ont rempli un questionnaire de satisfaction à la fin de la formation. Les réponses aux questionnaires ont été évaluées quantitativement par les auteurs. Par ailleurs, les auteurs ont mené des entretiens individuels semi-structurés, programmés 3 mois après la formation. Les auteurs ont procédé à une analyse par contenu en suivant les 3 étapes de pré-analyse, traitement et interprétation.

Résultats: Tous les participants ont rempli le questionnaire de satisfaction. La moyenne des scores attribués était corrélée à une satisfaction modérée des participants. Par ailleurs, onze étudiants ont été interviewés : 5 en DCEM1, 2 en PCEM2, 2 en DPC et 2 médecins de familles. Les principaux thèmes abordés par les étudiants étaient l'organisation de l'enseignement, l'évaluation, l'impact sur la recherche et l'impact sur le système de santé.

Conclusion: afin de promouvoir l'enseignement de la médecine basée sur le niveau d'évidence, les étudiants ont initialement besoin de participer activement à un enseignement interactif introduit assez tôt dans le curriculum et de manière progressive dans tous les niveaux et incluant toutes les spécialités.

Mots clés: lecture critique d'articles médicaux, médecine basée sur le niveau d'évidence, étude qualitative

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INTRODUCTION

Acquiring new competencies in the medical field represents a challenge. The mission of any Faculty of medicine is to help learners acquire new competencies in order to be able to practice in their particular professional context. Concerning the students in medical field, the learning process aims to acquire different competencies in order to act as professionals and to answer the society's needs. The mission of the Faculties of Medicine of Tunisia was defined by the law 2008-19, the 25th February 2008. This mission consists of tutoring doctors who are able to practice medicine according to the most recent recommendations of science and to answer the different problems of the society.

This mission highlights the necessity of change and flexibility in learning according to the society's needs. The learners in clinical settings need to develop the competency of self-directed learning, which is defined as the capacity of achieving a new knowledge according to once needs and to the different situations faced in professional conditions. The learner in the medical field needs to acquire the competencies of self-directed learning and of clinical reasoning in order to solve the different health problems of the society. Clinical reasoning process is complex and includes hypothesis generation, pattern recognition, context formulation, diagnostic tests interpretation, differential diagnosis and diagnostic verification (1). It is a mandatory competency to achieve in the medical curriculum. The concepts of learning in clinical settings, self-directed learning and clinical reasoning represent a trigger for a new practice in medicine called: evidence-based medicine. It is a widely used concept that aims to bridge a gap between evidence and practice rather than clinical impression, expert opinion or tradition (2). Solving medical problems is a mainstay in medicine and necessitates linking medical practice to scientific background. This process contains 5 steps consisting of facing a clinical problem, formulation of the medical problem into an accurate and clear question, critical appraisal of medical literature, assessment of the validity and applicability of the articles' conclusions and the global assessment of the process. The third step of the EBM process consists of the critical appraisal of medical literature. It was the most assessed in the literature because it needs cognitive and technical abilities. In a questionnaire-based study, Hadley et al. assessed the needs of residents from diverse specialties concerning critical appraisal process and reported that 77.6% of the respondents pointed out their need in achieving such a competency (3). Godwin M et al, reported in a questionnaire-based study that early practitioners are more sensitive to learning EBM principles than experienced practitioners (4). Other factors influencing the learning needs in EBM have been reported such as gender, fundamental science knowledge, the experience in research and specialization. The assessment of critical appraisal competencies has been based mainly on cognitive tests or self-assessment tests or satisfaction tests. Even if the tests assessing these competencies varied in the literature, few studies assessed the impact of such a learning on the care process. Assessing the impact of pedagogical techniques is always challenging because there is no consensual delay between the assessment and the training period in the literature, besides, it is always difficult to establish the influence of a new learning on the relation patient-doctor and the process of care. In our Faculty, EBM principals aren't included in the curriculum. Many courses dealing with methodology, statistical tests, and preventive medicine are performed during the first (theme 7) and second years (theme 15) of medical studies, but they aren't linked to the EBM practice. In order to assess the needs and impact perceived by the students concerning the practice of EBM, the authors performed a qualitative study including undergraduate and postgraduate students from the same Faculty.

METHODS

The authors performed a qualitative study based on individual semi-structured interviews. Besides, the participants fulfilled a questionnaire assessing their satisfaction concerning the program, the duration of the training, its impact on their practice or the training environment.

Participants:

The participants were students from different levels from the same faculty and who attended the same training centred on critical appraisal of medical literature. Participants agreed voluntarily to participate to the study. The study was dealt from September 2020 to June 2022. Concerning the training centred on critical appraisal of medical literature, all the students from the second year of medical education (SYME), third year of medical education (TYME) and postgraduate students were invited using their institutional e-mails. They were aware that the training wasn't included in their curriculum and that the assessment performed wasn't normative. Family doctors (FD) that were registered in the certificate of Family medicine held in the same Faculty were also invited using their institutional e-mails. 95 participants were included in the training with 76 women and 19 men. Six participants (6.3%) were in SYME, 54 in TYME (56.8%), 16 in CME (16.8%) and 19 participants were FD with a minimum of 10 years of expertise (20%). All the students were asked to fulfil the satisfaction questionnaire at the end of the training. Besides, Among the 95 participants included in the training, volunteers were asked to answer to an interview at the end of the training.

Learning activities:

All the students interviewed received the same training in critical appraisal of medical literature. The students were invited to participate to a 9-hour-workshop centred on the critical appraisal of medical literature. All the workshops were tutored by the same tutor and the students were grouped according to their level. The students were invited to appraise 2 original articles dealing with covid-19:

Article 1: Hydroxychloroquine in Non hospitalized Adults With Early COVID-19. A Randomized Trial. Skipper CP, Pastick KA, Engen NW, et al. Ann Intern Med. doi:10.7326/M20-4207 (5)

Article 2: Diagnostic accuracy of serological tests for covid-19: systematic review and meta-analysis. Bastos ML, Tavaziva G, Abidi SK, et al. BMJ 2020;370:m2516 (6).

During the workshop, the students were introduced to elementary statistical concepts they learned during the first cycle of medical education through the correction of a prerequisite test, some lectures and 2 problematic situations to solve. The students were asked to perform a critical appraisal of both manuscripts in order to answer particular clinical situations that were presented, using published checklists. Both manuscripts represented the evidence to appraise in order to answer 2 problematic situations.

The critical appraisal of both manuscripts was performed following 3 steps. The first step consisted of assessing the validity of the methods' section. The second step consisted of analysing the results. The third step consisted of answering the research question. The students used the CONSORT checklist 2010 in order to appraise the first manuscript and the AMSTAR 2 checklist to appraise the second manuscript.

Satisfaction questionnaire:
After the workshop, the participants were asked about their personal implication during the training, the competencies achieved and the teaching methods used by the tutor. The seven likert-scale questions assessing the participants' satisfaction were as follow:

1- You are globally satisfied by the workshop
2- The duration of the workshop seemed to you: too long, long, adequate, short or insufficient
3- The environment was adequate to teaching
4- Your personal implication into this teaching was adequate
5- The tutor's intervention was efficient
6- The manuscripts used during the workshop were adequate
7- You perceive, after this workshop, that you reached new competencies

The questionnaire was sent online to the participants through google-forms.

Interview and data collection method:
Three months after the workshop, the participants were invited to answer a semi-structured interview. The interviews were conducted in a private room. Each interview was recorded after obtaining consent from the participant. The interviewer asked only a few predetermined questions, while the rest of the questions were not planned in advance. The predetermined questions concerned the workshop's impact felt by the students, their feelings about the training, their self-confidence about their competencies in that matter and the improvement in the management of their patient secondary to this workshop.

Data analysis:
Concerning the interviews, we proceeded to a content analysis following 3 steps: pre-analysis, treatment of the results, and interpretation. Two researchers (MM, FM) analysed most of the text data. MM first performed coding of data. Then, the other authors confirmed the contents. The themes were extracted inductively after the data were obtained. The coding process was carried out each time an interview was conducted.
Concerning the satisfaction questionnaire, the participants were asked about their general satisfaction, their perception of the tutor's expertise, the educational environment, the duration of the workshop and their perception about their competencies concerning the critical appraisal of medical manuscripts. All the questions were likert-scaled. The authors considered scores between]21, 28[as correlated to a high satisfaction, scores between]14, 21] correlated to a mild satisfaction and scores under 21 correlated to unsatisfaction.

Ethics:
The present study has been conducted according to the principles of the Declaration of Helsinki. Ethical approval for the study was obtained from the ethics committee of a University Hospital (Ref 07/2022). Also, participants were made aware of the purpose of the study, the anonymous nature of the purpose, the anonymous nature of the dataset generated, and the option to not respond if they so wished. This information served as the basis for an informed consent from each respondent.

RESULTS

The semi-structured interview results:
Eleven students gave consent to be interviewed: Five students from the TYME, 2 students from the SYME, 2 postgraduate students and 2 FD.
The content analysis highlighted 4 themes including the training program, the institutional assessment, the impact on the research practice and the impact on the patients' management. We detail the 4 themes below providing supporting quotes from the interviewees with information about their levels. Table 1 illustrates the analysis of the different themes.

Table 1. The different themes described by the students.

Themes	Categories	Number of students
Training program	1- Techniques used Traditional learning Team-based and case-based learning 2- Duration 3- Organization of the curriculum 4- Adequate time to introduce the learning process 5- Steps of the critical appraisal practice	8 students (M1, M4, M5, S1, S2, C2, F1, F2)
The institutional assessment	1- Assessment of the critical appraisal practice	4 students (M2, M3, S1, S2)
The impact on the research practice	1- Utility of the critical appraisal practice in preparing the thesis 2- Utility in the continuing medical education progression	3 students (M5, S1, S2)
The impact on the patients' management.	1- Improvement in self-motivation 2- Improvement of patients' health	5 students (M5, S1, C1, F1, F2)

The figure 1 illustrates the word-cloud of the different interviews. The most cited words were: training, medical assessment, think, curriculum and techniques.

Figure 1. The word-cloud of the different interviewees

Training program

Teaching organization
Comments concerning the teaching organization varied according to the students' levels. Students from the SYME, CME and FD agreed that the workshop structure and length were available and motivating. TYME students felt that the workshop was too long and expressed the need for shorter but multiple learning sessions. One interviewee expressed her feeling about the length of the workshop. Student M4 is a student in the TYME. The particularity of

her speech concerned the duration of the workshop: »The training was very interesting but it seemed not interesting to me in the third year of medical education. I appreciated the interaction with the tutor. The training was too long. I was concentrated at the onset but not at the end. The training should be divided into 2 training sessions and won't interest the students because there is no assessment of this practice in our faculty. A 9-hour workshop is too long.»
Another student expressed his disappointment due to its unsatisfied needs in the Faculty. Student S1 is a student in the SYME. His speech highlighted an important unsatisfaction towards the curriculum: «I was delighted about this training. In other faculties, this practice is introduced early in the curriculum and medical students are involved in the research projects performed by the different laboratories of the Faculties of medicine but not in ours. I'm desperate about the fact that the curriculum doesn't meet my needs. Why we don't teach and assess this skill in our Faculty? I'm sure that this kind of learning will improve the management of the patients in the future. I would like to be involved in other training lessons like this. I'm more used to transmissive methods of teaching in the faculty and I'm not sure that the priority of the teachers is to help us and motivate us in the research field».
An interviewee expressed his desapointment due to the lack of time to appraise the medical articles. Student C1 is an orthopeadist who teaches in the Faculty: «I was involved in other training sessions about critical appraisal of medical literature. Desperately, I didn't find enough time to improve this competency but I'm convinced of its benefits in the management of the patients».
A FD interviewee pointed out the lack of training in critical appraisal of medical literature into many specialties, especially in family medicine. Student F1 is a Family Doctor who has been practicing for 10 years. Her speech was characterized by a feeling of lack of involvement into special training by the Faculty: «The training session was very interesting even if dealing with articles in English, which is less familiar to me than French, was very challenging. I found this kind of tutoring interactive and I hope we'll be involved in more training sessions like this. As a Family doctor, I feel that the faculty should pay more attention to our needs in the field of evidence-based medicine because this practice is able to improve our management of the patients' problems».

Teaching techniques
The students appreciated the use of interactive techniques that enhanced their participation and engagement. Student S2 is a student in the second year of medical education. Her speech was characterized by a satisfaction due to the use of interactive methods during the training: «I was excited by this training. I used to face negative reactions from the different tutors of the Faculty when I was asking about the difference between conferences and articles or asking to be involved in the research field. In the other faculties of medicine, students are compelled to perform research works and they are evaluated and their knowledge is assessed. Besides, they add them to their curriculum. I would be delighted to do a training period in order to achieve the competencies needed in the research field. This training changed my view of teaching inside our faculty. I think it needs to be integrated early in the curriculum but not as a unique workshop. Our knowledge about biostatistics seems insufficient to me and it is delivered to us without pointing out its utility in the field of critical appraisal of medical literature.»
Using interactive techniques in this training reinforced the motivation and positive attitudes according to some students. Student M5 is a student in the third year of medical education. Her speech was characterized by a positive behaviour and motivation: «I was very motivated by this learning. I appreciated the use of interactive methods with some softwares. It was a new method to me and it was different form the traditional learning techniques we're used to in the faculty. I will be more interested in the research field and I'm sure this will help me manage the patients in the future».

Steps used to appraise medical literature
Some students appreciated the scenario-based learning and the steps followed to appraise the literature. The FD interviewed appreciated the 3-step-method used to appraise medical literature. In fact, the first step consisted in assessing the validity of the article. It consists in analysing the methods used. The second step consisted in analysing the results and the third step consisted in wondering about the applicability of the results to the problematic situation used. Student C2 is an ophtalmologist who teaches in the Faculty. His speech was characterized by a motivation induced by the use of the scenario-based problems during the training session: «I liked this session about critical appraisal of medical literature. The teaching techniques used, especially the use of scenario-based problems seemed very interesting. I don't appraise medical literature frequently but this training motivated me to improve this skill.»

The institutional assessment
The institutional assessment was expressed differently according to the students' levels. Students from the TYME expressed the need for institutional assessment: «there is no institutional exam allowing us to assess our competencies. All of us are centred on the exams and felt that we were wasting our time because we were dealing with notions that aren't included in our curriculum». Students from the SYME expressed their wish to attend more certified courses about EBM. Student M2 is a student in the TYME. The main theme spoken about concerned the absence of assessment, reason why she couldn't understand the relevance of the training: «We asked why did you do this training during this year. I felt that this training would be helpful in the context of continuing medical education. We aren't going to read medical articles during our undergraduate period. Besides, there is no assessment of our critical appraisal competencies during the undergraduate period».
Another student linked a gap between the assessment and the motivation. Student M3 is a student in the TYME. She was demotivated because of the absence of assessment: «I was annoyed by the initial part about biostatistics. I discovered Pubmed and I used to use only google. I changed my habit of search for scientific information but this training didn't motivate me. There is no assessment of this practice in our faculty so I'm wondering about its utility».

The impact on the research practice
The impact on the research practice was mentioned differently according to the students' levels. TYME students didn't understand the impact of such a teaching on the research practice: « we need all the principles of critical appraisal when we'll be enrolled in research projects and this will happen in the future years. At that time, we'll forget all what we've learned about critical appraisal of medical literature». The other students agreed that improving their competencies in EBM will motivate them to be enrolled or to conduct research projects in the future. One student realized her lack in critical thinking potential after this training. Student M1 is a student in the TYME. She was the only student who pointed out her self-desappointment about her critical thinking abilities: «The workshop was too

long. I was motivated at the beginning than I became demotivated. I felt that the workshop was necessary in order to allow me appraise articles. I arrived late and I sited in the back. I couldn't hear you very well. The initial part about statistics was very interesting. I think that the tutoring period has to be shortened. I discovered that we had to discuss the informations delivered by the articles. I'm not used to think about the validity of the information delivered by tutors».

The impact on patients' management

Concerning the impact on the patients' management, SYME students, CME students and FD agreed that this learning will improve their patients' management. The TYME students expressed that they weren't aware of the impact of this learning on the patients' management: «we are more interested in passing the exams than in thinking about the patients' management». Other students reported that acquiring and improving skills in critical appraisal of medical literature should improve the patients' management. Student F2 is a FD who has been practicing for 15 years. She was convinced that she'll improve her management of the patients thanks to the critical appraisal practice: «The training session was very cool. I liked the interactive techniques used but I wasn't able to understand all the English articles. Appraising medical literature by starting with the assessment of the validity followed by the analysis of the results and searching for their applicability to the patients seemed a very interesting manner to appraise manuscripts and I think I'm going to repeat this experience by myself. I'm sure this kind of practice will improve my management of the Health problems.»

All the themes highlighted by the students are represented in Figure 2. They identified their needs in integrating EBM principals into the curriculum and focused on the necessity of multiplying the learning opportunities with appropriate duration. They also put emphasis on the necessity of using active learning techniques that make them aware of their needs and objectives using scenario-based learning sessions. Integrating teaching of EBM principals into the curriculum implies an assessment, which seems necessary to motivate the students. This assessment will highlight further impact of this training on the research practice and the process of care.

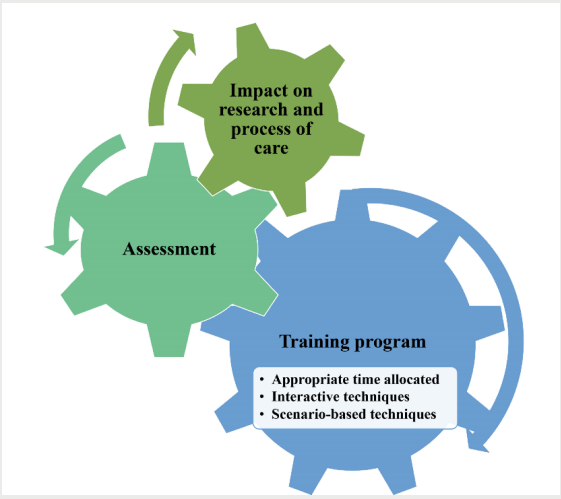

Figure 2. The framework linking the themes described by the interviewees: training organization, the assessment, the impact on research, the impact on the process of care.

The results of the satisfaction questionnaire

All the participants (95) fulfilled the questionnaire. The satisfaction's mean score reached 16.842/28 revealing a general moderate satisfaction. Twenty students (21.1%) were unsatisfied, 19 students (20%) were moderately satisfied and 56 students (58.9%) were highly satisfied. The figure 3 illustrates the different students' scores. The means' scores reached 26/28 in SYME, 12.98/28 in TYME, 18.37/28 in CME and 23.63/28 in FD highlighting a high satisfaction in SYME and FD, an unsatisfaction in TYME and mild satisfaction in CME.

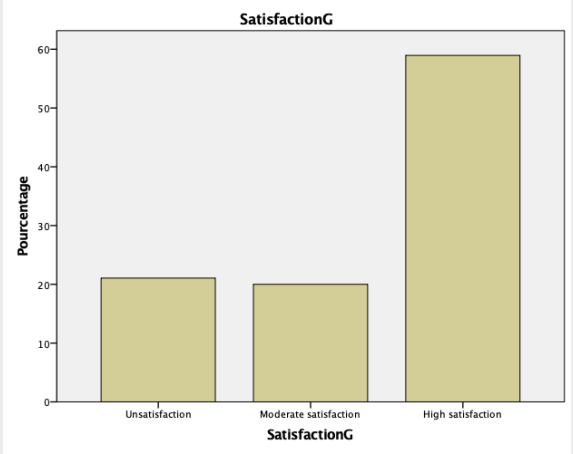

Figure 3. Satisfaction scores of the different students

The figure 4 illustrates the different scores according to the students' levels.

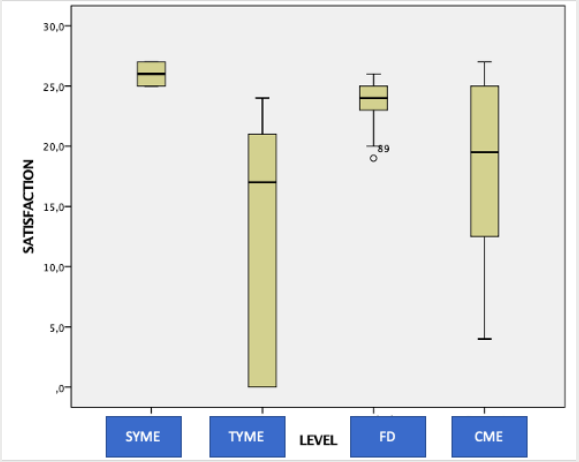

Figure 4. The satisfaction score means according to the level

SYME: Second year of medical education, TYME: Third year of medical education, FD: Family doctors, CME: Continuing medical education

DISCUSSION

In this study, we aimed to assess the needs and impact perceived by the students concerning the practice of EBM. We performed a qualitative study including undergraduate and postgraduate students from the same Faculty. In that Faculty, teaching evidence-based medicine wasn't included in the curriculum. The students used to receive training on biostatistics and preventive medicine during the first two years of medical education. This teaching wasn't contextualized or centred on realistic situation putting emphasis on the necessity of practicing EBM principals when facing foreground questions. In our study, the satisfaction mean's score highlighted a general moderate satisfaction with a high satisfaction in the SYME, CME and FD and an unsatisfaction in TYME. These results may be explained by the qualitative study data in which the TYME students expressed their feelings of usefulness concerning the training especially because of the absence of assessment. Four themes were highlighted by the students including the training organization, the necessity of

an institutional assessment and the impact of such a practice on research and the process of care. In a qualitative study performed by Kataoka Y, et al. the authors extracted five themes consisting of finding foreground questions, observing role models, active learning, understanding patient backgrounds and understanding the reason for learning EBM (7). The authors focused on the necessity of explaining to the trainees why they have to practice EBM before tutoring them to use the different necessary skills. The difference between Kataoka Y, et al's results and ours could be explained by the fact that we interviewed students and Kataoka Y, et al interviewed educators. Students are more likely interested in passing the exams and the assessment is the only way to achieve that. In a systematic review of quantitative studies dealing with doctors' perceptions of EBM, Maartje HJ, et al. described other themes including variety in individual mind-set, lack in EBM competencies and the difficulty of achieving a balance between confidence and critical reflection and differences in groups norms. The latter has also been reported by Wilson A, et al. who put emphasis on the necessity of a collaborative learning (8). The differences in themes with our results could also be explained by the fact that all the doctors included in these studies were residents or general practitioners. This fact could also explain the fact that in that reviews, the interviewees put emphasis on the necessity of learning at the bedside than standalone EBM courses (9). Concerning the training organization, the students included in our study put emphasis on the necessity of introducing this training early and gradually in the curriculum in order to achieve an integrative approach. In the early 80's, Radack KL, et al. used a problem-based learning to teach EBM skills. They used problem-oriented materials to cover specific areas consisting in clinical measurement, diagnostic testing and evaluation of therapeutic efficacy and clinical traits. These materials were distributed in advance and consisted in a written case scenario posing a clinical problem, a copy of a relevant article and review of methodologic criteria pertinent to the specific topic. The students assessed the validity of the informations driven by the manuscripts, their applicability to the clinical practice and then recommended the proper use of the therapeutic issue. The authors concluded that the method used was efficient and available for the training of students in the second year of medical school (10). Maloney MD, et al. used the journal club (a kind of lectures associated to exercises) in order to introduce paramedic students to research fundamentals and critical appraisal of medical literature (11). They developed a fourth-part journal clubs. The first three journal club sessions were divided into a 30-minute lecture followed by a 90-minute interactive class discussion. The topic was chosen by the class and they were provided with related articles. This step aimed to discuss the differences between randomized controlled trials, reviews, case studies and letters to the editor. The second part was centred on a new class-chosen topic. They were provided with a related trade magazine article and were asked to discuss the article's sources after being introduced to the process of peer-review and publication. During the third session, the students chose a new topic and were asked to find, download and send a PDF of a peer-reviewed article to the educator. The latter gave statistics lectures then critiqued the results section of the articles found by the students. During the fourth session, the students were asked to present a self-interest-topic manuscript during no more than 5 minutes. After these sessions, the authors reported an increased self-reported ability to find, evaluate and apply medical research articles based on a self-confidence questionnaire. Moharari RS, et al. used also the journal club to teach critical appraisal and statistics in anaesthesia journal club (12). The authors chose only randomised controlled trials and programmed 2 one-hour journal clubs a week. Every student presented the aim of the study and the main results during the first 10 minutes, then the tutors focused on the principles of the critical appraisal practice and major statistics principles and the students were asked to use the CONSORT checklist in order to evaluate the manuscript (13). The authors reported a residents' awareness in the application of the information as well as the research methodology (12).

Marusic A, et al. reported a lecture and problem-based learning developed in Zagred University School (14). The program consisted in lectures (total of seven class hours) centred on scientific reasoning, planning and conducting research in medicine, finding information in medicine, scientific writing and responsibility in conducting the research. The lectures were followed by medium-sized group discussions (six class hours) about EBM, designing a study and critical appraisal of medical literature. The discussions were followed by a problem-based learning (12-class hours) centred on the search and selection of medical information, presenting research results, writing a structured abstract and discussing case studies in responsible conduct of research. Rohwer A, et al. developed an online postgraduate module on EBM (15). The authors dedicated 2 weeks to the introduction to EBM and phrasing questions, 2 weeks to searching the literature, 6 weeks to appraise the literature using the GATE framework, one week to consider application of evidence in practice and one week to the final assignment. The authors assessed the students' attitudes and self-confidence and concluded that the students had positive attitudes but needed more support from the tutors.

Maggio LA, et al, reported in a qualitative study the necessity of teaching basic principles using simple examples of medical decision making and the scientific method applied to the study of medical science during the first 2 years of medical school followed by a gradual progression of learning from lower to higher degrees (16). Planning the training to EBM skills has to adapted to the different students' levels. In our study, the students' needs varied according to their levels. Undergraduate students were more interested in lectures and courses and postgraduate were more interested in bedside learning because of the lack of time. The lack of time was also pointed out in a qualitative study performed by Zhao et al, including general practitioners (17). Concerning the assessment of EBM skills, the students weren't interested in the techniques to use, they only pointed out the necessity of an assessment in order to motivate them. This fact highlights the absence of intrinsic motivation. In fact, even if, the students perceive the impact of such a training on the research practice and the process of care, they are dependent on the assessment to be motivated. This may be explained by the competition culture reigning into the majority of the Faculties of Medicine in the country. There are several limitations to this study. One is that the number of participants (n=11) was small even if it has been reported that a sample of approximately 12 people is needed for a relatively homogeneous population (18). If we increase the number of participants, we will deepen our findings.

CONCLUSION

To promote EBM learning, medical students first need to actively participate to interactive learning, introduced early and gradually into the curriculum and integrating all specialties including postgraduate students. Introducing normative assessment was considered by the students as a trigger for the EBM practice. On the other hand, they were

conscious of the implications of this practice on the research and process of care. This fact puts emphasis on the necessity of including teaching techniques able to increase the intrinsic motivation of the students and their sensitivity to situations promoting EBM practice.

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