

# Evidence-Based Medicine: Short Course Effects To A Medical Undergraduate

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## ABSTRACT

**Background:** In modern scientific medicine, nowadays, non-can ignore the importance of teaching and practicing Evidence-Based Medicine (EBM) for getting better health outcomes at both individual and community levels. This study was set to estimate the usefulness and value of teaching an interventional introductory course of EBM knowledge and practice. This course was applied to one group (consisting of 25 students) from 4th year medical undergraduates in Al-Iraqia Medical College in Baghdad, Iraq for the academic year 2017-2018 and lasting 14 weeks in the 2nd semester. This study aimed to determine the effectiveness of prompt short-course in EBM training for medical undergraduates.

**Method:** The instrument for this study was borrowed from Modified Berlin Questionnaire which include tools for assessment of knowledge, skills and attitudes about EBM. Modified Angoff procedures was applied to this questionnaire in order to be standardized for this study.

**Results:** The study revealed significant differences between pre- and post-test for the intervention group regarding their knowledge, skills and attitudes towards the prompt short course in EBM training.

**Conclusion:** According to the importance of this subject and the feasibility and usefulness of this trial, it is recommended to be applied and included in the curriculum.

**Key words:** Efficient, short course, EBM, medical undergraduates.

**Keywords:** service quality, behavioral intention, emotional satisfaction, childcare center

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## INTRODUCTION

Evidence-based medicine is an effective approach to medical practice designed to optimize decision-making by highlighting the utilization of evidence from well-designed and well-performed research [1]. The most satisfactory definition for EBM still that implied "an integration of best obtainable evidence, with clinical expertise in addition to patient value. That definition really involves only most "valid and reliable" research evidence with clinical proficiency and patient favorite in establishing wise clinical decision making [2].

Physician's positive attitude towards EBM is essential for its application. These include lifelong learning and unending updating of knowledge, as evidence advances over time. Moreover, EBM also helps to supply the best medical care at the lowest price [3].

Introducing EBM as an early as possible is an attempt to educate future doctors to be familiar and hopefully expert with EBM. Researches have shown that an early introduction to EBM can improve student's knowledge, skills and attitudes towards learning and applying EBM [4]. literature also reported that the introduction of EBM in the academic curriculum enhances the physician residents' skills in critical appraisal [5].

Even though it has been only a decade since EBM has been included in medical syllabus, because of its importance, many researches have been done to improve and help to develop the curriculum [5, 6, 7]. This reveals the fact that the teaching of EBM is still not fully developed and requires a universal approach chiefly at the undergraduate level. Generally, the incorporation of EBM in the curriculum varies among the various medical schools. Some medical schools established EBM during the pre-clinical years to encourage them to think seriously at an early stage whilst others apply EBM in the clinical years or in postgraduate level [8-10]. Furthermore, the course content, teaching methods, duration, and student's evaluations varied between schools [11, 12].

In our College, Al-Iraqia College of Medicine, Baghdad Iraq, and in our road to get accreditation, we started EBM program in an academic year 2017-2018 in the whole 2<sup>nd</sup> semester course for a group from 4<sup>th</sup> year medical undergraduates for a period extending for 14 weeks aiming to introduce a proper educational program regarding such a crucial subject and improving it during the subsequent year.

## SUBJECTS AND METHOD

This intervention semi-randomized study was conducted during the second academic semester period from February 2018 through May 2018 in College of Medicine at Al-Iraqia University, Baghdad, Iraq.

The Fourth stage medical undergraduates were assigned every year to five groups according to their alphabetic list of names. Then they were randomly distributed to 5 seniors in Family and Community Medicine Department, and one of these groups was assent to the researcher of this work. The group was consisted of 25 students, their ages were around 22 years old with almost equal sex distribution.

Verbal consent was obtained from students about this intervention study after meticulous explanation for the purpose of this research. Moreover, formal consent was obtained from scientific affairs unit in the college for conduction of this study during research period in the 2<sup>nd</sup> semester for 4<sup>th</sup> year medical undergraduates 2017-2018.

Berlin questionnaire for assessment of knowledge and skills about EBM [13] was chosen after modification for assessment of student at pre- and post- periods of the study.

Modification of the above questionnaire was done by modified Ang-off procedure in the Family and Community Medicine Department at Al-Iraqia College of Medicine, Baghdad, Iraq.

The questionnaire was distributed to special committee consisted of 5 specialists' expert in the field of concern, and all their opinions were taken seriously in the final form of questionnaire and they all agreed in more than 80% about validity, reliability and reality of the final form of

questionnaire under the title Modified Berlin Questionnaire. Moreover, assessment of attitude toward EBM was also developed by researchers of this study and agreed upon by the above committee.

The final knowledge assessment questionnaire includes 10 questions regarding almost every important aspects of EBM, such definition, updates, practice and its relation to clinical decision making. Moreover, availability of EBM, its limitation, daily practice of it and information about systematic reviews and meta-analysis.

Skills assessment questionnaire was also consisted of 10 questions distributed as the following: The first two questions were presented two clinical scenario including questions from patients to physician to be answered by searching EBM web sites. Others, were asking about best study designed to get information about risk factors for any disease, its incidence, prevalence, risk estimation and some critical statistical questions about *P*-value and others.

Assessment of attitudes toward practicing EBM was done by special questionnaire generated by the researchers and reviewed by special committee in the Family and Community Medicine Department. It includes 10 questions, their answers by selecting one of five Likert scale of choices ranging from totally agree to totally disagree.

The assessment of knowledge, skills and attitudes was done twice prior and after the intervention program extending for about 14 weeks.

Teaching and learning of this program was done completely by researchers, through didactic lectures, small group discussion, E-practice.

Statistical analysis was performed using the available statistical package of SPSS (Statistical Packages for Social Sciences-version 26) and STATISTICA version 12. Data was presented with standard approaches including frequencies and percentages. Significance of association was tested by Wilcoxon Signed Ranks test. Statistical significance was detected with *P*-value equal or less than 0.05.

Finally, feedback about satisfaction of students from overall performance of this intervention program was gained by special form of questionnaire distributed to participants students at the end of this work.

**RESULTS**

By comparing between pre- and post-test results regarding knowledge about EBM among study sample, it found that there was a significant difference about the students' knowledge in pre- and post-tests; as the mean of computed knowledge scores was significantly higher in post-test than that in pre-test (76.8000± 11.80395 vs. 58.8000± 18.77942) respectively (*P* <0.05) (Table 1).

**Table 1 Students' knowledge about Evidence Based Medicine in Pre- and post-test (n=25)**

EBM Knowledge	Pre-test				Post-test			
	T	%	F	%	T	%	F	%
EBM means integration	14	56	11	44	23	92	2	8
Doctors updated	21	84	4	16	24	96	1	4
Practice of EBM	22	88	3	12	24	96	1	4
Clinical decision, based on EBM	14	56	11	44	21	84	4	16
Limitation of EBM	9	36	16	64	1	4	24	96
EBM available	20	80	5	20	24	96	1	4
Searching the net regarding your patient risk factors for ischemic heart disease	22	88	3	12	24	96	1	4
Results of Meta-analysis	14	56	11	44	22	88	3	12
Results of systematic reviews about a clinical problem	9	36	16	64	22	88	3	12
Practicing medicine without EBM	20	80	5	20	7	28	18	72
<b>Knowledge score for correct answer (mean ± SD)</b>	<b>58.8000± 18.77942</b>				<b>76.8000± 11.80395</b>			

Z value of Wilcoxon Signed Ranks Test: -2.682, *P* = 0.007

Similarly, a significant difference was found among study group regarding gaining EBM skills between post- and pre-test, as the mean of skills scores in post-test was significantly

higher than that in pre-test (90.4000± 14.57166 vs. 25.6000± 11.21011) respectively (*P* <0.01) (Table 2).

**Table 2 Students' EBM skills in pre- and post-test (n=25)**

EBM Skills	Pre-test				Post-test			
	T	%	F	%	T	%	F	%
Q1. Case (1): Write down what you will type for your electronic search in the net by searching tool bar:	-	-	25	100	25	100	-	-
Q2. Case (2): Write down what you will type for your electronic search in the net by searching tool bar:	7	28	18	72	25	100	-	-
Q3. What strategy you used in searching the evidence for the above 2 cases?	-	-	25	100	22	88	3	12
Q4. Which of the following will give the most valid and reliable source of information (evidence):	18	72	7	28	24	96	1	4
which one you are going to choose in order to help your patient in	7	28	18	72	23	92	2	8

making the right clinical decision?								
Q6. The best type of study in evaluating risk factors for a rare disease is	11	44	14	56	23	92	2	8
Q7. In detecting the prevalence of certain disease, the best type of study you can use is:	5	20	20	80	19	76	6	24
Q8. In detecting the incidence of certain disease, the best type of study you can use is	7	28	18	72	21	84	4	16
Q9. In studying new treatment of certain disease, the best type of study you can use is:	5	20	20	80	20	80	5	20
Q10. A study found factor A associated with the occurrence of certain disease, but its p-value was (0.0001), the statistical association is:	4	16	21	84	24	96	1	4
<b>Skills score for correct answer (mean ± SD)</b>	<b>25.6000 ± 11.21011</b>				<b>90.4000 ± 14.57166</b>			

Z value of Wilcoxon Signed Ranks Test: -4.402, P = 0.000

Likewise, a significant changes were obtained regarding the participants' attitudes at end of current study, as mean of positive attitudes toward EBM was more in post-test than

that was in pre-test (4.2280± 0.47742 vs. 3.6960± 0.62148) respectively (P <0.05) (Table 3).

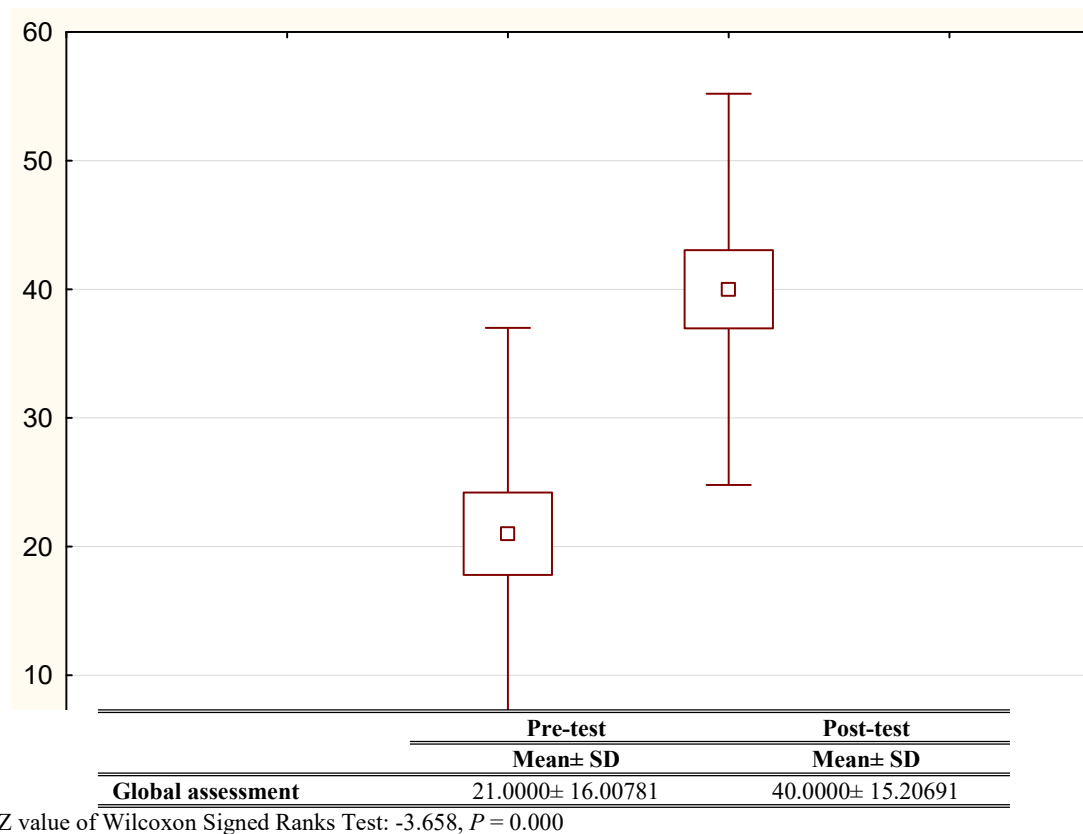
Table 3 Students' attitudes towards Evidence Based Medicine in pre-and post-test (n=25)

EBM Attitude	Pre-test	Post-test
	Mean± SD	Mean± SD
Working with EBM is satisfying.	4.6800± 0.55678	4.6400± 0.90738
Formal medical authority should cover the fees of EBM.	3.6800± 1.37598	4.0800± 0.75939
There is much that I can do to help my patients with EBM.	4.1600± 0.80000	4.4800± 1.04563
I feel especially concerned toward subjects like EBM.	3.0800± 1.44106	4.2400± 1.05198
EBM is not irritating me.	2.9200± 1.46969	3.6000± 1.63299
I wouldn't mind to search the net for EBM in order to care for my patients.	3.4000± 1.47196	3.6000± 1.55456
Practicing EBM for medical care is not a wasting of money.	3.6800± 1.43527	4.7600± 0.52281
Practicing EBM for medical care is not difficult to me.	3.1200± 1.36382	3.9600± 1.27410
I enjoy giving extra time to such subjects like EBM.	3.8800± 1.12990	4.7200± 0.61373
I prefer to practice medicine with EBM.	4.3600± 0.81035	4.2000± 0.81650
<b>Skills score for answered strongly agree and agree (mean ± SD)</b>	<b>3.6960± 0.62148</b>	<b>4.2280± 0.47742</b>

Z value of Wilcoxon Signed Ranks Test: -2.923, P = 0.003

Furthermore, significant changes were observed regarding global assessment of students' knowledge, attitude and

practice toward EBM in pre- and post-test (21.0000± 16.0078 vs. 40.0000± 15.20691) respectively (P <0.01) (Figure 1).



**Figure 1 Global assessment of students' knowledge, attitudes and skills towards Evidence based Medicine (n=25)**

Lastly, assessment of students' point of view about educational environment and their satisfaction, showed that

most of students explain strongly agreement regarding all the items of evaluation (Table 4).

**Table 4 Educational environment assessment from student's point of view (n=25)**

Items	Strongly disagree	Disagree	Uncertain	Agree	Strongly agree	Total
The time of this workshop is optimal.	1	0	3	6	15	25
The duration of this workshop is sufficient.	1	1	1	6	16	25
Educational resources and references are adequate.	1	1	3	4	16	25
The learning method of this workshop is interesting.	1	0	3	5	16	25
The tutor of this workshop is motivating.	3	2	2	4	14	25
The content of this workshop is clear and easy to understand.	2	1	3	7	12	25
Overall, I have been satisfied with workshop.	1	1	2	8	13	25
More advanced workshop in EBM is necessarily.	1	2	3	4	15	25
All my colleagues should attend such a workshop.	1	0	2	7	15	25
EBM is the only right way in medical practice.	1	0	5	7	12	25

## DISCUSSION

EBM is a process that can strengthen critical and logical thinking and provides the opportunity for ideal clinical decision-making. By appraising of the literature showed the necessity of teaching EBM to undergraduate medical students to make them aware about the models of working in

clinics based on the best available and assessed evidences about diagnosis and treatment of diseases [14-16].

The results of overall parameters of knowledge gaining of EBM, during the whole intervention training period of this study, showed positive significant change at the end of the study clearly demonstrated between pre and post-tests. The

same results were gained in Malaysia 2017 by Manan *et al*<sup>[3]</sup>, although their intervention study was lasting for only 4 weeks, for all 4<sup>th</sup> year medical undergraduates.

Regarding skills evaluation of EBM training in this study, we assess method of formulating an electronic medical question, strategy used in questioning, different epidemiological study designs and its usefulness in answering clinical questions in addition to evaluation of adequacy in statistical procedures. Results of post-test regarding all parameters of skills assessment showed significant positive change in comparison with pre-test results. Again, similar changes in skills gaining was demonstrated by Manan *et al* study<sup>[3]</sup>.

Moreover, attitudes of the 4<sup>th</sup> year medical undergraduates were all changed positively towards working in future within practices and principles of EBM at the end of this study. Atwa and Abdelaziz on 2017 in Saudi Arabia,<sup>[17]</sup> obtained the same results in their study on 4<sup>th</sup> year medical undergraduates. Getting positive attitudes towards practicing medicine with EBM principles is very crucial for continuation of best health services towards patients globally. Finally, in this study, global assessment of overall performance of medical undergraduates concerning their knowledge, skills and attitudes was strongly and statistically significant towards EBM at end of this study. Nonetheless, almost all students were strongly satisfied with learning environment of this study.

#### CONCLUSION

Based on evident revealed in this study that significant differences were found between pre- and post-test regarding knowledge, skills and attitudes towards the prompt short course in EBM training among intervention group in addition to its feasibility and usefulness, it is recommended to be applied and included in the curriculum.

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#### Conflicting interests

Authors declare that no potential competing interests is exist for this self-funding study.

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