



Cross-sectional Study

Knowledge, attitude, practice, and barriers of evidence-based medicine among physicians in general hospitals in Kuwait: A cross-sectional study

Iman Qadhi^{a,*}, Lulwah AlSaidan^b, Hoda AlSomali^c, Shaden Younes^d, Hadeel AlHamly^b,
Mariam Kenawy^d

^a Mubarak Al Kabeer Hospital, Kuwait City, Kuwait

^b Farawniyah Hospital, Kuwait City, Kuwait

^c Adan Hospital, Kuwait City, Kuwait

^d Amiri Hospital, Kuwait City, Kuwait

ARTICLE INFO

Keywords:

Evidence based medicine
Clinical practice
Medical education

ABSTRACT

Background: Evidence-based medicine (EBM) is renovating the field of medicine as it is being acknowledged as the standard and basis of clinical judgment. As general governmental hospitals are at the forefront of health-care in Kuwait, the practice of EBM among physicians could improve the health of the population. The aim was to assess the knowledge, attitude, practice, and barriers of EBM among physicians practicing in general governmental hospitals in Kuwait.

Methods: A cross-sectional study with self-reported questionnaires was used to survey 439 physicians in Kuwait's 6 general hospitals with a response rate of 74%.

Results: Respondent's knowledge of EBM was considerably low with a median knowledge score of 13 out of 20. Overall female physicians, undergraduates from Kuwait and Ireland, and those that received formal EBM training scored higher knowledge scores. Most respondents were unaware of well-known EBM resources, however more than half (69.3%) were aware of 'Up-to-date' and used it for clinical decisions. Most of the respondents had positive attitudes towards EBM: 88.2% either 'strongly welcomed' or 'welcomed' the promotion of EBM. Lack of investment by health-care authorities was the main perceived barrier to EBM.

Conclusion: Overall, even though participants were not well-informed in regards to EBM, half of them claim that their practice is EBM-based and use EBM resources to support clinical decisions. Formal EBM training and integration of EBM in undergraduate programs considerably promotes EBM practice.

1. Introduction

Since its inception in the early 1980's, evidence-based medicine (EBM) has been universally adopted and as of now, it stands as the corner stone of modern medicine. EBM was essentially established as a guide to critically appraise research articles, however currently has a wider connotation than its original definition [1], "the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients". The 'new improved' definition, "the integration of best research evidence with clinical expertise and patient's values" [2], now involves patient-decision, prominently individualizing clinical management [3].

Since the introduction of EBM, its philosophy and practice has

substantially improved the quality of health care and physicians' skills and knowledge due to the rapid growth of updated and validated information in diagnostic and therapeutic areas. Furthermore, it facilitates the communication between patients and physicians about the rationale behind clinical decisions. However, practicing physicians, clinical trainers and trainees face several challenges in translating existing evidence into practice.

Although an international collaborative study showed that most clinical guidelines in developed countries, such as the USA, Canada, Australia, New Zealand, and Europe, are evidence-based [4], the clinical practice in most developing countries seems to be far from evidence-based. A study conducted at King Abdulaziz University Hospital, Jeddah in Saudi Arabia, suggests that the attitude of the practicing doctors towards EBM was good, but knowledge and practice were not up

* Corresponding author. Mubarak Al Kabeer Hospital, Kuwait University, Kuwait.

E-mail addresses: iman.94.ik@gmail.com, iman.94.ik@gmail.com (I. Qadhi), lulwah.alsaidan@gmail.com (L. AlSaidan), alsomali17@gmail.com (H. AlSomali), shaden.younes@gmail.com (S. Younes), hadeel830@gmail.com (H. AlHamly), Mariame_kenawy@hotmail.com (M. Kenawy).

<https://doi.org/10.1016/j.amsu.2021.103081>

Received 30 October 2021; Accepted 16 November 2021

Available online 19 November 2021

2049-0801/© 2021 The Authors. Published by Elsevier Ltd on behalf of IJS Publishing Group Ltd. This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

List of abbreviations

EBM	Evidence Based Medicine
EBP	Evidence Based Practice

to standard [5]. Another study from Saudi Arabia also concluded that consultant physicians appeared enthusiastic to utilize EBM in their daily clinical practice with a strong welcoming attitude to it; nevertheless, they require need further educations and training on how to review publications and databases related to EBM [6].

In Kuwait, a previous study on the practice of EBM has addressed attitudes of primary care physicians [7]; However, there is still a need to assess the attitude and knowledge of physicians in different specialties towards EBM, and determine factors preventing physicians from incorporating EBM into their everyday practice. Moreover, Kuwait has also been found to have one of the highest levels of antibiotic resistance [8], which most probably is due to the non-evidenced-based over-prescription of antibiotics. Therefore, this study sought to assess the knowledge, practice, attitude, and perceived barriers towards EBM among physicians practising in general governmental hospitals in Kuwait.

2. Methods

2.1. Study population and design

A cross-sectional study was conducted among physicians ($n = 439$) practising in general governmental hospitals across Kuwait. Namely, data was collected from physicians at Mubarak Al Kabeer, Amiri, Adan, Al-Jahra, Farwaniya, and Al Sabah general hospitals between December 2016 and January 2017. These six general hospitals cover the six governorates in Kuwait. All physicians who were working in general hospitals and have more than one year of clinical practice, at the time of the study, were eligible to participate in the study. Study participants were enrolled using a convenience sampling strategy. Newly graduated physicians, interns or trainees, were excluded from the study population due to their restricted practice, and to ensure that all physicians approached had at least one year of practice. The study was approved by the Health Sciences Center Ethics Committee for Student Research at Kuwait University (no. 2882/2016) and was carried out in accordance to the guidelines of the Declaration of Helsinki. Written informed consent was obtained from each study participant.

2.2. Questionnaire and study variables

A self-administered questionnaire was developed based on previously published research papers [9–11]. The adoption of formerly utilized questionnaires, which have already been validated, was a means to standardize and to allow for comparison with similar international studies. The study questionnaire was divided into 5 sections: personal information of the participant, knowledge and awareness of EBM, practice of EBM, attitude, and barriers towards EBM. Personal information of the participant included gender, age, nationality, and educational achievements. The knowledge and awareness of EBM were assessed by answering few questions regarding journals and terminology used in these journals. On the other hand, the way physicians indulged EBM in their practice and how they felt about it was included in the practice and attitude sections. Finally, multiple questions regarding barriers were asked to address the reason of EBM restriction if any.

2.3. Statistical analysis

All statistical analysis were conducted using SPSS® version 21.0

(SPSS Inc., Chicago, IL). Descriptive analysis was used to obtain frequencies and estimate proportions. A scoring system was also generated to assess the extent of knowledge of EBM among physicians and to study the factors that influence the level of knowledge. Questions regarding EBM terms were utilized to compute this score for each participant, which were totalled between 0 and 20 (Table 1). Medians and inter-quartile ranges (IQR) of knowledge scores were reported due to the fact that the score variable was not normally distributed. In addition, associations between knowledge scores and various variables were evaluated using non-parametric statistical tests; Mann–Whitney U test was used for variables with 2 categories and Kruskal–Wallis test was applied for those with 3 or more categories. P -values < 0.05 were considered statistically significant.

3. Results

3.1. Description of study population

In total, 597 eligible study participants (physicians) were invited to participate in the study, out of which, 439 consented and participated in the study (response proportion: 73.5%). The study included 307 (69.9%) male and 132 (30.1%) female physicians. While 40.9% (179/438) were Kuwaitis, 59.1% (259/438) were non-Kuwaiti physicians. Less than half of the physicians (38.3%, 167/436) were board certified. In addition, 38.2% (166/434) were clinical instructors. Most respondents were at the registrar level, accounting for 22.1% (96/435) of the study sample (Table 2).

3.2. Knowledge about evidence based medicine

To assess the knowledge of EBM, we asked two questions, familiarity with different EBM sources and understanding of the frequently used terminology in EBM literature. Fig. 1 shows that physicians had a low level of knowledge and awareness of the available resources of EBM that guide clinical practice. Nearly 69.3% (303/437) of physicians were aware of ‘Up-to-date’ and used it in clinical decisions, while 27% (118/437) of the physicians were aware of ‘JAMA Evidence’. In regards to understanding the frequently used terminologies in EBM literature, more than half of the respondents can confidently explain the technical terms used in EBM papers, with 61.2% (268/438) confident in explaining the term “systemic review” (Table 3). However, only 26.5% (116/438) understood “heterogeneity” and could explain it to others. On average, around 30% of the physicians had ‘some understanding’ of technical terms used in EBM literature (Table 3). In general, a considerable proportion who did not understand the terms expressed a desire to understand (7.1–34.5%).

3.3. Practice towards evidence based medicine

Among physicians in general hospitals, 52.1% (228/438) feel that ‘51–75%’ of their clinical practice is currently evidence-based. Regarding suggested methods to move from opinion based practice to EBM, out of 435 respondents, 192 physicians (44.1%) believe that it is more appropriate to use “evidence based practice guidelines or protocols developed by colleagues for use by others” (method c), while 39.3% (171/435) thought it should be by “learning the skills of evidence based medicine to identify and appraise the primary literature or systematic reviews” (method a), and only 29.2% (127/435) by “seeking and applying evidence based summaries, which give the clinical bottom line. Such summaries may be obtained from abstracting journals” (method b) (Table 4). The percentage of physicians currently using ‘method c’ is 52.1%; (226/434) on the other hand, 48.3% (210/435) are interested in using ‘method a’ in the future (Table 4).

Half of the respondents received formal training in EBM (52.2%, 229/439); most received it during their undergraduate (42.3%, 99/234) and postgraduate (40.6%, 95/234) education. Only 28.3% (123/435)

Table 1
Scheme used to generate EBM knowledge score.

	It would not be helpful to me to understand	Don't understand but would like to	Some understanding	Yes, understand and could explain to others
Relative risk	0	0	1	2
Absolute risk	0	0	1	2
Systematic review	0	0	1	2
Odds ratio	0	0	1	2
Meta-analysis	0	0	1	2
Clinical effectiveness	0	0	1	2
Number needed to treat	0	0	1	2
Confidence interval	0	0	1	2
Heterogeneity	0	0	1	2
Publication bias	0	0	1	2
Total				20

Table 2
Characteristics of study sample.

Characteristic	n/total (%)
Gender	
Male	307/439 (69.9)
Female	132/439 (30.1)
Nationality	
Kuwaiti	179/438 (40.9)
Non-Kuwaiti	259/438 (59.1)
Age (years)	
<30	101/432 (23.4)
30-39	183/432 (42.4)
40-49	97/432 (22.5)
≥50	51/432 (11.8)
Board certified	
Yes	167/436 (38.3)
No	269/436 (61.7)
Country of Undergraduate Training	
Egypt	188/430 (43.7)
Kuwait	112/430 (26)
Ireland	27/430 (6.3)
Bahrain	24/430 (5.6)
India	23/430 (5.3)
Syria	21/430 (4.9)
United Kingdom	14/430 (3.3)
Clinical instructor	
Yes	166/434 (38.2)
No	268/434 (61.8)
Job Rank	
Assistant	73/435 (16.8)
Resident	81/435 (18.6)
Registrar	96/435 (22.1)
Senior Registrar	51/435 (11.7)
Specialist	75/435 (17.2)
Consultant	46/435 (10.6)
Others	13/435 (3.0)
Speciality	
Medicine	161/435 (37)
Surgery	158/435 (36.3)
Paediatrics	77/435 (17.7)
Obstetrics & Gynaecology	26/435 (6)
Other	13/435 (3)
Years of Practice	
1-10	184/420 (43.8)
11-20	161/420 (38.3)
21-30	45/420 (10.7)
31+	30/420 (7.1)

reported attending other courses related to EBM. Among physicians, 61% (266/436) had access to PubMed and other relevant databases at their place of practice, while 32.8% (143/436) had access at the local library and 72.9% (318/436) at home. Access to the internet at the place of practice and local library are equal, 45.6% (199/436), while 96.8% (422/436) have access at home. A majority of the physicians (74.4%, 326/438) attended local conferences every few months, however, 38.1% (167/438) of the physicians attended international conferences once a year.

Fig. 2 summarizes the resources physicians use to support their clinical decisions. Most physicians always use clinical practice guidelines (44.9%, 196/437) for their clinical decisions. In addition, 37.8% (165/437) often rely on their clinical experience.

3.4. Attitudes of physicians towards evidence based medicine

Physicians' attitudes were evaluated by questions in our survey to assess their level of agreement and disagreement towards EBM. Almost half of physicians' (53.5%, 234/437) attitudes towards the current promotion of EBM was welcoming and 49.4% (216/437) thought that their colleagues' attitude was welcoming as well (Table 5). In addition, 43.7% (191/437) of respondents agreed that the adoption of EBM places another demand on already overloaded physicians. Moreover, 49% (214/437) are interested in learning to integrate EBM into their practice. Around 26.5% (116/437) of physicians disagreed on the fact that EBM does not take into account patient preference. Approximately half of the physicians (46.7%, 204/437) strongly agreed that practicing EBM improves patient care. In addition, 36.6% (160/437) of respondents agreed that EBM does not take into account limitations of clinical practice setting. Furthermore, 60.4% (264/437) of physicians believed that research findings are useful in their daily management of patients (Table 5).

3.5. Barriers to practicing evidence based medicine

The main perceived barrier to practicing EBM among physicians was lack of investment by health authorities (70%, 305/436; Fig. 3). Moreover, no financial gain in using EBM was the least perceived barrier (29.6%, 29/436). Almost more than half of the physicians consider lack of personal time (62.2%, 272/437), difficulties in involving in whole practice (61%, 266/436), and availability and access to information (53.7%, 234/436) as barriers. While a considerable proportion consider colleagues' attitudes (47.2%, 206/436), lack of searching skills (47.1%, 206/437), patient's expectations (46.1%, 201/436), lack of hard evidence (38.1%, 166/436), and too much evidence (35.8%, 156/436) as barriers.

3.6. Associations between level of EBM knowledge and socio-demographic factors

Overall, the knowledge of EBM amongst respondents was slightly low with a median knowledge score of 13 out of 20. Table 6 presents associations between the knowledge score of technical terminologies and concepts used in EBM and socio-demographic factors. There was no significant association between the years of practice and knowledge score ($P = 0.207$). On the other hand, gender was significantly associated with level of knowledge ($P = 0.008$), with female physicians having higher median knowledge scores (14, IQR: 8) than males (12, IQR: 8; Table 6). There were significant differences in the median of the knowledge score across the different specialties ($P = 0.024$). The rank of

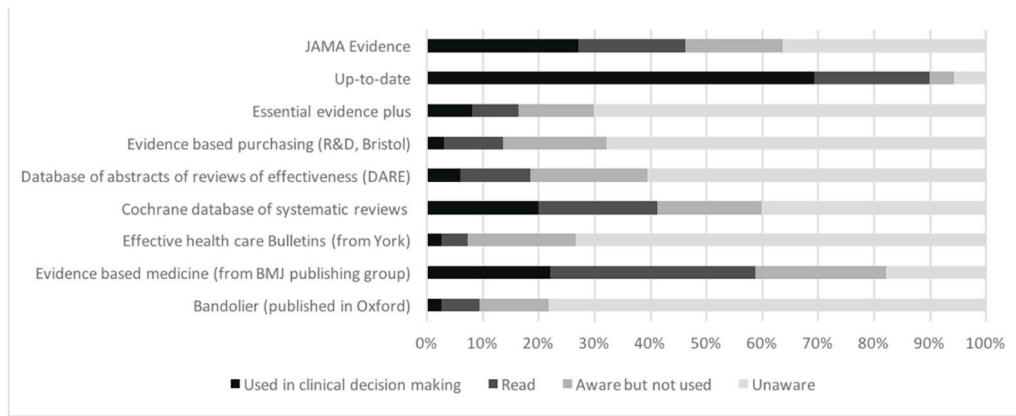


Fig. 1. Variability in the use of different sources that guide the clinical practice among physicians.

Table 3

Knowledge of terms used in literature about EBM, n/total (%).

	It wouldn't be helpful to me to understand	Don't understand but would like to	Some understanding	YES, understand & could explain to others
Relative Risk	17/438 (3.9)	31/438 (7.1)	145/438 (33.1)	245/438 (55.9)
Absolute Risk	17/438 (3.9)	36/438 (8.2)	129/438 (29.5)	256/438 (58.4)
Systemic Review	21/438 (4.8)	46/438 (10.5)	103/438 (23.5)	268/438 (61.2)
Odd Ratio	31/437 (7.1)	90/437 (20.6)	144/437 (33)	172/437 (39.4)
Meta-Analysis	24/438 (5.5)	66/438 (15.1)	105/438 (24)	243/438 (55.5)
Clinical effectiveness	19/438 (4.3)	60/438 (13.7)	136/438 (31.1)	223/438 (50.9)
Number needed to treat	24/438 (5.5)	61/438 (13.9)	133/438 (30.4)	220/438 (50.2)
Confidence interval	43/438 (9.8)	102/438 (23.3)	117/438 (26.7)	176/438 (40.2)
Heterogeneity	46/438 (10.5)	151/438 (34.5)	125/438 (28.5)	116/438 (26.5)
Publication bias	39/438 (8.9)	81/438 (18.5)	147/438 (33.6)	171/438 (39.0)

Table 4

Different ways to move from opinion based practice to EBM, n/total (%).

Methods of moving towards EBM	Methods currently used	Methods interested to use in the future	Method most appropriate for practice
A) Learning skills of EBM	174/434 (40.1)	210/435 (48.3)	171/435 (39.3)
B) Seeking and applying EBM summaries	196/434 (45.2)	166/435 (38.2)	127/435 (29.2)
C) Using EBM guidelines	226/434 (52.1)	189/435 (43.4)	192/435 (44.1)

In the questionnaire, method (a) was described as “by learning the skills of evidence-based medicine i.e. to identify and appraise the primary literature or systematic reviews oneself”; method (b) was “by seeking and applying evidence-based summaries, which give the clinical ‘bottom line.’ Such summaries may be obtained from abstracting journals”; and method (c) was “by using evidence based practice guidelines or protocols developed by colleagues for use by others.” Respondents were allowed more than one response when asked what methods they were currently using and would be interested in using in the future but only one response when asked which of these methods they thought was most appropriate in general practice.

the physician ($P < 0.001$) and country of undergraduate training ($P < 0.001$) also showed association with the knowledge score. Physicians specialized in obstetrics & gynecology had the highest median knowledge score (15, IQR: 8.3), as well as physicians with the rank of consultant with a median value of 17 (IQR: 9) and those who received undergraduate training in Kuwait or Ireland (median score:15). In addition, board certification was significantly associated with the level of knowledge of EBM ($P = 0.046$, median score:14, IQR: 8), and receiving formal training in EBM was also significantly associated with the level of knowledge ($P = 0.001$, median score:15, IQR: 8; Table 6).

4. Discussion

4.1. Principle findings

In this cross-sectional study, we assessed, for the first time, the knowledge, practice, attitude, and barriers of EBM among physicians in general hospitals in Kuwait. As the emphasis on the importance of EBM escalates in the international medical community, we were interested to know the extent of which physicians in Kuwait incorporate EBM in their daily practice.

Results of this report indicate that physicians had limited knowledge of numerous internationally recognized journals and research databases relevant to the field of EBM. However, the most frequently used and relied upon as an EBM resource by our study participants was ‘Up-to-date’ for clinical decision making. Factors which affected the level of EBM knowledge, included job rank, country of undergraduate training, and receiving formal EBM training. Consultants were found to have the highest knowledge scores compared to the other ranks. Undergraduates from Kuwait and Ireland scored the highest on knowledge, which may be due to the fact that both have EBM courses integrated into to their undergraduate curriculum. In addition, female physicians and board certification were also shown to be statistically significant factors that influence the level of knowledge of EBM.

It was discovered that most physicians believe that their clinical practice to be ‘51–75%’ based on EBM, and that clinical practice guidelines and research findings were the main EBM sources used in clinical decision making in daily patient’s management. A majority of the participants were also welcoming to the promotion of EBM and believed that their colleagues’ attitudes were similar to theirs. The main perceived barriers to EBM were a lack of investment by health authorities as well as a lack of personal time.

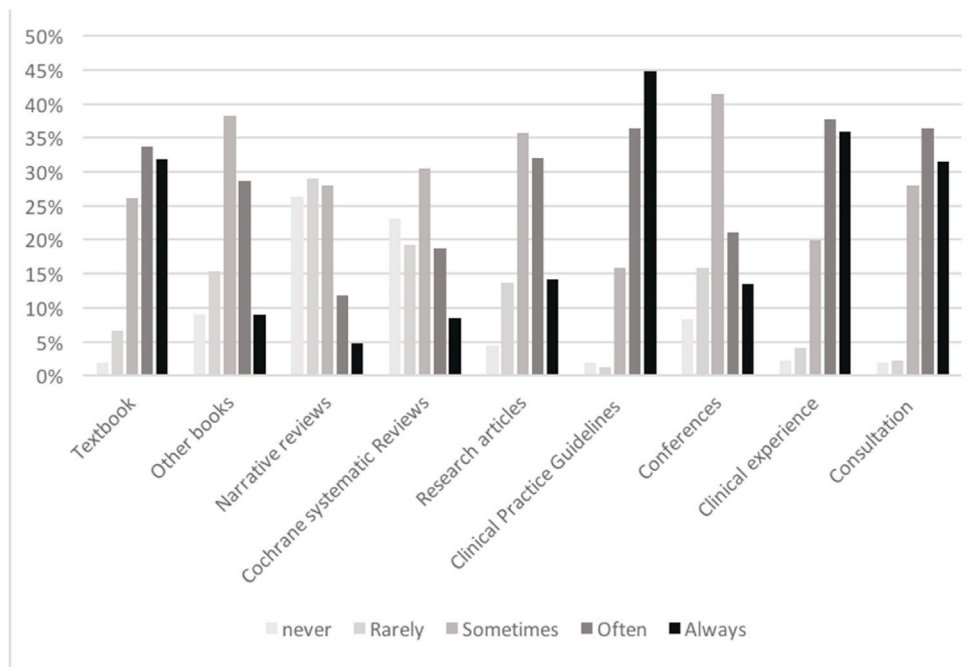


Fig. 2. Sources physician use to support their clinical decisions.

Table 5

Attitudes of physician towards EBM, n/total (%).

	Extremely welcoming	Welcoming	Neutral	Unwelcoming	Extremely unwelcoming
Attitude towards the current promotion of evidence-based medicine	152/437 (34.8)	234/437 (53.5)	39/437 (8.9)	7/437 (1.6)	5/437 (1.1)
Attitude of colleagues towards evidence-based medicine	70/437 (16)	216/437 (49.4)	125/437 (28.6)	23/437 (5.3)	3/437 (0.7)
The adoption of EBM places another demand on already overloaded physicians	Strongly agree 58/437 (13.3)	Agree 191/437 (43.7)	Neutral 121/437 (27.7)	Disagree 51/437 (11.7)	Strongly disagree 16/437 (3.7)
Interest in learning to integrate evidence based medicine into practice	180/437 (41.2)	214/437 (49)	38/437 (8.7)	5/437 (1.1)	0/437 (0)
Evidence-based medicine does not take into account patient preference	32/437 (7.3)	109/437 (24.9)	150/437 (34.3)	116/437 (26.5)	30/437 (6.9)
Practicing evidence-based medicine improves patient care.	204/437 (46.7)	191/437 (43.7)	36/437 (8.2)	5/437 (1.1)	1/437 (0.2)
Evidence-based medicine does not take into account limitations of clinical practice setting	51/437 (11.7)	160/437 (36.6)	142/437 (32.5)	75/437 (17.2)	9/437 (2.1)
Usefulness of research finding in daily Patients' management	Extremely useful 123/437 (28.1)	Useful 264/437 (60.4)	Neutral 46/437 (10.5)	Not useful 4/437 (0.9)	

4.2. Comparison with other studies

Internationally, many studies have focused on EBM among primary health care physicians while limited knowledge is known about the awareness and practice of EBM among physicians as a whole. In our study, the most utilized EBM source used in clinical decision-making among physicians in general hospitals in Kuwait was 'Up-to-date', which is somewhat different compared to Bandolier which was the most used EBM source in a similar study among general practitioners in the UK [9]. Additionally, a study in Japan showed different results as PubMed was the most utilized EBM source [12]. A Saudi Arabian study, however, stated that local and Middle Eastern editions of the Practitioner were the most regularly read journals [13]. Although the Cochrane database is widely accepted as the most valuable source of EBM, only 19.9% of the participants in this study used it as a source of clinical decisions making. However an improvement is seen compared to a previous Kuwaiti study, which showed that only 8.1% of primary care physicians use Cochrane

[7].

In the assessment of EBM practice, receiving formal EBM training was reported by 52.2% of participating physicians in our study, which is considerably higher than other studies. For example, the study in UK, 16% [9], and 11.7% in a Saudi Arabian study [13]. However, in the previous study in Kuwait among primary care physicians, a slightly higher percentage of receiving formal EBM training was reported at 58% [7]. Clinical decision-making among participants in our study was mainly dependent upon clinical practice guidelines, similar to that of a Turkish study, which affirmed that more than 50% of primary health-care physicians used clinical practice guidelines [10]. In contrast, the previous study in Kuwait [7] showed that 'own judgement' was the most relied upon in clinical decision-making, which may indicate an advancement in the transition between traditional opinion-based practices towards EBM amongst physicians in Kuwait in the current years.

Attitudes towards EBM were all-across welcoming among participants, suggestive of this was the positive attitudes towards the

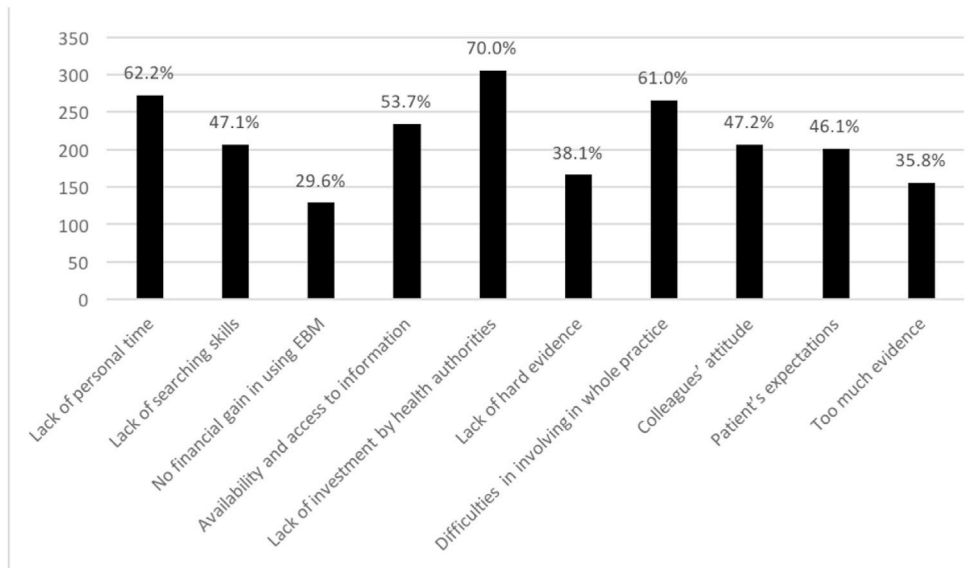


Fig. 3. Barriers to practicing EBM.

Table 6
Association between level of EBM knowledge and socio-demographic characteristics among general physicians in Kuwait.

Characteristic	n	Median score knowledge (IQR)	P value
Gender			0.008
Male	307	12 (8)	
Female	132	14 (8)	
Board Certified			0.046
Yes	167	14 (8)	
No	269	12 (7.5)	
Speciality			0.024
Medicine	161	14 (8)	
Surgery	158	12 (8)	
Paediatrics	77	11 (8)	
Obstetrics & Gynaecology	26	15 (8.3)	
Other	13	14 (8)	
Years of Practice			0.207
1–10	184	14 (7)	
11–20	161	12 (7)	
21–30	45	15 (8)	
31+	30	13 (9.5)	
Ranks			<0.001
Assistant	73	13.5 (7.8)	
Resident	81	14 (7)	
Registrar	96	10 (8)	
Senior Registrar	51	13 (7)	
Specialist	75	13 (8.3)	
Consultant	46	17 (9)	
Others	13	12 (10)	
Country of Undergraduate Training			<0.001
Egypt	188	11 (8)	
Kuwait	112	15 (8)	
Ireland	27	15 (7)	
Bahrain	24	12 (8)	
India	23	14 (8)	
Syria	21	12 (9)	
United Kingdom	14	14 (6.8)	
Others	21	12 (9)	
Received Formal Training			0.001
Yes	229	15 (8)	
No	207	10 (8)	

promotion of EBM (88.8%). However, it is somewhat lower than the welcoming of the promotion of EBM in Saudi Arabia’s study which was 98.3% [5].

The most perceived barrier towards EBM in our study was lack of

investment by health authorities (70%) as well as lack of personal time (62.2%). In most other analogous studies, lack of personal time was stated as the most significant barrier, this is seen in the British study (70%) [9] in addition to the previous Kuwaiti study which indicated that “over 3/4th of the doctors also indicated that “lack of time” as a perceived barrier [7].

Factors that were significantly associated with knowledge of EBM in the current study included gender, favouring females (P = 0.008); in a Japanese study however, there was no association between gender and EBM knowledge [12]. Country of undergraduate training was also significantly associated with the EBM knowledge score, in both, the current study (P < 0.001) and the previous study conducted in Kuwait (P = 0.008) [7]. Also, the current study and the study by Ahmad et al. showed that medical graduates receiving their medical degree from Kuwait had the highest knowledge scores, and that undergraduates from Egypt scored the lowest [7].

4.3. Strengths and limitations

The strengths of this study include the adoption of formerly utilized questionnaires, which increases the validity of the questionnaire, and it was a means to standardize and to allow for comparison with international studies with similar objectives. In addition, the high response of 439/597 (73.5%) is considered a strength and an indication that self-selection bias is not a major issue in our study. Sampling from a number of different general hospitals in Kuwait allowed us to have a good representation of physicians across Kuwait. The cross-sectional nature of our study design does not allow the assessment temporality when testing associations. Moreover, self-reporting and self-judgment can introduce substantial bias in reporting study-related information.

4.4. Implications

Incorporation of EBM courses in undergraduate programs, or receiving a formal training in EBM was shown to highly influence the knowledge of EBM among participants, therefore it is recommendable to include EBM courses in medical training programs as well as to conduct individual EBM courses to promote the practice of EBM. The greatest perceived barrier was lack of investments by health authorities which should be addressed, and increased efforts should be taken to overcome this limitation by means of increased availability and access to EBM databases.

5. Conclusion

Based on the results of this study, it can be concluded that most participants were relatively knowledgeable regarding EBM, compared to other international studies as well as the previous study in Kuwait. Most physicians also expressed welcoming attitudes towards the current promotion of EBM (88.8%), and were under the impression that a majority of their colleagues' attitudes were welcoming as well (65.4%). The main barrier towards the practice of EBM was discovered to be lack of investment of healthcare authorities as well as a lack of personal time. Further in-depth studies should be conducted to elaborate on how to improve the use of EBM amongst physicians in Kuwait and globally.

Availability of data and materials

The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

Ethical approval

The study was approved by the Health Sciences Center Ethics Committee for Student Research at Kuwait University (no. 2882/2016) and was carried out in accordance to the guidelines of the Declaration of Helsinki. Written informed consent was obtained from each study participant.

Sources of funding

None.

Author contributions

HH, HS, IQ, LS, MK, and SY, all equally participated in conceiving and designing the study, data collection, data analysis and interpretation, and drafting the manuscript. AZ supervised the design and conduct of the study, analyzed and interpreted the data, and critically revised the manuscript. All authors critically revised the manuscript for important intellectual content. The manuscript has been read and approved by all authors.

Consent

Written informed consent was obtained from each study participant.

Trial registry number

1. Name of the registry: Research Registry
2. Unique Identifying number or registration ID: researchregistry7311

3. Hyperlink to your specific registration (must be publicly accessible and will be checked): <https://www.researchregistry.com/browse-the-registry/#home/registrationdetails/617d1dafd00f62001e2e64f8/>

Guarantor

Iman N. Qadhi MDMubarak Al Kabeer Hospital, Kuwait University, Kuwait. Tel: (+965) 97701990 Email: iman.94.ik@gmail.com.

Declaration of competing interest

The authors declare that they have no competing interests.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.amsu.2021.103081>.

References

- [1] D.L. Sackett, W.M. Rosenberg, The need for evidence-based medicine, *J. R. Soc. Med.* 88 (1995) 620–624.
- [2] D.L. Sackett, S.E. Straus, W.S. Richardson, S. Richardson, W. Rosenberg, et al., *Evidence Based Medicine: How to Practice and Teach EBM*, Churchill Livingstone, London, 2000.
- [3] Z. Fedorowicz, K. Almas, J.V. Keenan, Perceptions and attitudes towards the use of evidence-based dentistry (EBD) among final year students and interns at King Saud university, college of dentistry in Riyadh Saudi Arabia, *Braz. J. Oral Sci.* 3 (2004) 470–474.
- [4] J.S. Burgers, R. Grol, N.S. Klazinga, M. Makela, J. Zaat, A. Collaboration, Towards evidence-based clinical practice: an international survey of 18 clinical guideline programs, *Int. J. Qual. Health Care* 15 (2003) 31–45.
- [5] M. Baig, Z. Sayedalam, O. Almouteri, M. Algarni, H. Allam, Perceptions, perceived barriers, and practices of physicians' towards evidence-based medicine, *Pak. J. Med. Sci.* 32 (2016) 49–54.
- [6] F.K. Al-Omari, S.M. Al-Asmary, Attitude, awareness and practice of evidence based medicine among consultant physicians in western region of Saudi Arabia, *Saudi Med. J.* 27 (2006) 1887–1893.
- [7] A.S. Ahmad, N.B. Al-Mutar, F.A. Al-Hulabi, E.S. Al-Rashidee, S.A. Doi, L. Thalib, Evidence-based practice among primary care physicians in Kuwait, *J. Eval. Clin. Pract.* 15 (2009) 1125–1130.
- [8] R. Zhang, K. Eggleston, V. Rotimi, R.J. Zeckhauser, Antibiotic resistance as a global threat: evidence from China, Kuwait and the United States, *Glob. Health* 2 (2006) 6.
- [9] A. Mccoll, H. Smith, P. White, J. Field, General practitioner's perceptions of the route to evidence based medicine: a questionnaire survey, *Bmj (Clinical Research Ed)* 316 (1998) 361–365.
- [10] R. Kahveci, C. Meads, Is primary care evidence-based in Turkey? A cross-sectional survey of 375 primary care physicians, *J. Evid. Base Med.* 2 (2009) 242–251.
- [11] K.S. Davies, Physicians and their use of information: a survey comparison between the United States, Canada, and the United Kingdom, *J. Med. Libr. Assoc.* 99 (2011) 88–91.
- [12] R.R. Risahmawati, S.S. Emura, T.T. Nishi, S.S. Koizumi, Japanese resident physicians' attitudes, knowledge, and perceived barriers on the practice of evidence based medicine: a survey, *BMC Res. Notes* 4 (2011) 374.
- [13] L.A. Al-Ansary, T.A. Khoja, The place of evidence-based medicine among primary health care physicians in riyadh region, Saudi Arabia, *Fam. Pract.* 19 (2002) 537–542.