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Research Article

**FAMILY PHYSICIANS' KNOWLEDGE AND APPLICATION OF
EVIDENCE BASED MEDICINE IN AL-WAZARAT HEALTH CARE
CENTER, PRINCE SULTAN MILITARY MEDICAL CITY, RIYADH 2016**Abdullah Alturki¹, Ghada Alarfaj², Nouf Alturki², Sultan Alturki³¹ Resident, Family Medicine Department, Prince Sultan Military Medical City² Consultant, Family Medicine Department, Prince Sultan Military Medical City³ Intern, College of Medicine, Al Imam Mohammad Ibn Saud Islamic University (IMSIU)**Abstract**

Background: Evidence-based medicine (EBM) has emerged as an international priority in efforts to reduce unwarranted variations in medical practice and to improve patient safety and health care quality. There is lack of recent data examining the awareness and use of EBM among family physicians in Saudi Arabia, specially after the recent incorporation of EBM in the curricula of medical schools and improvement of internet access. Additionally, awareness and use of EBM databases specially the Cochrane library have never been the focus of previous studies. Moreover, there is lack of data on physician and system factors associated with better use of EBM. **Objective:** To assess the level of awareness and use of EBM databases including Cochrane Library among family physicians and to determine demographic and occupational characteristics associated with better use of EBM databases. **Methods:** A cross-sectional design was used to examine family physicians working in Al-Wazarat health care center in Riyadh between October 2016 and July 2017. Data were collected using a self-administered questionnaire which was slightly modified from the questionnaire validated and used before. **Results:** The current analysis included 46 family physicians. The average age was 40.4 ± 4.1 years and 76.1% of the physicians were males. The majority (93.5%) of the study physicians reported using the internet to solve dilemmas about their patients. The majority (89.1%) were able to recognize systematic review of randomized controlled trials as the top level of evidence. Approximately 65.9% of the study physicians thought that the Cochrane Library could help them in solving the problems encountered in their practice. Approximately 56.8% of the study physicians had internet access at work and 45.7% had access to EBM databases. Approximately 47.8% were using specialized EBM databases and 34.8% were using the Cochrane Library and/or reading its systematic reviews. Having access to EBM databases was the only factor that was significantly associated with frequent use of specialized EBM databases while having internet access at work, having access to EBM databases, hearing about the Cochrane Library, and to less extent positive attitude towards the Cochrane Library were associated with frequent use of the Cochrane Library and/or reading its systematic reviews. **Conclusions:** The levels of awareness and use of EBM observed in the current study are considered better than reported before in Saudi Arabia but still suboptimal in some aspects. There still need for more educational activities to improve EBM skills and use. Further interventional studies are needed to examine the impact of fixing the insufficient knowledge and limited access to EBM information on the quality of patient care

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INTRODUCTION:

Evidence-based medicine (EBM), commonly referred to as the integration of best research evidence with clinical expertise and patient values, has emerged as an international priority in efforts to improve patient safety and health care quality [1, 2]. It is used as a method to bridge the gap between knowledge production and its clinical implications [3]. Physicians should have the ability to gain, assess, apply and integrate new knowledge in their professional life [4]. EBM implementation can assist physicians in making informed decisions which are believed to reduce unwarranted variations in medical decisions [5]. Several studies described barriers and facilitators for implementing EBM in different disciplines including family medicine [6-8]. Physician knowledge and perception about EBM is probably one of the critical issues in implementing EBM in clinical practice and improving the quality of care [9].

There is lack of recent data examining the awareness and use of EBM among family physicians in Saudi Arabia, specially after the recent incorporation of EBM in the curricula of medical schools and improvement of internet access. Additionally, awareness and use of EBM databases specially the Cochrane library have never been the focus of previous studies. Moreover, there is lack of data on physician and system factors associated with better use of EBM. Therefore, this study examined the awareness and use of EBM among family physicians in large primary care center in Saudi Arabia on purpose to increase awareness among family physicians regarding EBM and eventually improve the patients' health care.

LITERATURE REVIEW:

A computerized English-language search was performed between June 2015 and June 2017 on different search engines to identify EBM relevant articles used in executing this work. Search engines used included Pubmed, Web of science, Springer link, ScienceDirect, and Google scholar. The search strategy used a series of keywords to identify the topics of interest, such as; evidence-based medicine, EBM, evidence-based practice, EBP, Cochrane Library, Cochrane database, GRADE, and BMJ. Different combinations of search were done using AND/OR conjunctions. The abstracts of retrieved articles and documents, when available, were compiled into endnote library along with their pdf to facilitate further in-document search and to facilitate accurate citations.

I. Background and resources of EBM:

EBM has been defined by Dr. David Sackett almost two decades ago as "the conscientious, explicit and judicious use of current best evidence in making decisions about the care of the individual patient [1]. It integrate individual clinical expertise with the best available external clinical evidence from systematic research [1]. Few years later, Haynes and colleagues updated the EBM definition so as to consider the following in clinical decisions (1) the patient's clinical and physical circumstances (2) the relevance of research evidence (3) the patient's preferences and likely actions (acceptance), and finally, (4) clinical expertise needed to bring the above three considerations together as a recommended treatment that the patient is willing to accept [10]. The five-step model of practicing EBM includes the following five steps: (1) formulation of a specific clinical question, (2) collection of the best available evidence, (3) critical appraisal of such evidence for validity, clinical relevance, and applicability, (4) integration of appraised evidence in the decision in clinical practice and finally (5) evaluation of the outcomes of such integration [4].

A number of approaches and systems have been used for grading the evidence and the strength of recommendations [11]. The grades of recommendation, assessment, development, and evaluation (GRADE) working group developed the GRADE approach that addresses key shortcomings in the previous systems [11-13]. The GRADE system classifies the quality of evidence as high in RCTs, moderate in Quasi-randomized trial, low in observational studies, and very low in any other evidence [13]. The GRADE system additionally focused on other aspects of the quality of evidence such as risk of bias, consistency, directness, and precision [14, 15].

There are two sources of evidence; primary and secondary [16]. Primary (unfiltered) evidence is found in original bibliographic citations such as individual RCTs and observational studies including cohort and case control studies. Primary evidence can be obtained from PubMed, Ovid, and CINAHL. Secondary (filtered) sources include pre-appraised literature, such as systematic reviews, critically-appraised topics (evidence syntheses), and critically-appraised individual articles (article synopses) written by experts in critical appraisal of primary citations. The Cochrane library is considered the most important EBM resource [17, 18]. It is the most comprehensive database available on systematic reviews. The Cochrane Library contains several

databases, including the Cochrane database of systematic reviews (for Cochrane reviews), database of abstracts of reviews of effects or DARE (structured abstracts of systematic reviews), and the Cochrane central register of controlled trials or CENTRAL (which includes records of trials) [18].

II. EBM Knowledge and attitude among family physicians internationally

Several studies around the world examined the knowledge, attitude, and perception of EBM among family physicians. The findings were generally showing limited knowledge about EBM basics and resources. For example, a cross-sectional study among 573 physicians from family practice and university hospital in Croatia showed that only half of them were able to correctly identify highest level of evidence in EBM and only a third heard about the Cochrane Library [18]. Similarly, 35% of family physicians in Bosnia and Herzegovina were able to correctly identify highest level of evidence in EBM and 35% heard about the Cochrane Library [19]. Additionally, less than 30% of family physicians in Australia were aware of basic terms of EBM such relative risk, absolute risk, and number needed to treat and only 15% of them considered systematic reviews as 'very useful' [20].

The limited knowledge about EBM among family physicians was usually associated with positive attitude towards EBM [21-23]. For example, a cross-sectional study among 182 family physicians in Qatar showed that while only 40% of the physicians were aware of the American College of Physicians' Journal Club and 26% of the physicians were aware of the Cochrane Library, more than 90% of the physicians welcomed the current promotion of EBM and believed that practicing EBM can improve patient care [22]. Similarly, cross-sectional study among 202 family physicians in Jordan showed that approximately 60% of them reported knowledge of the concept of EBM while higher percentages had positive attitude towards EBM; 75% believed that EBM improves quick knowledge update, 85% believed that EBM should be promoted, 94% reported that it positively impact the doctor-patient relationship [21]. Another study in Jordan showed also a very positive attitude towards EBM; 63.5% welcomed the current promotion of EBM and 90% agreed that practicing EBM can improve patient care [23].

III. Practicing EBM among family physicians internationally

While all professional groups in primary care setting

welcome and support EBM, very few use EBM resources including guidelines or protocols [24]. For example, despite the very positive attitude towards EBM, 56% family physicians in Jordan reported that they ever used the EBM, probably because of the several individual and system barriers towards implementing EBM [21]. Similarly, approximately 50% of family physicians in Jordan believed that less than 50% of their current clinical practice is evidence-based [23]. Additionally, more than 60% of family physicians in Qatar and Bahrain claimed using EBM in their practice [22, 25]. The use was higher among those attended an EBM workshop in the past [25]. However, when the use of specific EBM resource was asked much lower rate of EBM practice was give. For example, only 5% of family physicians and 19% of physicians in University hospitals in Croatia reported ever using the Cochrane Library [18]. This is despite that 63% and 40% of these physicians (respectively) reported having access to specialized EBM databases [18]. In Bosnia and Herzegovina, 23% of family physicians had access to EBM databases, but only 4% were able to name the actual EBM databases they used [19].

IV. Knowledge and attitude towards EBM in Saudi Arabia

Similar to international and regional reports, family physicians in Saudi Arabia appeared to have generally limited knowledge but positive attitude towards EBM. For example, a cross-sectional study among 650 family physicians working in MOH primary care centers in Riyadh showed low awareness of the methods of extracting journals or reviewing publications and databases [26]. On the other hand, between 80% and 90% these physicians welcomed the promotion of EBM and believed that practicing EBM is useful in clinical practice and can improve the patient care [26]. Similarly, in another a cross-sectional study among 409 physicians working in primary care centers and general hospitals in Dammam, only 40% of the physicians heard about EBM [27]. However, 66% of the physicians in that study were in favor of EBM and more than 90% of those who heard about EBM had a positive attitude towards EBM [27]. Positive attitudes were also reported in Family and Community Medicine physicians in Abha (median score was 8 out of 10 points) [28].

Outside family physicians, a cross-sectional study among 300 consultant physicians working in governmental hospitals in Al-Taif showed that more than 95% of them welcomed EBM, believed in its usefulness and its ability to improve the patient care

[29]. However, the awareness of common sources of EBM such as ACP Journal Club and Cochrane Library in these consultant physicians was only 46% and 59%, respectively [29]. Positive attitudes were also reported in physicians working in general hospitals in Aseer (average score was 6.4 out of 10 points) [30]. However, physicians working in the general hospitals in Aseer were unaware of the sources of EBM; for example, only 26% were aware of the Cochrane Library, 23% were aware of ACP Journal Club, and 39% were aware of UpToDate [30].

V. Practicing EBM in Saudi Arabia

Similar to international and regional reports, physicians in Saudi Arabia specially family physicians appeared to have poor use and application of EBM. For example, less than 4% of family physicians working in MOH primary care centers in Riyadh were using one or more of the common EBM sources [26]. Outside family physicians, the use and application of EBM sources among physicians working in general hospitals in Aseer was generally very poor [30]. For example, the use and application of EBM resources was 6% for the Cochrane Library, 4-6% for the ACP Journal Club, and 10-18% for UpToDate [30]. Additionally, only 7% and 13% of consultant physicians working in governmental hospitals in Al-Taif were using ACP Journal Club and Cochrane Library, respectively [29].

VI. Barriers to EBM application in primary care:

Although EBM was designed to help the physician including primary care physician in taking the right clinical design, application of EBM is not a straightforward process [2, 6]. Several studies examined the individual and institutional barriers and facilitators to evidence-based practice (EBP) adoption both internationally [2, 6, 31] and in Saudi Arabia [8, 26, 28, 29, 32]. For example, a systematic review of 106 articles that examined the challenges and barriers of the application of EBM in different types of healthcare settings showed the following barriers in primary care; lack of resources, inadequate EBM skills, insufficient/inappropriate EBM training, insufficient time, and being not a priority [2]. Another systematic review of 22 qualitative and quantitative studies done in primary care setting reported a significant number of barriers with access to and applicability of clinical evidence (which were perceived either lacking or unsuitable) were the major challenges to the application of EBM in general practice [6]. In addition, family physician belief in expertise, the variability of patient's situation, and patient's preferences were perceived as

barrier to the use of EBM. Furthermore, practice related challenges such lack of resources, busy schedule, and lack of supporting administration were also reported [6].

In Saudi Arabia, the main barriers for practicing EBM as stated by physicians working in primary care centers and general hospitals in Dammam were the lack of training followed by lack of resources, time, and relevance [8]. In another study done among physicians in tertiary care hospital in Jeddah, the barriers for practicing EBM included the lack of time, lack of the availability and access to information, difficulties in involving the evidence in practice, and lack of investment by health authorities [32]. Similarly, lack of training, resources, and time were consistently reported barriers for practicing EBM among physicians in Saudi Arabia [26, 28, 29].

VII. EBM education and impact of application on quality of care:

Several studies showed that educating physicians on EBM knowledge and skills significantly improve their ability to articulate questions, perform required literature search, perform critical appraisal of relevant evidence, utilize decision-making approaches and apply best-evidence in their clinical practice [33-36]. For example, the impact of EBM workshops on EBM related competencies has been examined in RCT conducted in a primary care center in Dammam [34]. Participation in EBM workshop was associated with a significant improvement in the physicians' EBM related competencies such as searching and appraising related evidence, both immediately after the workshop and 4 months later [34]. Similarly, a quasi-experimental study among 110 clinical residents in Iran showed improvement in the ability to use four different decision-making approaches one month after a short workshops on EBM [36]. The greatest post-education improvement in EBM skills was shown to happen with courses that involve more active participation, small number of participants and topics, and more attention to statistical concepts [33].

Unlike the quick recognizable impact of EBM education and training on physician knowledge and competencies, the impact of EBM training on specific physician performances with their patients was less clear or at best modest [9, 37, 38]. For example, a multi-component EBM implementation of clinical practice guidelines in primary care setting in Sweden was associated with modest positive effect on the use of these guidelines. Similarly, the association of the EBM knowledge among primary care physicians with the quality of care offered to their chronic patients (with diabetes, hypertension,

and heart diseases) was examined in a cross-sectional study in Israel; the findings showed a modest positive correlation [9].

VIII. Rationale of the Study:

EBM has emerged as an international priority in efforts to reduce unwarranted variations in medical practice and to improve patient safety and health care quality. Primary care setting is considered the front line for dealing with a large number of health complaints. Studying the awareness and behavior of EBM among family physicians is an important step towards improving EBM application in primary care setting. The knowledge of EBM can potentially improve the competencies of using EBM and may be actual application in practice. Although a number of studies in Saudi Arabia examined the awareness and use of EBM among family physicians (alone or with other specialties), there is still a need for further research as the most recent available data were collected at least 15 years ago and published at least 10 years ago [8, 26, 27, 39]. Additionally, Therefore, the previously reported awareness and practice of EBM may not represent the current situation in Saudi Arabia, specially after the recent incorporation of EBM in the curricula of medical schools and improvement of internet access [40]. Additionally, awareness and use of EBM databases specially the Cochrane library have never been the focus of these studies. Moreover, none of the previous studies determined the physician demographic and occupational characteristics that are potentially associated with better use of EBM.

AIM AND OBJECTIVES:

I. Research Questions:

- What are the levels of awareness and application of EBM among family physicians?
- Are they able to access relevant databases, journals and review publications?
- Are they able to apply EBM in their career?
- What are the physicians' characteristics associated with better use of EBM?

II. Aim of the Study:

- To increase awareness among family physicians regarding EBM, evidence based journals, articles and databases

III. Objectives of the Study:

1. To assess the level of awareness of EBM databases including Cochrane Library among family physicians working in Al-Wazarat health care center (WHC) in

Riyadh.

2. To evaluate the application of EBM databases among above family physicians.
3. To determine demographic and occupational characteristics of the above physicians associated with their better use of EBM databases including Cochrane Library.

METHODS:

I. Setting:

The study was conducted in WHC, a big family medicine center located in Riyadh City, the capital of Saudi Arabia. The center provides family and community services to eligible patients, which may involve treatment for acute or chronic disorders, antenatal care, child welfare, vaccination programs, chronic disease clinic and care of chronic/acute wounds and injuries. The WHC is run by about 88 physicians and is serving about 1000 visits daily. The WHC is one of 12 primary care centers under the umbrella of Prince Sultan Military Medical City (PSMMC). PSMMC is part of the Medical Services Department (MSD) of the Ministry of Defense and Aviation (MODA).

II. Design:

A cross-sectional design was used to conduct this study. The study was conducted during the period from 1st of October 2016 and 31st of July 2017.

III. Population:

The current study targeted family physicians working in WHC in Riyadh, Saudi Arabia. There were no restrictions by age, gender, nationality, or duration of service. Physicians who had no clinical responsibilities or those who refused to give consent were excluded from the study

IV. Sample size estimation:

Previous studies among family physicians in Saudi Arabia showed a positive attitude towards EBM ranging approximately between 60% and 80% [27, 28, 30]. The sample size was calculated according to the following assumptions; 70% estimated positive attitude towards EBM, 95% desired level of confidence and 10% confidence limits. The calculation was done using this formula

$$\text{Sample size} = \frac{z^2(p)(1-p)}{\delta^2}$$

Where:

Z = 1.96 (95% confidence level)

p = positive attitude towards EBM = 0.70

$\delta = 0.10$ (Error tolerance in the estimation)

It was estimated that 81 family physicians are required to allow detection of a positive attitude towards EBM of 70% with 10% confidence limit. However, the total number of physicians available at the WHC was 88. Therefore, the sample size was corrected for the limited population using the following formula

$$\text{Corrected Sample size} = \frac{\text{Uncorrected Sample size}}{1 + \frac{\text{Uncorrected sample size}}{\text{Population}}}$$

The final corrected sample was between 43 family physicians

V. Sampling technique:

The study population was obtained through a convenience sample. All family physicians in WHC have been invited to join the study. A total 46 family physicians out of 52 approached agreed to join the study, making a study response rate of 88.5%.

VI. Data collection tool:

Data were collected using a self-administered questionnaire which was slightly modified from the questionnaire validated and used by Novak et al. in a study evaluating the awareness and use of EBM databases and Cochrane Library among family physicians in Croatia in 2010 [18]. The same questionnaire was used in a similar study in Bosnia and Herzegovina in 2015 [19]. A permission was obtained from the corresponding author of Novak et al. study (Dr Livia Puljak, School of Medicine in Split, Croatia, email: livia@mefst.hr) to use their questionnaire. The questionnaire consisted of 28 questions arranged into four sections; (1) Socio-demographic and occupational characteristics of the physicians such as age, gender, nationality and professional category, (2) Consultations done when the physician is uncertain about what to do with his/her patient, (3) Knowledge and use of EBM and EBM databases, (4) Knowledge and use of the Cochrane Library. The questionnaire was piloted before widespread distribution. The feedback was excellent with only few wording changes were done to become more relevant to our physicians.

VII. Ethical considerations:

The proposal was approved by the research and ethics committee at PSMC. Permission was obtained from WHC administration to distribute the questionnaires to family physicians at WHC. The cover page of the study questionnaire contained information about the study objectives and importance. The first page of the questionnaire has

the title of the study and the contacts (email) of the researchers for future or further inquiries. Acceptance of participation was clearly stated as voluntarily and completing the questionnaire was considered as acceptance of participation. The sensitive information of family physicians as name and contacts were not collected. The data were confidentially kept and were only used for the purposes described in the study objectives.

VIII. Statistical analysis:

All categorical variables were presented as frequencies and percentages while continuous variables were presented as means and standard deviations. To detect significant associations between socio-demographic and occupational characteristics of the physicians and their use of EBM databases or the Cochrane Library, chi-square or Fisher's exact test, as appropriate, were used for categorical variables and student t-test or Mann-Whitney test, as appropriate, were used for continuous variables. All P-values were two-tailed. P-value <0.05 was considered as significant. SPSS software (Version 22.0 Armonk, NY: IBM Corp) was used for all statistical analyses.

RESULTS:

A total 46 family physicians out of 52 approached agreed to join the study, making a study response rate of 88.5%. The current analysis included 46 questionnaires that have been filled up by the study physicians after getting their appropriate consents. Table 1 shows the socio-demographic and occupational characteristics of the study physicians. The age of the study physicians ranged between 26 and 45 years with an average age of 40.4 ± 4.1 years. Almost half (47.8%) of the participants were below the age of 30 years. Approximately three-fourth (76.1%) of the participants were males and the majority (87.0%) of the participants were Saudi. Residents were the most frequent (78.3%) professional category included, followed by registrars/senior registrars (17.4%), and consultants (4.3%). The average number of patients seen by half (50.0%) of the study physicians was 10 to 20 patients per day. This average number of patients seen was <10 patients per day in 31.8% of the study physicians and >20 patients per day in 18.2% of the study physicians.

Table 2 and figures 1 and 2 show the consultations done by the study physicians when they are uncertain about what to do with their patients. All study physicians reported that they sometimes need help to choose diagnosis or therapy for their patients (Figure 1). Internet was the most frequent (95.7%) resource

tool used by the study physicians when you do not know what to do in any part of workup of their patients (Figure 2). Other consultation resources included colleagues (84.8%), books (45.7%), research articles (37.0%), promotional materials of pharmaceutical companies (4.3%), and other source of information (17.4%). More than half (56.8%) of the study physicians had internet access at work. The majority (93.5%) of the study physicians reported using the internet to solve dilemmas about their patients. These participants reported using the following internet resources; specialized EBM databases (47.8%), search engines such as google and yahoo (45.7%), Pub Med (15.2%), and other source of information (21.7%).

Table 3 shows the responses of the study physicians regarding EBM. Less than half (45.7%) of the study physicians had access to EBM databases while more than half (54.3%) of them either did not have that access (39.1%) or were not aware of its presence (15.2%). Among the 21 (45.7%) study physicians who reported having access to EBM databases, the following databases names were give as the most frequent databases; Up to Date (52.4%), PubMed (19.0%), British Medical Journal (BMJ) best practice/BMJ EBM journal (19.0%), Cochrane (9.5%), DynaMed (9.5%), Ovid (4.8%), and other databases (23.8%). This was in addition to 3 (14.3%) study physicians who could not give a name of an EBM database. The majority (89.1%) of the study physicians were able to recognize systematic review of randomized controlled trials as the top level of evidence in medicine. On the other hand, the minority (10.9%) of the study physicians wrongly reported that single randomized controlled trial, prospective cohort study, or case report are the top levels of evidence in medicine. As shown in Figure 3, he following were reported as the most frequent sources of basic information about EBM; postgraduate education (58.7%), continuous medical education (34.8%), and undergraduate education (13.0%).

Table 4 and figures 4 and 5 show the responses of the study physicians regarding the Cochrane Library. Approximately 56.5% of the study physicians reported hearing about the Cochrane Collaboration while 76.1% of the study physicians reported hearing about the Cochrane Library. The most frequent reported sources of information about the Cochrane Library included; internet (32.6%), colleagues (28.3%), research articles (21.7%), and books (4.3%). Approximately one-fourth (26.1%) of the study physicians reported ever using the Cochrane Library and less than one-third (30.4%) reported ever reading

systematic reviews in the Cochrane Library. The most commonly read format of systematic reviews in the Cochrane Library was summaries alone (93.8%), followed by both summaries and full text (6.3%) (Figure 4). Home was the most frequent access to the Cochrane Library (56.3%), followed by work (31.1%) (Figure 5). The majority (81.3%) of the study physicians who were using Cochrane Library and/or reading its systematic reviews were doing this less than once a month. Half (50.0%) of these participants thought that Cochrane Library helped them in solving problems in their practice, while 37.5% did not believe that and 12.5% believed that very much or completely. Only 14% of the study physicians were reading summaries of Cochrane systematic reviews in Medical Gazette, with only a third of them were recalling the titles they have read. Approximately two-thirds (65.9%) of the study physicians thought that the Cochrane Library could help them solving the problems encountered in their practice. Approximately half (51.2%) of the study physicians expressed their interest in learning the methodology of making a Cochrane systematic review.

Slightly less than half (47.8%) of the study physicians were using specialized EBM databases. The only characteristic that was significantly associated with frequent use of specialized EBM databases was having access to EBM databases (72.7% among those who had access and 20.8% among those who did not have access, $p < 0.001$) (Figure 6). On the other hand, none of the examined socio-demographic or occupational characteristics (such as age, gender, nationality, professional category, etc) were associated with frequent use of specialized EBM databases.

As shown in Figure 7, approximately one-third (34.8%) of the study physicians were using Cochrane Library and/or reading its systematic reviews. Table 5 compared the socio-demographic and occupational characteristics of the study physicians by the status of using the Cochrane Library and/or reading its systematic reviews. Having internet access at work, having access to EBM databases, and hearing about the Cochrane Library were all significantly associated with frequent use of the Cochrane Library and/or reading its systematic reviews (p -values were 0.026, 0.022, and 0.040, respectively). Both thinking that the Cochrane Library could help in solving problems encountered in practice and having interest in learning the methodology of making a Cochrane systematic review were associated with better use of Cochrane Library and/or reading its systematic reviews. However, the last 2 associations were only marginally significant (p -values were 0.096 and

0.076, respectively). On the other hand, none of other examined socio-demographic or occupational characteristics (such as age, gender, nationality,

professional category, etc) were associated with using the Cochrane Library and/or reading its systematic reviews.

Table 1: Socio-demographic and occupational characteristics of the study physicians

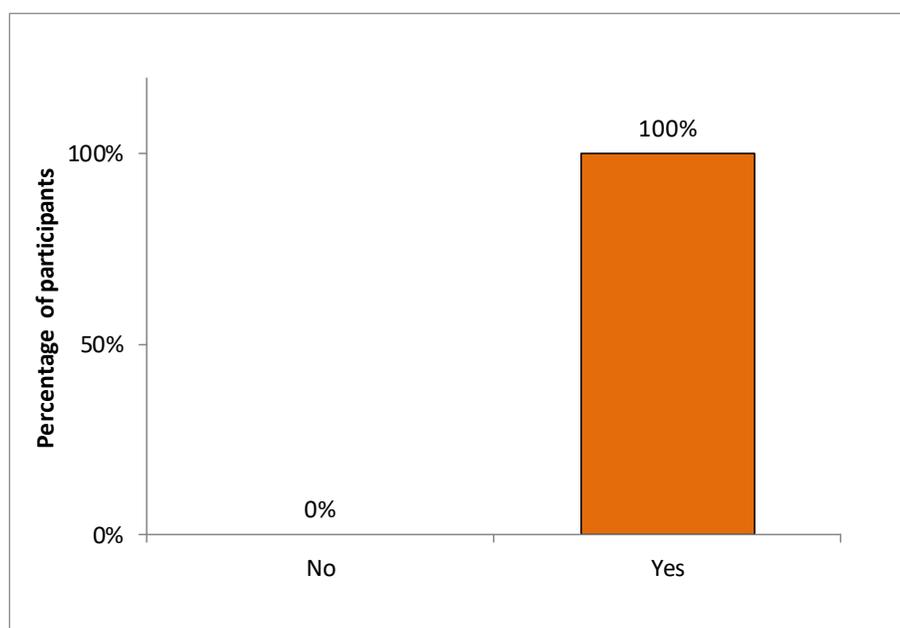
Characteristics	Number*	Percentage
Age (years)		
Range	26 - 45	
Mean \pm standard deviation	40.4 \pm 4.1	
<30	22	47.8%
30	9	19.6%
>30	15	32.6%
Total	46	100.0%
Gender		
Male	35	76.1%
Female	11	23.9%
Total	46	100.0%
Nationality		
Saudi	40	87.0%
Non-Saudi	6	13.0%
Total	46	100.0%
Professional category		
Resident	36	78.3%
Registrar/senior registrar	8	17.4%
Consultant	2	4.3%
Total	46	100.0%
Average number of patients seen daily		
<10 patients	14	31.8%
10-20 patients	22	50.0%
>20 patients	8	18.2%
Total **	46	100.0%

* Unless mentioned otherwise ** 2 physicians were excluded due to missing information

Table 2: Consultations when uncertain about what to do with a patient

Characteristics	Number	Percentage
Do you have Internet access at work?		
No	19	43.2%
Yes	25	56.8%
Total *	44	100.0%
Do you use Internet to solve dilemmas about patients?		
No	3	6.5%
Yes	43	93.5%
Total	46	100.0%
If using internet, which internet sources do you use? **		
Search engines (Google, etc.)	21/46	45.7%
Pub Med	7/46	15.2%
Specialized evidence-based medicine databases	22/46	47.8%
Other source of information	10/46	21.7%

* 2 physicians were excluded due to missing information ** The total for each source was 46 as multiple answers were allowed

**Figure 1: Do you sometimes need help to choose diagnosis or therapy for your patient?**

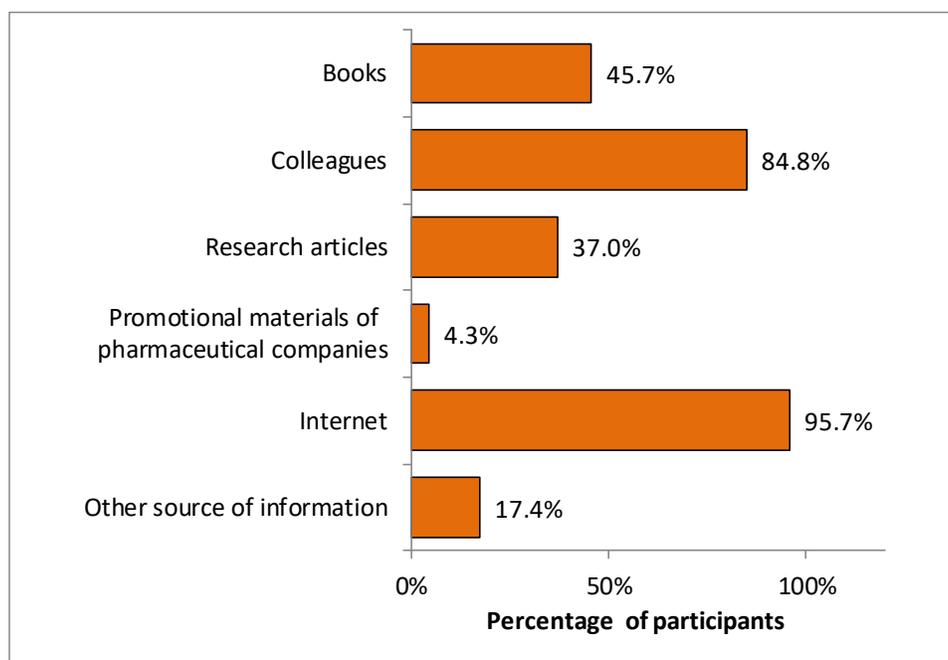


Figure 2: Do you sometimes need help to choose diagnosis or therapy for your patient?

Table 3: Participants' responses regarding evidence-based medicine (EBM)

Characteristics	Number	Percentage
Do you have access to evidence-base medicine databases?		
No	18	39.1%
Yes	21	45.7%
Do not know	7	15.2%
Total	46	100.0%
If you have access, which of these databases do you use? (open-ended question)*		
Up to Date	11/21	52.4%
PubMed	4/21	19.0%
BMJ best practice/BMJ EBM journal	4/21	19.0%
Cochrane	2/21	9.5%
DynaMed	2/21	9.5%
Ovid	1/21	4.8%
Others	5/21	23.8%
No answer given	3/21	14.3%
In the hierarchy of evidence in medicine, the top level is:		
Case report	1	2.2%
Prospective cohort study	2	4.3%
Systematic review of randomized controlled trials	41	89.1%
Single randomized controlled trial	2	4.3%
Total	46	100.0%

* The total for each database was 21 (who had access to EBM databases) as multiple answers were allowed

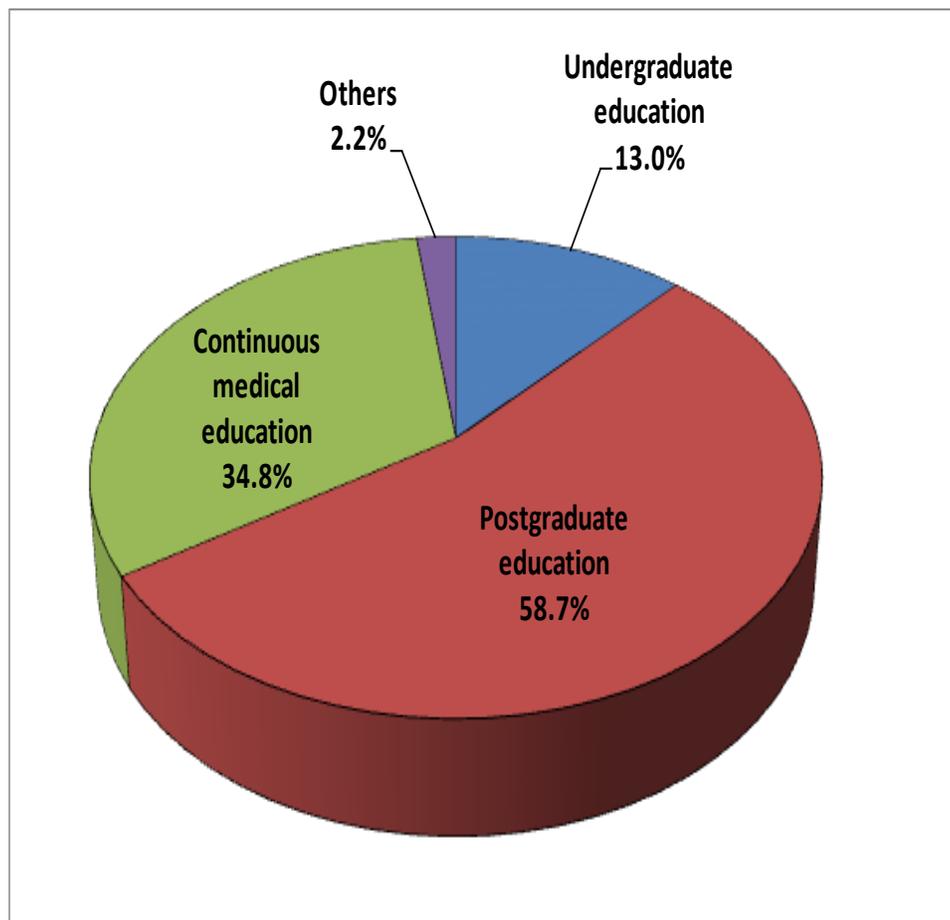


Figure 3: Where did you get basic information about evidence-based medicine?

Table 4: Responses regarding The Cochrane Library

Characteristics	Number	Percentage
Did you hear about The Cochrane Collaboration?		
No	20	43.5%
Yes	26	56.5%
Total	46	100.0%
Did you hear about The Cochrane Library?		
No	11	23.9%
Yes	35	76.1%
Total	46	100.0%
If you heard, from where did you get information about The Cochrane Library? ⁽¹⁾		
Books	2/37	5.4%
Colleagues	13/37	35.1%
Research articles	10/37	27.0%
Leaflets of pharmaceutical companies	0/37	0.0%
Internet	15/37	40.5%
Others	6/37	16.2%
Do you ever use The Cochrane Library?		
No	34	73.9%
Yes	12	26.1%
Total	46	100.0%
Do you ever read systematic reviews in The Cochrane Library?		
No	32	69.6%
Yes	14	30.4%
Total	46	100.0%
How often do you use The Cochrane Library?		
Never	0	0.0%
Less than once a month	13	81.3%
Once a month or more	3	18.8%
Total ⁽²⁾	16	100.0%
Did The Cochrane Library help you in solving a problem in your practice?		
Not at all/very little	6	37.5%
it helped me enough	8	50.0%
Very much/completely	2	12.5%
Total ⁽²⁾	16	100.0%

Table 4: Responses regarding The Cochrane Library (continued)

Characteristics	Number	Percentage
Did you read summaries of Cochrane systematic reviews in Medical Gazette?		
No	37	86.0%
Yes	6	14.0%
Total ⁽³⁾	43	100.0%
If you read Medical Gazette, do you recall any titles of Cochrane review summaries that were published in Medical Gazette?		
No	4	66.7%
Yes	2	33.3%
Total ⁽⁴⁾	6	100.0%
If you recall titles, which title of a Cochrane summary from Medical Gazette do you remember?		
Title given	1	50.0%
Title not given	1	50.0%
Total ⁽⁵⁾	2	100.0%
Do you think The Cochrane Library could help you solve problems that you encounter in your practice?		
No	14	34.1%
Yes	27	65.9%
Total ⁽⁶⁾	41	100.0%
Are you interested in methodology of making a Cochrane systematic review?		
No	21	48.8%
Yes	22	51.2%
Total ⁽⁷⁾	43	100.0%

(1) The total for each source was 37 (who heard of the Cochrane Collaboration or the Cochrane Library) as multiple answers were allowed. (2) The total was 16 who ever used the Cochrane Library or read its systematic reviews. (3 & 6 & 7) The total was less than 46 due to missing information. (4) The total was 6 who read summaries of Cochrane systematic reviews in Medical Gazette. (5) The total was 2 who recalled titles of Cochrane review summaries that were published in Medical Gazette.

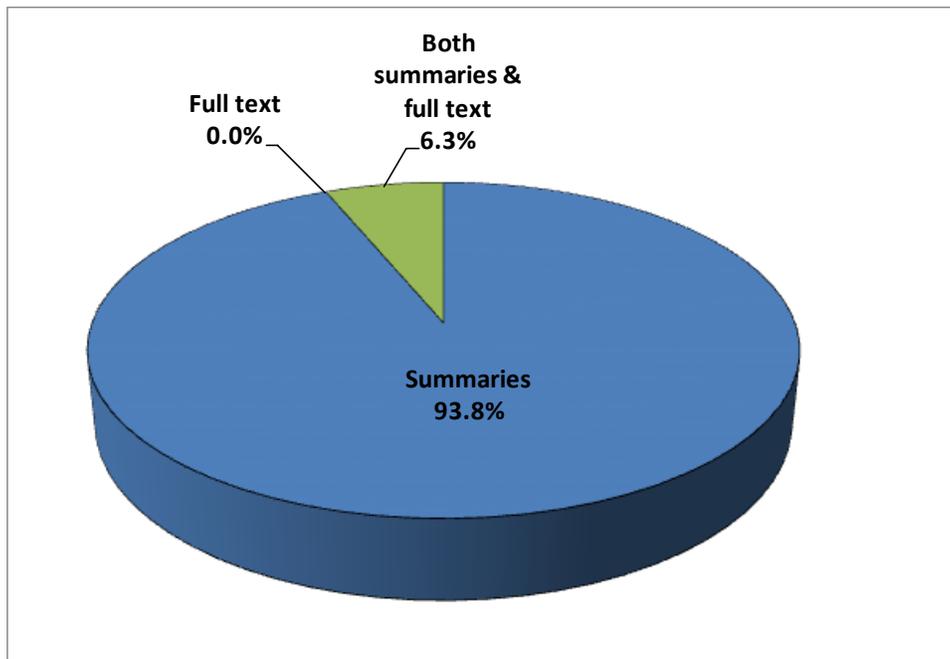


Figure 4: Do you mostly read summaries of Cochrane systematic reviews or full text?

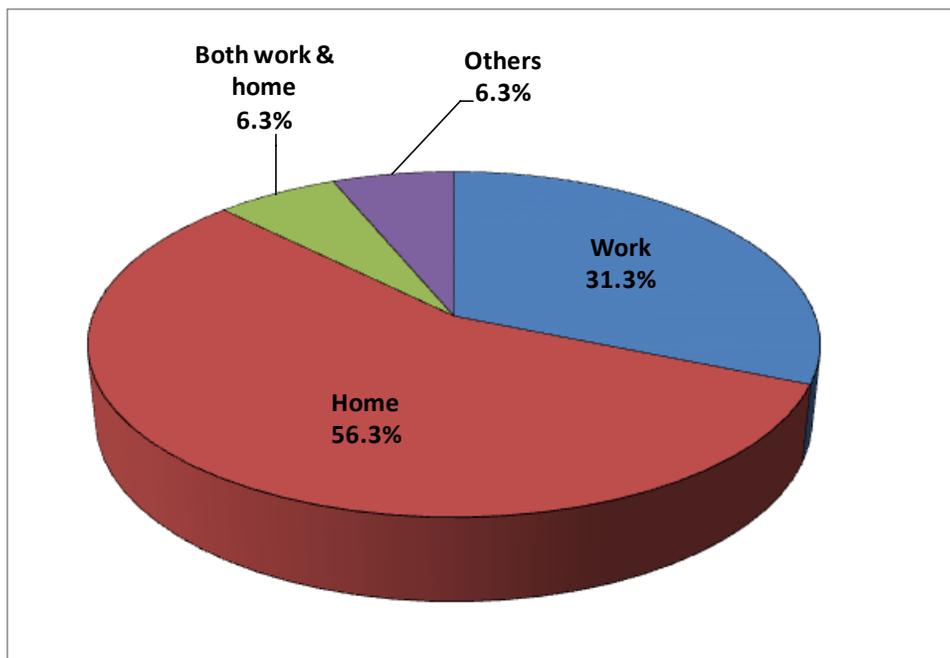


Figure 5: From where do you access The Cochrane Library?

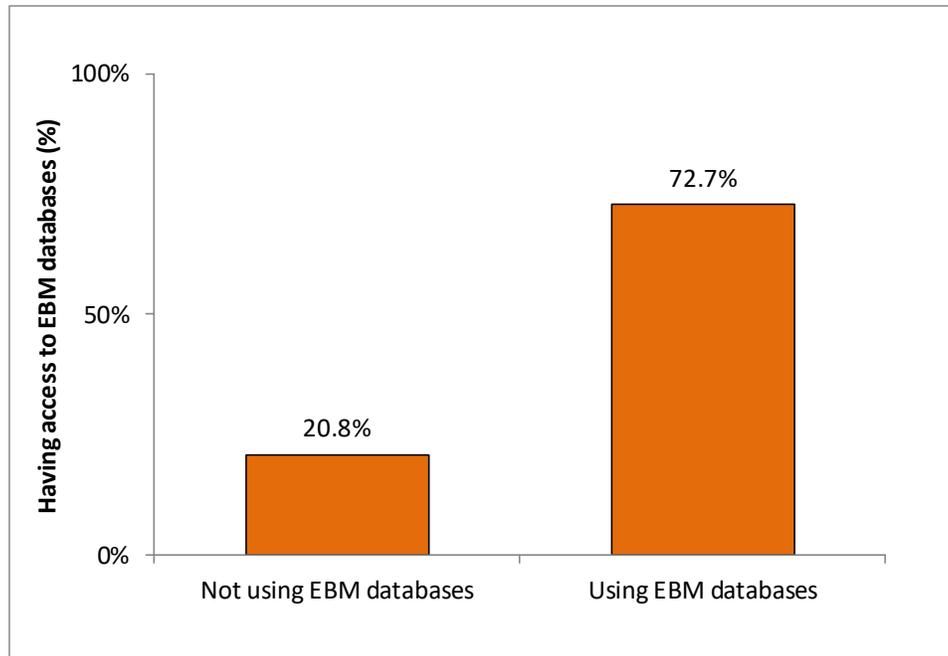


Figure 6: Having access to EBM databases by the use of evidence-base medicine databases

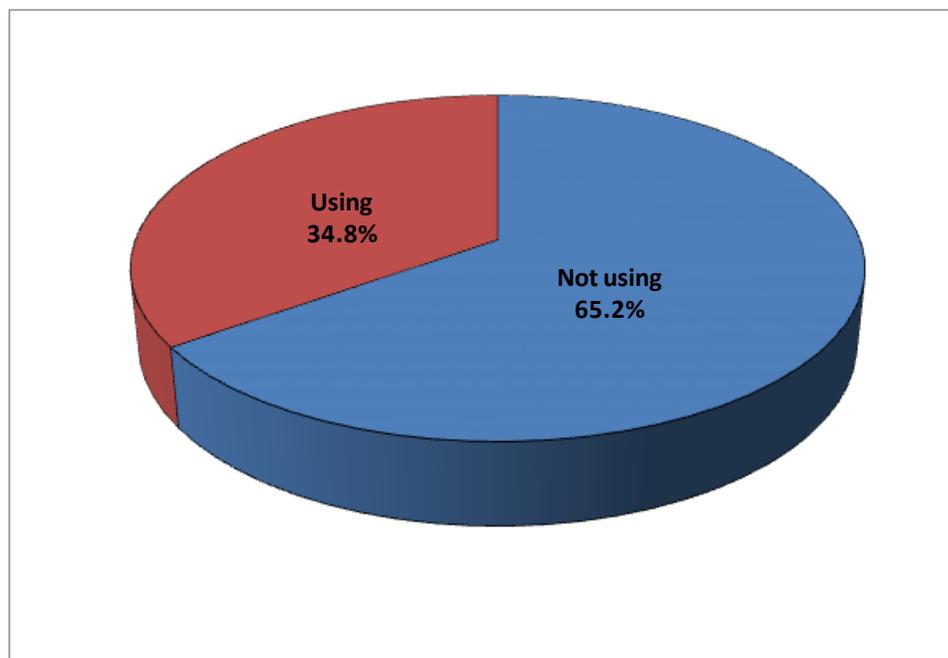


Figure 7: Do you ever use The Cochrane Library or read its systematic reviews?

Table 5: Socio-demographic and occupational characteristics of the study physicians by using the Cochrane library and/or reading its systematic reviews

Characteristics	Not using Cochrane	Using Cochrane	p-value
Overall	30 (65.2%)	16 (34.8%)	---
Age (years)			
Mean \pm standard deviation	29.6 \pm 2.4	32.0 \pm 5.9	0.358
<30	15 (68.2%)	7 (31.8%)	0.468
30	7 (77.8%)	2 (22.2%)	
>30	8 (53.3%)	7 (46.7%)	
Gender			
Male	21 (60.0%)	14 (40.0%)	0.282
Female	9 (81.8%)	2 (18.2%)	
Nationality			
Saudi	28 (70.0%)	12 (30.0%)	0.163
Non-Saudi	2 (33.3%)	4 (66.7%)	
Professional category			
Resident	25 (69.4%)	11 (30.6%)	0.182
Registrar/senior registrar	5 (62.5%)	3 (37.5%)	
Consultant	0 (0.0%)	2 (100.0%)	
Average number of patients seen daily *			
<10 patients	8 (57.1%)	6 (42.9%)	0.492
10-20 patients	16 (72.7%)	6 (27.3%)	
>20 patients	4 (50.0%)	4 (50.0%)	
Having Internet access at work *			
No	16 (84.2%)	3 (15.8%)	0.026
Yes	13 (52.0%)	12 (48.0%)	
Having access to EBM databases?			
No/do not know	20 (80.0%)	5 (20.0%)	0.022
Yes	10 (47.6%)	11 (52.4%)	

Table 5: Socio-demographic and occupational characteristics of the study physicians by using the Cochrane library and/or reading its systematic reviews (continued)

Characteristics	Not using Cochrane	Using Cochrane	p-value
Identifying systemic reviews as the top evidence in medicine			
No	4 (80.0%)	1 (20.0%)	0.645
Yes	26 (63.4%)	15 (36.6%)	
Get information about EBM from continuous medical education			
No	21 (70.0%)	9 (30.0%)	0.351
Yes	9 (56.3%)	7 (43.8%)	
Hearing about The Cochrane Library			
No	10 (90.9%)	1 (9.1%)	0.040
Yes	20 (57.1%)	15 (42.9%)	
Sources of access to The Cochrane Library *			
Work	5 (50.0%)	5 (50.0%)	0.142
Home	8 (47.1%)	9 (52.9%)	
Other	7 (87.5%)	1 (12.5%)	
Both work & home	0 (0.0%)	1 (100.0%)	
Thinking that The Cochrane Library could help in solving problems encountered in you practice *			
No	11 (78.6%)	3 (21.4%)	0.096
Yes	14 (51.9%)	13 (48.1%)	
Having interest in the methodology of making a Cochrane systematic review *			
No	16 (76.2%)	5 (23.8%)	0.076
Yes	11 (50.0%)	11 (50.0%)	

* The total is less than 46 due to missing information

DISCUSSION:

The current study reported the levels of awareness and application of EBM databases specially the Cochrane library in primary care setting in Saudi Arabia.

I. Awareness of EBM

Comparing the awareness of EBM reported in the current study with previous studies done both inside and outside Saudi Arabia is greatly limited by different methods used, the definition of awareness, the time of the study, and the physician population examined (such as age and rank). Nevertheless, the awareness of EBM and its database resources reported in the current study is considered better than reported before in Saudi Arabia but still suboptimal in some aspects. For example, almost 90% of the physicians in the current study were able to recognize that systematic review of randomized controlled trials is the top level of evidence in medicine and 76% of them heard about the Cochrane Library. On the other hand, only 40% of the physicians working in primary care centers and general hospitals in Dammam heard

about EBM [27]. Additionally, the awareness of Cochrane Library was only 26% among physicians working in the general hospitals in Aseer [30] and 59% in the consultant physicians working in governmental hospitals in Al-Taif [29]. Interestingly, the awareness of EBM in the current study was better than seen in studies that used the same data collection tool among primary care physicians, such as in in Croatia (90% versus 44% for the top level of evidence and 76% versus 20% for hearing the Cochrane Library) [18] and in Bosnia and Herzegovina (90% versus 32% for the top level of evidence and 76% versus 33% for hearing the Cochrane Library) [19].

The better awareness of EBM among the physicians in the current study may reflect the general better awareness of EBM in Saudi Arabia in recent years, the more accessibility to EBM databases, and the EBM training courses. For example, almost 60% of the physicians in the current study reported that postgraduate education was the main source of getting basic information about EBM. Additionally,

access to internet (57%) and EBM databases (46%) in the current study was higher than reported in previous studies. Accesses to internet and EBM databases were 10% and 16% (respectively) among family physicians working in MOH primary care centers in Riyadh [26], 13% in physicians working in general hospitals in Aseer [39], and 38% and 15% (respectively) among primary care physicians in Bosnia and Herzegovina [19]. Moreover, there has been a trend in the past few years to incorporate EBM in the curricula of Saudi medical schools, which probably made EBM a widely accepted concept [40]. This EBM educational trend may have resulted in improved knowledge of EBM basics and skills [41]. Since 78% of our sample were residents who received updated curricula, it is not surprising to see better levels of EBM knowledge and use in the current study compare to previous studies that have been published at least 10 years ago [8, 26, 27, 39].

II. Attitude towards EBM

Physicians in the current study showed a generally positive attitude towards EBM. For example, approximately two-thirds of the physicians in the current study thought that the Cochrane Library could help them solving the problems encountered in their practice. Similarly, previous studies done both inside and outside Saudi Arabia among family physicians showed a very positive attitude towards EBM. For example, between 80% and 90% family physicians working in Saudi Arabia welcome the promotion of EBM and believe that practicing EBM is both useful in clinical practice and can improve the patient care [26, 27, 39]. Similarly, between 85% and 95% family physicians in Jordan and Qatar welcome the promotion of EBM and/or believe that EBM is useful in clinical practice and can improve the patient care [21-23]. The discrepancy between the knowledge of and attitude towards EBM clearly observed in previous studies and to less extent in the current study may indicate a potential for improvement in knowledge if more efforts are done in educating and training family physicians on EBM skills. Educational interventions on EBM have been shown in several studies to significantly improve the ability to raise questions, perform literature search, and perform critical appraisal [33-36].

III. Application of EBM

For the EBM use, the way the question is asked has a great impact on the answer. For example, approximately 48% of the consultant physicians working in governmental hospitals in Al-Taif reported regular use of EBM, 42% reported sometimes use, and 9% reported never use of EBM [29]. However, when the physicians were asked about the use of specific EBM sources much lower

rates were reported; for example only 7% and 13% of the above physicians were using ACP Journal Club and Cochrane Library, respectively [29]. In the current study, we assessed the use of EBM by a multi-choice question asking about the internet sources used with an option of specialized EBM databases in the list of answers. Additionally, this was followed by an open-ended question asking about the names of the specific databases used. In our study only 3 (14%) out of the 21 physicians who reported having access to EBM databases could not name even one database. This probably added credentials to the answers of the physicians in the current study.

Irrespective of the question asked, it appeared that the use of EBM in the current study was better than reported before in Saudi Arabia but still suboptimal. For example, while the majority (>90%) of the physicians in the current study reported using the internet to solve dilemmas about their patients, only 48% were using specialized EBM databases and 35% were using Cochrane library. While this was less than expected, it was much better than reported in previous studies assessing the use of EBM in healthcare setting in Saudi Arabia [26, 29, 39]. In these studies, the use and application of EBM resources such Cochrane Library, the ACP Journal Club, and UpToDate ranged between 4% and 18% [26, 29, 39]. This difference again can be explained by better access to EBM resources observed in the current study and the recent incorporation of EBM in the curricula of Saudi medical schools [40]. Interestingly, lack of training and lack of resources specially access to internet at work have been consistently reported as barriers for practicing EBM among physicians in Saudi Arabia [8, 26, 28, 29, 32].

IV. Factors associated with EBM use

In the current study, having access to EBM databases was the only factor that was significantly associated with frequent use of specialized EBM databases while having internet access at work, having access to EBM databases, hearing about the Cochrane Library, and to less extent positive attitude towards the Cochrane Library were associated with frequent use of the Cochrane Library and/or reading its systematic reviews. Although previous studies done in Saudi Arabia did not examine the physician characters associated with the use of EBM databases, they frequently reported self-perceived barriers for EBM application. For example, lack of training followed by lack of resources were the main barriers to practicing EBM among physicians working in primary care centers and general hospitals in Dammam [8]. Similarly, lack of resources specially

access to internet and access to EBM databases was reported as an important barrier in several studies done at primary care setting in Saudi Arabia [26, 28, 39]. Additionally, it was reported that EBM knowledge was the only significant predictor of positive attitude towards EBM among family physicians in Dammam [27].

V. Strengths and limitations of the study

The current study had several strengths and few limitations. The current study is considered the first local study to examine the physician and system factors that are associated with frequent use of specialized EBM databases. Given the lack of recent data on the awareness and use of EBM in primary setting, the current study represent the only recent study that probably reflect the current changes in Saudi Arabia, regarding improved access and education of EBM [40]. Furthermore, the current study used a tool that have been validated and used by two research groups in Croatia and Bosnia and Herzegovina [18, 19]. Nevertheless, we acknowledge few limitations. For example, the cross-sectional design does not prove causations but only associations. Additionally, convenience sampling used in the current study may limit the generalizability of the current findings. However, lack of casualty and limited generalizability are almost unavoidable limitations in all previous similar studies.

RECOMMENDATIONS:

The findings of the current study revealed several points that represent a potential for improving the incorporation of EBM in primary care setting;

- As at least 40% of the physicians in the current study reported lack of internet access and/or access to EBM databases at work, therefore, much work is still needed to provide free internet and free EBM access to physician at primary care setting
- The suboptimal knowledge of some EBM aspects observed in the current study such as the correct identification of only few sources of EBM information may call for more educational activities to improve such knowledge. Additionally, the presence of more than 50% of the physicians who are interested in learning more about the methodology of making a Cochrane systematic review is another proof of the urgent need for more education, that should be acceptable by the physicians
- As the majority of the physicians using Cochrane systematic reviews in the current study did not

read full text, this may call for a need to improve the quality of EBM use among users. Suggestions include setting weekly journal club to discuss a pre-determined topics, conducting regular sessions and workshops to improve the EBM skills and competencies, and freeing some of the time of family physician for EBM use

- Further interventional studies are needed to examine the impact of fixing the insufficient knowledge and limited access to EBM information on the quality of patient care

CONCLUSIONS:

A cross-sectional design was used to examine the levels of awareness and application of EBM databases among 46 family physicians in Riyadh, Saudi Arabia. The level of awareness of EBM and its database resources reported in the current study is considered better than reported before in Saudi Arabia but still suboptimal in some aspects. Similar to what previously reported, physicians in the current study showed a positive attitude towards EBM. Approximately 48% physicians in the current study were using specialized EBM databases and 35% were using Cochrane library. At least 40% of the physicians in the current study reported lack of internet access and/or access to EBM databases at work. Having access to EBM databases was the only factor that was significantly associated with frequent use of specialized EBM databases while having internet access at work, having access to EBM databases, hearing about the Cochrane Library, and to less extent positive attitude towards the Cochrane Library were associated with frequent use of the Cochrane Library and/or reading its systematic reviews. Further interventional studies are needed to examine the impact of fixing the insufficient knowledge and limited access to EBM information on the quality of patient care

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