



UNDERGRADUATE MEDICAL STUDENTS' AWARENESS AND PERCEPTION OF BARRIERS TOWARD EVIDENCE-BASED MEDICINE, EASTERN PROVINCE, SAUDI ARABIA; 2015 – 2016

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ABSTRACT

Introduction

Teaching Evidence-Based Medicine (EBM) is an essential part of developing competent future physicians. This study was designed to assess the level of knowledge, attitude, and perception of barriers to EBM among undergraduate medical students in the Eastern Province of Saudi Arabia.

Methodology

This was a cross-sectional descriptive study conducted through a modified self-administered questionnaire adapted from EBP questionnaire and was validated by the researchers. The questionnaires were distributed to the undergraduate medical students in their clinical years at King Faisal University (KFU) and University of Dammam (UOD) during 2015-2016. Data were entered and analyzed using SPSS program.

Results

Out of 1035, 738 students filled the questionnaire with a response rate 71.3%. The students in the study are found to have poor EBM knowledge ($\mu=3.4919$, $SD=\pm 1.99$). More than half (62.7%) of the students strongly agree on the importance of EBM implementation in the clinical practice. Most of them believe that their patients have the ability to be involved in clinical decision-making and clinical trial studies. When the recent evidence contradicts the clinical judgment of the future physicians, 65% of the students choose to evaluate the evidence. Half of the students strongly support EBM introduction into their medical curriculum, and the majority of them show the intention to use EBM in their future practice. Lack of EBM education at the university level is noted as a barrier by most of the students (30.6% strongly agree, 31.3% partially agree), followed by lack of encouragement from teachers to attend EBM courses (26.2% strongly agree, 33.9% partially agree).

Conclusion

There is an overall low level of EBM knowledge among the participants. However, their attitude toward EBM is positive. The most cited barriers to EBM use are lack of educational courses at the university level and lack of teachers' encouragement to attend EBM courses.

KEYWORDS

EBM; evidence-based medicine; knowledge; attitude; barriers; undergraduate.

INTRODUCTION

Evidence-based medicine (EBM) is defined as "the conscientious, explicit, and judicious usage of currently best evidence in making decisions about the care of individual patients"⁽¹⁾. EBM involves the integration of individual clinical expertise with the best available evidence keeping in mind individual patients' preferences and circumstances to make a decision about patients' care⁽²⁾.

Evidence-based practice is the scientific method that supports the physicians' clinical decision and preserves patient safety. This occurs through selecting the relevant research by asking researchable clinical questions. A national EBM advisory board committee was developed in the Kingdom of Saudi Arabia in November 2000, few years after the introduction of EBM concept. The committee was the cornerstone in the implementation of EBM in the Kingdom⁽³⁾.

Nowadays, acquisition of evidence-based medicine skills becomes a core competency for physicians. These skills need to be built on the groundwork laid by well-structured educational programs. The EBM-based curriculum is a crucial method to establish life-long learners who adopt patient-centered approach⁽⁴⁾. EBM application can help in patient's health enhancement, complications reduction, and quality of life improvement.

Studying the medical students' knowledge and opinions is essential to determine their willingness to learn more about EBM. Many studies were focused on teaching EBM to increase the awareness among postgraduate and working physicians rather than medical students⁽⁵⁻¹²⁾. Therefore, the undergraduate medical students were the targeted population in the current study. This study was designed to be the first study in this field conducted at two major universities in two different

sectors of the Eastern Province of KSA simultaneously. The study was also emphasizing on investigating the perception of barriers toward effective teaching and utilization of EBM.

The aim of this study is to assess the awareness and barriers toward evidence-based medicine among undergraduate medical students in the eastern province, Kingdom of Saudi Arabia.

Methodology

1. Study design: Descriptive cross-sectional study.

2. Study setting and time: The study was conducted during the period February 2015 to the end of July 2016, including two major universities in the eastern province of the Kingdom:

- 1) King Faisal University (KFU), AlHassa
- 2) University of Dammam (UOD), AlKhubar.

3. Study population: All undergraduate medical students, male and female, during the clinical period of their academic years (4th, 5th, and 6th years) from the two universities; The response rate was calculated and found to be 71.3%. Any medical student on a vacation or freeze at the time of the study period or refused participation was excluded. Students in the preclinical period of the academic years were excluded as well.

4. Variables and Instruments

4.1. Study variables:

1) Independent variables

Age; Gender; Marital status; Academic year; GPA; Attending lectures or courses inside the university as a part of the medical curriculum; Attending courses about EBM outside the university; Reading medical

journals.

2) Dependent variables

Knowledge, attitude, the perception of future use, and barriers toward evidence-based medicine.

4.2. Data collection tool:

- Data was collected through self-administered questionnaire adapted from EBP questionnaire (Z.Fedorowicz, BDS., unpublished study March 2003)⁽¹³⁾.
- The questionnaire was in English language and consists of 25 multiple choice questions and 1 Likert scale question. It was divided into four main sections as follows:
- Section A is the demographic data and EBM exposure.
- Section B is the knowledge toward EBM.
- Section C is the attitude toward EBM.
- Section D is the perception of barriers toward the use of EBM. This section includes 12 barriers designed in 5-Likert scale questions based on students' opinions. The barriers were divided into four groups: Resources, Institutional, Personal, Application.

5. Procedure:

5.1. Data collection technique: The researchers recruited one medical student from each batch to be responsible for questionnaire distribution and collection. The researchers explained the research aim and questionnaire components to the recruited students. In addition, they were ensured to check the completion of questionnaire items on the spot. The trained students distributed the questionnaires during the working hours; care was taken not to disturb the lectures. The researchers were available to check completion of the data and the questionnaires were collected in the same setting.

5.2. Data management: Any questionnaire less than 50% filled was canceled. Data was entered into a personal computer, and it was analyzed using Statistical Package of Social Services (SPSS) software version 21. Data was presented in descriptive tables and figures.

- A P-value less than 0.05 was considered significant.
- Some variables were coded before entry and were checked before analysis, while the numerical data was entered as it is.
- After data entry, total knowledge score was calculated out of 9 for each student. Then total knowledge percentage was also calculated and categorized based on the success rate of the university as the following:

- o Less than 60%: poor
- o 60% to 80%: fair
- o More than 80%: good

5.3. Validity and reliability: The researchers used a validated questionnaire. The questionnaire was modified in order to meet the research questions. Modification of the questionnaire was done based on an extensive literature review to ensure the construct validity. The questionnaire items were reviewed by five EBM experts to ensure the importance of each item included as a part of content validity. A pilot study was conducted to ensure the clarity of the questionnaire. Reliability was checked by Cronbach's (alpha) test and total Cronbach alfa score was found to be 0.7.

5.5. Data analysis: Descriptive data were analyzed using the mean and standard deviation, while categorical data were presented in frequency and percentage. The total knowledge score was calculated by sum up the correct answers. The associations were measured using appropriate statistical test (t-test, one-way ANOVA, Chi-square).

6. Ethical consideration:

- Approval of the study was taken from Institutional Review Board (IRB) research committee and local committee in Saudi Board Family Medicine before implementation of the study.
- Ethical approval was obtained from Ethics Committee at UOD which was accepted by the Research Deanship at KFU.
- The anonymity of the participants and confidentiality of the

information were preserved.

- By answering the questionnaire, informed consent was taken from the participant.
- The research had no conflict of interest.

7. Strength: To the researchers' knowledge, the current study is the first study in the kingdom of Saudi Arabia that emphasizes the knowledge and attitude toward EBM among undergraduate medical students in more than one university. It includes more than one academic level with a large sample size. It was done systematically, and the validity and reliability were considered. Knowledge was assessed by nine questions while most of the studies used four questions.

8. Weakness: This is an observational cross-sectional study. Therefore, it has a limitation in evaluation the temporality and the causality of the observed relationship with no follow up of the sequence of events. The other limitation is the use of modified questionnaire that has not been previously validated. However, validation was done through both construct and content validity. More items were added to the questionnaire which were adopted through reviewing the literature. This addition led to a long questionnaire which may affect the response rate.

Results

4.1. Sample characteristics

Of the 1035 questionnaires distributed, 738 were received representing a 71.3% response rate. Of those received, 60.3% of the students were from UOD, and 39.7% were from KFU.

More details for the demographic characteristics of the respondents are shown in table 1.

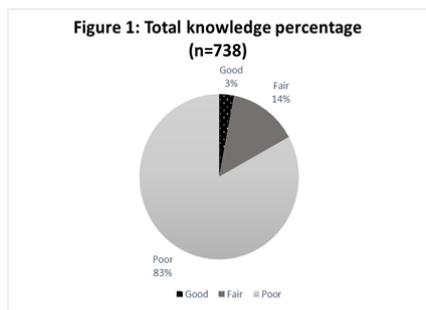
Table 1: Demographic characteristics of the students (n=738)

Quantitative data description	Mean (Sd)
Students' age by year	22.63 (1.29)
Students' GPA out of 5	4.08 (0.61)
Qualitative data description	n (%)
Students' gender:	363 (49.2)
• Male	375 (50.8)
• Female	
Students' marital status:	560 (75.9)
• Single	170 (23.0)
• Married	3 (0.4)
• Divorced	1 (0.1)
• Widowed	
Name of university:	293 (39.7)
• KFU	445 (60.3)
• UOD	
Students' academic year:	234 (31.7)
• 4th year	263 (35.6)
• 5th year	241 (32.7)
• 6th year	
Attending course of EBM inside university:	331 (44.9)
• Yes	397 (53.8)
• No	
Attending course of EBM outside university:	118 (16.0)
• Yes	613 (83.1)
• No	
Preference in reading medical journals:	52 (7.0)
• National	251 (34.0)
• International	429 (58.1)
• Not reading	
Research contribution:	387 (52.4)
• Yes	339 (45.9)
• No	

Key: Sd = Standard deviation; % = Percentage

4.2. Students' knowledge toward EBM

The mean of the students' total knowledge score was 3.59 ± 1.99 SD out of 9. The vast majority of students (83%) had a poor EBM knowledge, while 14% had a fair knowledge and only 3% of them were found to have a good knowledge (Figure 1).



4.3. Students' attitude toward EBM

Table 2 shows the students' attitude toward EBM. Almost two-thirds of the students strongly agreed on the importance of EBM implementation in clinical practice (62.7%). Most of the students agreed that their patients are willing to participate in clinical decision-making (69.6%). More than one-third of the students believed that half of their patients will be capable of participating in clinical trial studies (37.8%). Two-thirds of the students chose to evaluate the evidence if it contradicts their clinical judgment (65.0%), while less than one-third chose to follow the evidence (27.6%) and only (6.1%) chose to reject the evidence. Approximately one-half of the students strongly supported the introduction of EBM into their curriculum (49.6%), and the majority would use EBM in their daily clinical future practice (82.8%).

Table 2: Data description of the students' attitude to EBM (n=738)

Attitude items	n (%)	Attitude items	n (%)
Importance of EBM implementation in practice:	463 (62.7)	The best action if the recent evidence contradicts clinical judgment:	480 (65.0)
• Strongly agree	128 (17.3)	• Evaluate the evidence	204 (27.6)
• Partially agree	10 (1.4)	• Follow the evidence	45 (6.1)
• Neutral	5 (0.7)	• Reject the evidence	
• Partially disagree			
• Strongly disagree			
Patients' willingness to participate in clinical decision-making:	299 (40.5)	EBM introduction into medical curriculum:	366 (49.6)
• Strongly agree	215 (29.1)	• Strongly agree	193 (26.2)
• Partially agree	166 (22.5)	• Partially agree	133 (18.0)
• Neutral	40 (5.4)	• Neutral	26 (3.5)
• Partially disagree	8 (1.1)	• Partially disagree	12 (1.6)
• Strongly disagree		• Strongly disagree	
Percentage of patients capable of participating in clinical trials:	30 (4.1)	EBM future use in daily clinical practice:	611 (82.8)
• 100%	168 (22.8)	• Yes	117 (15.9)
• 75%	279 (37.8)	• No	
• 50%	242 (32.8)		
• 25%	10 (1.4)		
• 0			

4.4. Correlation between the total knowledge score with the academic performance and EBM exposure

Table 3 shows that there was a statistically significant association between the total knowledge score with the students' GPA ($P < 0.001$), attending EBM courses inside university ($P < 0.001$), attending EBM courses outside the university ($P < 0.001$), and reading medical journals ($P < 0.001$).

Table 3: Correlation between the total knowledge score with the academic performance and EBM exposure (n=738)

Independent Variables		Total knowledge score
Quantitative Variables	μ (Sd)	P Value
GPA	3.8263 (2.01)	< 0.001
Qualitative Variables		P Value
Attended EBM course inside university	695 (94.2)	< 0.001
Attended EBM course outside university	699 (94.7)	< 0.001
Preference in reading medical journals	700 (94.9)	< 0.001
Previous research contribution	694 (94.0)	0.053

Key: μ =mean; Sd =Standard deviation, statistically significant p-value < 0.05

4.5. Correlation between the students' attitude toward EBM with the academic performance and EBM exposure

There was a statistically significant association between the students' attitude toward EBM implementation into clinical practice and previous research contribution ($P=0.013$). There was also a statistically significant association between the students' attitude toward patients' willingness to participate in clinical decision-making and attending EBM courses inside the university ($P=0.038$). Statistically significant associations between the students' attitude toward EBM introduction into the medical curriculum with attending EBM courses outside the university and preference in reading medical journals were found ($P=0.033$ and 0.042 , respectively). On the other hand, the association between the students' attitude toward EBM and their GPA was not statistically significant in all attitude items.

Table 4: Association between the students' attitude toward EBM and EBM exposure (n=738)

Attitude items	Chi-square P value			
	Attended EBM course inside university	Attended EBM course outside university	Preference in reading medical journals	Previous research contribution
EBM implementation in clinical practice	0.537	0.200	0.802	0.013
Patients' willingness to participate in clinical-decision making	0.038	0.141	0.205	0.612
Percentages of patients capable of participating in clinical trial study	0.106	0.462	0.340	0.714
Best action if recent evidence contradicts clinical judgment	0.815	0.407	0.375	1.000
EBM introduction into medical curriculum	0.721	0.033	0.042	0.668
EBM future use in daily clinical practice	0.365	0.510	0.467	0.652

Statistically significant p-value < 0.05

4.6. Data description of the students' perception of EBM barriers:

Around half of the students agreed that lack of internet access (23.2% strongly agree, 24.8% partially agree), lack of subscription to journals in the university (24% strongly agree, 35.1% partially agree), and lack

of time (19.6% strongly agree, 37.4% partially agree) are considered as resources barriers toward EBM implementation. More than half of the students agreed that lack of encouragement from teachers to attend EBM courses (26.2% strongly agree, 33.9% partially agree), lack of EBM education at the university level (30.6% strongly agree, 31.3% partially agree), and lack of skilled teachers (21.3% strongly agree, 32.7% partially agree) are considered as institutional barriers toward EBM implementation. Around half of the students agreed that difficulty to understand EBM (17.3% strongly agree, 34.8% partially agree) and lack of EBM interest (25.1% strongly agree, 28.9% partially agree) are personal barriers. Near 17% of the students strongly agreed, and 26.8% of them partially agreed that weakness in the English language is considered as a personal barrier toward EBM implementation. Around one-third of them addressed the difficulty in applying EBM (10% strongly agree, 26.2% partially agree), EBM limits doctors' clinical judgment (11.8% strongly agree, 25.9% partially agree), EBM being not applicable to their culture (10.20% strongly agree, 21% partially agree) are considered as application barriers toward EBM implementation.

5.DISCUSSION

EBM is the backbone of the future residency programs. Therefore, it is important to ensure that students have the adequate level of awareness toward practicing EBM. Up to the researchers' knowledge, most published articles focused on assessing the level of awareness toward EBM among postgraduate and working physicians more than the undergraduate students such as Al-Musa, Al-Ansari and Al-Baghli studies which targeted the general practitioners⁽¹⁴⁻¹⁶⁾. Whereas, Al-Omary and Al-Asmari study targeted the consultant physicians⁽¹⁷⁾. The present study concentrates on the undergraduate medical students in their clinical years, which is quite similar to Bahammam et al and Ghahremanfard et al^(18,19). Moreover, students' awareness of EBM concept will help them in understanding the guidelines and using the latest evidence which will improve patients' safety.

As far as the current authors know, this is the first study done in more than one university involving more than one academic level in more than one sector with a large sample size reaching more than 1000 students. Less sample size was taken in previous studies such as Bahammam et al which recruited 400 students, 43 female students were involved in Al-Faris et al, and only 15 students were selected to participate in Hassanien study^(18, 20, 21). Smaller sample size was also recruited in studies conducted internationally^(22,23).

5.1. Students' knowledge toward EBM and its association with the academic performance and EBM exposure

This study found that a considerable number of students had poor level of knowledge on almost all aspects of EBM and mainly in advanced EBM questions. The poor knowledge can be attributed to several reasons such as low attendance of EBM courses, below expected level of EBM exposure and participation in researches, as well as low interest of medical journals reading. These reasons are supported by the current study which showed that half of the students did not attend EBM courses inside the university (53.8%) and the majority did not attend EBM courses outside the university (83.1%). It also showed that more than half of the participants are not interested in reading medical journals (58.1%), and 45.9% of them did not have a previous research contribution. Surprisingly, these findings were similar to those of Bahammam study which was done four years ago and found low attendance to EBM courses and reluctance in reading medical journals. This similarity can be explained by the nature of the medical curriculum which consists of one-way teaching method with no changes since many years. In addition, the universities enrolled in this study may not recognize the Bahammam study and other international studies which shared the same recommendations. Hence, no further steps were taken to modify the curriculum^(18, 24, 25). The low level of knowledge can be also explained by lack of proper EBM education. In the USA, studies showed that attending EBM courses during the undergraduate years lead to gain a higher level of EBM knowledge and modified medical curriculum with EBM incorporation can improve the students' knowledge significantly⁽²⁴⁻²⁸⁾. Another explanation of the low level of knowledge can be a lack of skilled teachers. Teaching EBM to the teachers will improve their skills and uses as proven in an Iranian study⁽²⁹⁾. Consequently, this will help them to deliver the knowledge to the students and affect their behavior.

In this study, the association between the total knowledge score and the students' GPA was statistically significant ($P < 0.001$). Although the

students' GPA was very good, their level of knowledge was poor. This can be attributed to the fact that the majority of the students with high academic achievements are focusing on their exams rather than the EBM activities. A statistically significant association between the level of the student's knowledge and attending EBM courses both inside and outside the university was noted ($P < 0.001$). These results were corresponding with Alahdab and Taheri studies⁽³⁰⁾. Similar findings were reported in a Mexican study conducted among medical students and showed that the students who received EBM teaching as a part of their curriculum had more knowledge score compared to those who did not ($p < 0.001$)⁽²⁷⁾. Our study also found a statistically significant association between the students' total knowledge score and reading medical journals ($P < 0.001$). However, no studies were found in the literature about this association.

5.2. Students' attitude toward EBM and its association with the academic performance and EBM exposure

The students in this study showed a favorable attitude toward EBM implementation in clinical practice, which was similar to Ghahremanfard and Davies studies^(19,31). On the other hand, this finding was on the contrary to the Bahammam et al which reported lower agreement to EBM implementation into practice and suggested that this could be due to limited EBM usage⁽¹⁸⁾. The present study displayed that more than half of the students either strongly or partially agree that their patients are willing to be involved in clinical decision-making, and one-third of them thought that half of their patients will be capable of participating in clinical trials. Similar findings were reported by Bahammam and Fedorowicz studies^(13, 18). These findings may be a reflection of the cultural acceptance to EBM. However, no international studies were found to support such findings. In this study, most of the students chose to evaluate the evidence if it contradicts their clinical judgment, which was also observed by Bahammam et al⁽¹⁸⁾. This attitude may be due to students' internal beliefs of the importance of taking their clinical judgment and patients' preferences into consideration. The current study perceived that the students are aware that the evidence should not be followed blindly, but many steps are needed to be considered before its application, appraising the evidence is one of them. Internationally, the students' attitude regarding the best action when there is disagreement between the evidence and their judgment was not studied. This may be due to that the EBM is already applied in their practice. Hence, this issue was not of a concern. In the current study, about half of the participants agreed on the EBM introduction into the medical curriculum. Students in Ghahremanfard study showed similar enthusiasm to EBM learning⁽¹⁹⁾. This may be due to the presence of traditional teaching method e.g. one-way teaching in the curriculum which does not fulfill the students' educational needs and interest. A study done in Thailand stated that the best method to teach EBM is in a longitudinal manner through small-group discussion, learner-centred, and problem-based learning⁽³²⁾. Additionally, Ilic et al compared between the traditional one-way lecturing method in teaching EBM and the new method of learning which combines lectures with online teaching and hands-on exercises, and found that the new learning method is more effective than the traditional one at improving the students' attitude toward EBM⁽³³⁾. Fortunately, almost half of the participants in this study had been a part of a research team. The research participation rate among medical students was not studied neither nationally nor internationally. Students who were involved in a research team found to have more confidence in their competencies and have a better understanding of medical articles, as proven by a study done in Germany⁽³⁴⁾. The level of research participation that was found in the current study can be attributed to the importance of such participation in the future application for a new job or a postgraduate residency program. In the present study, the majority of the participants thought that they will use EBM in their future daily practice. A systematic review published recently addressed that EBM future use in the clinical practice can not be predicted⁽³⁵⁾. However, it is expected that the students who have a favorable attitude toward EBM introduction into the curriculum and previous research contribution will apply EBM in their future career.

There was a statistically significant association between students' attitude toward EBM implementation in clinical practice and the previous research participation ($P = 0.013$). This association can be related to that research contribution may improve the students' awareness of the importance of EBM, as the EBM is the core of the clinical researches. There was also a statistically significant association between the students' beliefs about the ability of their patients to participate in clinical decision-making and attending EBM

courses inside the university ($P=0.038$). Taheri et al study proved that attending EBM courses will positively enhance the attitude toward it⁽³⁶⁾. The explanation of this result can be that with attending EBM courses, the awareness about the EBM components will increase, in which patients' preferences and values are major components. There was a statistically significant association between the attitude toward EBM introduction into the medical curriculum with attending EBM courses outside the university and reading medical journals ($P=0.033$ and $P=0.042$; respectively). This association is expected, as more extra-curricular EBM exposure will emphasize the need for incorporation of EBM into the medical curriculum.

It is worth to mention that there are no studies in the literature measure the association between the students' attitude toward EBM and EBM exposure. Therefore, further studies are needed to measure these associations in the practice.

5.3. Perception of barriers:

Almost all studies about the perception of barriers to EBM were focused on the enumeration of the barriers rather than studying them in depth. Hence, it was hard to compare the findings of the current study to other surveys. In addition, there were no studies regarding the association between the perception of barriers to EBM among the students with their academic performance and EBM exposure. In the present study, a considerable proportion of participants perceived a lack of EBM education at the university level as the main barrier to EBM use. This finding was consistent with Alahdab et al. who stated that 94% of the enrolled students in their study recognized the absence of EBM teaching in the medical school as a barrier⁽³⁰⁾. Surprisingly, the involved universities in the current study provide some lectures in EBM, but the students claimed that there were no EBM courses. This finding may indicate that the EBM is not well incorporated into the curriculum, and the presence of these lectures without practice is not sufficient to enhance EBM utilization. The second barrier found in this study was a lack of teachers' encouragement to attend EBM courses which was listed by more than half of the students. In Albarrak et al. study in Dubai 2010, the lack of teacher's encouragement was also perceived as a major barrier⁽³⁷⁾. This finding in the current study can be attributed to that the clinical teachers themselves did not receive training in EBM before. Hence, they are not fully aware of the effect of EBM courses in improving the knowledge and the attitude. The third barrier in the current study was found to be a lack of subscription to journals in the university. In the literature, this barrier was addressed in many national, middle east, and international studies as a major obstacle to EBM use^(13, 38-44). The UOD and KFU provide a free subscription to the famous and updated medical journals which are easily accessible through the medical library in the universities, but the limited awareness of the students in EBM resources may prevent them from using this facility. A lack of time was counted as the fourth barrier in this study. Unlike many middle east and international studies which cited a lack of time as a number one barrier to EBM implementation⁽⁴⁵⁻⁴⁸⁾. "the issue of availability of time is a complex one and is often attributed to clinical overload" as stated by Fedorowicz et al.⁽¹³⁾. A lack of skilled teachers in EBM as a barrier came next in this study, as reported by about 50% of the students. A systematic review was done in 2008, recommended effective EBM training to the teachers to improve their EBM skills and teaching abilities⁽⁴⁹⁾. Kljakovic et al. also raised the need for training the teachers in EBM⁽⁴⁸⁾. A lack of interest in EBM was also considered a barrier by half of the participants in the current study. This finding was expected because the students were attending the clinics as observers and they were not involved in real patients' care. Moreover, the assessment tool for the students were not focus on EBM. Hence, there is no motivation for them to use EBM. The next barrier in this study was the difficulty to understand EBM concepts, which was reported as the greatest barrier in Bahammam et al. study⁽¹³⁾. This finding can be related to that EBM is a new model. Therefore, students need more time and practice in order to absorb the subject. A lack of internet access as a barrier came next in the present study, in contrast to a study conducted in Yemen which cited the unavailability of the internet as the first major barrier⁽⁵⁰⁾. This result is expected, as with all this development in the technology which makes the internet access available to almost all physicians. A Weakness in the English language communication was mentioned by around 40% of the participants in the current study as a barrier. This finding was predictable as EBM usually taught in the English language. The next barrier in this study was that EBM limits doctors' clinical judgment. A similar finding was addressed in Al-Omari et al. study which found that the hospital physicians believed that EBM may threaten their

judgment⁽⁵¹⁾. This finding may be attributed to the limited awareness among the students of the major EBM components which do not neglect the doctors' experience and judgment. The difficulty in applying EBM and inapplicability to the culture were the least mentioned barriers in the current study. Other studies did not dissect the cultural barriers in depth^(18,13). The participants in this study believed that their patients are willing to be involved in clinical decision-making as well as in the clinical trial studies, as shown earlier. These findings reflect their beliefs that the EBM is applicable to our culture.

6. CONCLUSION

In conclusion, the undergraduate medical students in the Eastern Province of Saudi Arabia had an overall substandard level of EBM knowledge but a favorable attitude toward it. Lack of EBM courses at the university level and lack of encouragement from the teachers to attend EBM courses were the most noted barriers.

Therefore, we recommend EBM integration into medical curriculum during the early undergraduate years. The integration should be in a problem-based and longitudinal manner. Further studies with different methodology are required to measure the association between the level of awareness toward EBM with the students' academic performance and the EBM exposure. Further researches are needed to explore factors behind the reluctance to eliminate the current barriers to EBM implementation, and an action plan is required to overcome these barriers.

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