Evidence-based medicine among Jordanian family physicians

Awareness, attitude, and knowledge

Farihan Barghouti MD MRCGP Lana Halaseh MD Tania Said MD Abdel Halim Mousa PhD Adel Dabdoub PhD

ABSTRACT

OBJECTIVE To assess family practitioners' attitudes toward and awareness of evidence-based medicine (EBM).

DESIGN A cross-sectional study from a questionnaire distributed between January and March 2007.

SETTING Rural and urban family medicine centres throughout Jordan that are affiliated with the Ministry of Health, military centres, university medical centres, and the private sector.

PARTICIPANTS Two hundred family physicians.

MAIN OUTCOME MEASURES Family physicians' attitudes toward EBM; training in EBM; barriers to practising EBM; level of awareness of and access to EBM journals and databases; and knowledge and understanding of related technical terms.

RESULTS The response rate was 70.5%. Among those who responded, 56.7% were women and 42.6% were between the ages of 40 and 49 years. More than 50% of the respondents were working in mixed urban and rural practice settings. Most of the respondents had a positive attitude toward EBM: 63.5% welcomed the concept of EBM; more than 40% used EBM in their daily practices; and 90% agreed that practising EBM improved patient care. Of the respondents, 42.6% thought that the best way to move from opinion-based medicine to EBM was through learning the skills of EBM. Fifty percent of the respondents had access to MEDLINE, while only 20.4% of them had received formal training in research and critical appraisal. Lack of personal time was the main perceived barrier to practising EBM. Participants reported a low level of awareness of some of the technical terms.

CONCLUSION Jordanian family physicians showed eagerness to learn and implement EBM in their daily practices. Nevertheless, they need more guidance and training to ensure the correct application of EBM ideals.

EDITOR'S KEY POINTS

- Jordan is currently in the process of implementing the use of evidence-based medicine (EBM).
- The goal of this study was to determine the degree to which Jordanian family physicians practise EBM in everyday clinical practice settings.
- Most of the participants not only had positive attitudes toward EBM, but also believed that practising EBM improved patient care. In order for them to implement EBM ideals in daily practice, however, they need much more guidance and training.

This article has been peer reviewed.
Can Fam Physician 2009;55:e6-13

Médecine fondée sur des preuves chez les médecins de famille jordaniens

Sensibilisation, attitudes et niveaux de connaissance

Farihan Barghouti MD MRCGP **Lana Halaseh** MD **Tania Said** MD **Abdel Halim Mousa** PhD **Adel Dabdoub** PhD

RÉSUMÉ

OBJECTIF Vérifier les attitudes et le niveau de sensibilisation de médecins de famille vis-à-vis la médecine fondée sur des preuves (MFP).

TYPE D'ÉTUDE Étude transversale à partir d'un questionnaire distribué entre janvier et mars 2007.

CONTEXTE Centres de médecine familiale urbains et ruraux de Jordanie associés au Ministère de la santé, à des centres militaires et des centres médicaux universitaires, et au secteur privé.

PARTICIPANTS Deux cents médecins de famille.

PRINCIPAUX PARAMÈTRES À L'ÉTUDE Attitudes des médecins de famille envers la MFP; formation en MFP; obstacles à l'application de la MFP; niveau de sensibilisation et accès à des revues et des bases de données sur la MFP; et connaissance et compréhension des termes techniques pertinents.

RÉSULTATS Le taux de réponse était de 70,5%. Parmi les répondants, 56,7% étaient des femmes et 42,6% avaient entre 40 et 49 ans. Plus de 50% des répondants pratiquaient dans un contexte mixte urbain-rural. La plupart avaient une attitude positive envers la MFP: 63,5% accueillaient favorablement ce concept; plus de 40% utilisaient la MFP dans leur pratique quotidienne; et 90% reconnaissaient que la pratique de la MFP améliorait les soins. Parmi les répondants, 42,6% croyaient que la meilleure façon de passer d'une médecine fondée sur des opinions à une MFP était d'apprendre à utiliser la MFP. La moitié des répondants avaient accès à MEDLINE, tandis que seulement 20,4% avaient reçu une véritable formation en recherche et en évaluation critique. Le manque de temps était perçu comme le principal obstacle à la pratique de la MFP. Les participants se disaient peu familiers avec certains des termes techniques.

CONCLUSION Les médecins de famille jordaniens étaient fortement intéressés à apprendre la MFP et à l'incorporer à leur pratique quotidienne. Ils ont toutefois besoin de plus d'encadrement et de formation pour s'assurer qu'ils appliquent correctement les principes de la MFP.

POINTS DE REPÈRE DU RÉDACTEUR

- La Jordanie est en voie d'instaurer une médecine fondée sur des preuves (MFP).
- Cette étude voulait déterminer à quel point les médecins de famille jordaniens utilisent la MFP dans leur pratique quotidienne.
- La plupart des participants avaient non seulement une attitude positive envers la MFP, mais ils estimaient que son application améliorait la qualité des soins. Ils ont toutefois besoin de plus d'encadrement et de formation afin d'intégrer les principes de la MFP dans leur pratique quotidienne.

Cet article a fait l'objet d'une révision par des pairs.
Can Fam Physician 2009;55:e6-13

Evidence-based medicine (EBM) is defined as the "conscientious, explicit, and judicious use of current best evidence."[1] Evidence-based medicine has emerged as a new paradigm for medical practice. It involves integrating individual clinical expertise with the best available external clinical evidence and compassionate use of individual patients' rights and preferences in making clinical decisions about their care. Awareness of the latest scientific evidence and the ability to critically appraise literature and assess its applicability have been identified as integral to the practice of EBM.[2]

The term *EBM* entered the lexicon in 1992. Since then, it has become the latest focus in the search for improved health care.[3] The use of EBM in clinical practice is a key strategy to improve primary health care services.[4]

Family physicians are patients' first point of contact with medical services. They provide ongoing comprehensive care and are pivotal to the coordination of care across the health care system. Within this broad and complex work environment, family practitioners make many thousands of clinical decisions each year about diagnosis, prognosis, and patient management; however, it is difficult to ascertain how many of these decisions are consistent with the best available evidence.[5] Recent papers have highlighted the need for evidence-based family medicine.[5,6] It has been suggested that strategies to promote change in clinical practice are more likely to be successful if they are based on an analysis of barriers and facilitators specific to the context.[7]

Jordan is a Middle Eastern country with a population of 6 million. It enjoys a mixture of urban and rural communities and is served by strong private and public health care systems. Its population has open access to all levels of care without referral. Family medicine training is not a prerequisite to practise in private or public primary care systems. Most doctors who offer primary care do not pursue postgraduate training but practise directly after qualifying from medical school. These doctors are known as general practitioners.

Currently, there are 4 family medicine residency programs in Jordan. The first program was established in 1981, responding to the perceived need for comprehensive and cost-effective medical services. The residency program is currently composed of 3 years of in-hospital training and 1 year at an accredited training health centre. The Jordan Medical Council is responsible for standardizing the content of training programs and managing board examinations. The first Board Examination in Family Medicine was held in 1986. Thus far, a total of 277 family physicians have passed this examination. Two hundred of the board-certified (ie, hold board certification as family medicine specialists) and board-eligible (ie, are eligible to become certified as family medicine specialists) doctors are registered with the Jordanian Medical Association (JMA)—a prerequisite to practising in the country. The terms *family physician* and *family practitioner* refer to the trained doctor in family medicine.

Many studies were conducted to assess the awareness of EBM in general practice (ie, among family physicians)[8-13]; however, no data are available about the adoption of EBM by Jordanian family physicians. Our study aimed to assess family practitioners' attitudes about and awareness of EBM, to evaluate their understanding of technical terms, and to determine their educational needs for EBM.

METHODS

Study design and setting

Between January and March 2007, a self-administered questionnaire was distributed to all 200 of the trained and board-certified or board-eligible family physicians registered with the JMA. These physicians work all over the country (eg, Ministry of Health, military centres, university medical centres, and the private sector). For this survey, the inclusion criteria were that the respondents were involved in active care of patients and were JMA registered. The study was approved by the Research Ethics Committee of University of Jordan medical school.

Survey instrument

The questionnaire was adopted from McColl et al.[8] We believed that adopting a previously published questionnaire would add strength to the study because it had already been tested and would allow an international comparison to be drawn. A pilot study was conducted in December 2006, which led to some modifications and local adaptations.

In addition to personal data and practice characteristics, the survey included questions that assessed family physicians' awareness of and opinions about using EBM, their access to various information sources, and the barriers to using EBM that they face.

Data analysis

The data collected were analyzed using SPSS, version 11. Tables of frequency and proportion were used to evaluate the variables. Data analysis yielded 5 themes: personal data and practice characteristics, attitudes toward EBM, barriers to practising EBM, awareness of EBM journals and databases, and knowledge of technical terms.

RESULTS

We received completed questionnaires from 141 family physicians (70.5% response rate). Nonrespondents were mainly in 1 of 3 groups: those who were outside the country, those with incomplete questionnaires, and

a smaller group of those who did not return the questionnaire after a second reminder; comparison could not be made with the latter group. Of the respondents, 56.7% were women; 42.6% were in the age group of 40 to 49 years; 35.5% were board certified in family medicine (Jordanian board or Member of the Royal College of General Practitioners). More than half of the physicians worked in mixed rural and urban centres; 56.7% of the physicians saw between 20 and 50 patients per day; and 31.9% worked in training practices (**Table 1**).

Table 1. Characteristics of respondents: *N = 141.*

CHARACTERISTICS	N (%)
Sex	
• Male	61 (43.3)
• Female	80 (56.7)
Age, y	
• < 30	7 (5.0)
• 30-39	42 (29.8)
• 40-49	60 (42.6)
• ≥ 50	32 (22.7)
Board certified*	
• Yes	50 (35.5)
• No	91 (64.5)
No. of patients seen daily	
• < 20	11 (7.8)
• 20-49	80 (56.7)
• 50-74	42 (29.8)
• ≥ 75	8 (5.7)
Practice settings	
• Rural	6 (4.3)
• Urban	63 (44.7)
• Mixed	72 (51.1)
Training practice†	
• Yes	45 (31.9)
• No	96 (68.1)

*Holds board certification as family medicine specialist, practising in various sectors of the Jordanian health system.
†Part of a residency training program.

Regarding the attitudes of respondents toward EBM (**Table 2**), 61.7% welcomed and 33.3% strongly welcomed the promotion of EBM; 66.7% of the respondents claimed their colleagues welcomed the promotion of EBM as well. Although 92.2% of participants agreed that EBM is useful or very useful in the management of patients, only 50.4% believed that most of their practice was evidence-based.

Ninety percent of respondents agreed that practising EBM improved patient care. In addition, 51% of respondents did not agree with the notion that "EBM is of limited value in family medicine because much

Table 2. Participants' responses: *A) Questions about and B) attitudes toward evidence-based medicine (EBM); N = 141.*

A) QUESTIONS	N (%)
1. How would you describe your attitude toward the current promotion of EBM?	
• Strongly welcoming	47 (33.3)
• Welcoming	87 (61.7)
• Not welcoming	2 (1.4)
• Do not know	5 (3.5)
2. How would you describe the attitude of most of your colleagues toward EBM?	
• Strongly welcoming	26 (18.4)
• Welcoming	94 (66.7)
• Not welcoming	11 (7.8)
• Do not know	10 (7.1)
3. How useful are research findings in your day-to-day management of patients?	
• Extremely useful	36 (25.5)
• Useful	94 (66.7)
• Not useful	6 (4.3)
• Do not know	5 (3.5)
4. What percentage of your clinical practice do you believe is currently evidence-based?	
• 75-100	14 (9.9)
• 50-74	57 (40.4)
• 25-49	39 (27.7)
• 0-24	31 (22.0)
B) ATTITUDES	**N (%)**
1. Practising EBM improves patient care	
• Strongly agree	58 (41.1)
• Agree	69 (48.9)
• Disagree	8 (5.7)
• Do not know	6 (4.3)
2. Evidence-based medicine is of limited value in family medicine because much of primary care lacks a scientific base	
• Strongly agree	20 (14.2)
• Agree	39 (27.7)
• Disagree	72 (51.0)
• Do not know	10 (7.1)
3. The adoption of EBM, however worthwhile as an ideal, places another demand on already-overloaded family practitioners	
• Strongly agree	21 (14.9)
• Agree	67 (47.5)
• Disagree	40 (28.4)
• Do not know	13 (9.2)

of primary care lacks a scientific basis." Most respondents (62.4%) agreed that adopting EBM would put more demand on already-overworked family practitioners.

Table 3 shows that 51.1% of respondents claimed to be currently practising EBM by seeking and applying EBM summaries. The same percentage was interested in learning the skills of EBM. On the other hand, 42.6% of participants thought that the best way to move from opinion-based medicine to EBM was by learning the skills of EBM.

Table 3. Opinions about the methods to move from opinion-based practice to evidence-based medicine (EBM): *Respondents were allowed more than 1 answer; N = 141.*

	OPINIONS		
METHODS	METHOD THAT IS CURRENTLY USED, N (%)	METHOD OF INTEREST FOR FUTURE USE, N (%)	METHOD THAT IS MOST APPROPRIATE IN FAMILY MEDICINE, N (%)
To learn the skills of EBM	65 (46.1)	72 (51.1)	60 (42.6)
To seek and apply evidence-based summaries	72 (51.1)	67 (47.5)	58 (41.1)
To use evidence-based practice guidelines or protocols	59 (41.8)	58 (41.1)	50 (35.5)

We learned that in the previous year, more than 50% of respondents had access to MEDLINE or other bibliographic databases for literature searches. Only 20% of participants reported having formal training in literature searches, and 17% received formal training in critical appraisal.

Table 4 shows the factors that family physicians perceived to be barriers to practising EBM. Lack of personal time was the main barrier identified by 68.8% of the respondents. Lack of investment by health authorities was the second most commonly identified barrier (55.3%), while the availability of and access to information was perceived to be a barrier by 50.4% of respondents.

Table 4. Factors that respondents perceive to be barriers to practising evidence-based medicine (EBM): *N = 141.*

BARRIERS TO PRACTISING EBM	N (%)
Lack of personal time	97 (68.8)
Lack of investment by health authorities	78 (55.3)
No financial gain in using EBM	41 (29.1)
Lack of hard evidence	13 (9.2)
Evidence not related to context of primary care	15 (10.6)
Too much evidence	22 (15.6)
Availability of and access to information	71 (50.4)
Patients' expectations	59 (41.8)
Colleagues' attitudes	59 (41.8)
Lack of critical appraisal skills	33 (23.4)
Belief that EBM is a threat	2 (1.4)
Others	8 (5.7)

Most of the respondents (43.3%) had little awareness of EBM resources (**Table 5**). Less than 10% of our respondents had used EBM resources in their clinical decision making.

An average of 38.1% of respondents showed some understanding of most (70%) of the technical terms (eg, *relative risk, absolute risk, systematic review, odds ratio, clinical effectiveness, confidence interval,* and *publication bias*). On the other hand, the terms *meta-analysis*, *number needed to treat*, and *heterogeneity* were poorly understood (**Table 6**).

DISCUSSION

The overall response rate in this study was 70.5%, which is a considerable achievement as response rates to questionnaire surveys among general practitioners are dropping.[14] Yet it is still lower than that of other studies,[9,12,15] which might be attributed to the fact that a good proportion of our family practitioners are working abroad.

Table 5. Respondents' awareness of various evidence-based medicine (EBM) resources: *N = 141.*

	RESPONDENTS' AWARENESS, N (%)			
EBM RESOURCE	UNAWARE	AWARE BUT NOT USED	READ	USE TO HELP IN CLINICAL DECISION MAKING
PubMed (MEDLINE)	51 (36.2)	28 (19.9)	41 (29.1)	21 (14.9)
Evidence-Based Medicine (from *BMJ* Publishing Group)	42 (29.8)	33 (23.4)	44 (31.2)	22 (15.6)
Clinical Evidence	48 (34.0)	40 (28.4)	41 (29.1)	12 (8.5)
Cochrane Database of Systematic Reviews	85 (60.3)	37 (26.2)	13 (9.2)	6 (4.3)
National Guidelines Clearinghouse	77 (54.6)	34 (24.1)	19 (13.5)	11 (7.8)
Journal of Evidence-Based Medicine	63 (44.7)	43 (30.5)	27 (19.1)	8 (5.7)

Table 6. Respondents' understanding of technical terms: *N = 141.*

A)*

TECHNICAL TERMS	RESPONDENTS' UNDERSTANDING, N (%)			
	IT WOULD NOT BE HELPFUL TO ME TO UNDERSTAND	DO NOT UNDERSTAND BUT WOULD LIKE TO	SOME UNDERSTANDING	YES, I UNDERSTAND AND COULD EXPLAIN TO OTHERS
Relative risk	29 (20.5)	27 (19.1)	49 (34.7)	36 (25.5)
Absolute risk	26 (18.4)	23 (16.3)	51 (36.1)	41 (29.0)
Systematic review	28 (19.8)	24 (17.0)	48 (34.0)	41 (29.0)
Odds ratio	32 (22.6)	41 (29.0)	46 (32.6)	22 (15.6)
Meta-analysis	34 (24.1)	55 (39.0)	27 (19.1)	25 (17.7)

B)*

TECHNICAL TERMS	RESPONDENTS' UNDERSTANDING, N (%)			
	IT WOULD NOT BE HELPFUL TO ME TO UNDERSTAND	DO NOT UNDERSTAND BUT WOULD LIKE TO	SOME UNDERSTANDING	YES, I UNDERSTAND AND COULD EXPLAIN TO OTHERS
Clinical effectiveness	32 (22.6)	24 (17.0)	56 (39.7)	29 (20.5)
Number needed to treat	36 (25.5)	47 (33.3)	27 (19.1)	31 (21.9)
Confidence interval	35 (24.8)	36 (25.5)	50 (35.4)	20 (14.1)
Heterogeneity	36 (25.5)	60 (42.5)	34 (24.1)	11 (7.8)
Publication bias	33 (23.4)	58 (41.1)	35 (24.8)	15 (10.6)

*Table 6 is divided into parts A and B for technical reasons.

More than 90% of our respondents had conclusively positive attitudes toward EBM, which is consistent with empirical evidence from the medical literature.[10,12,16] This is a good sign for promoting the uses of EBM in clinical practice to improve patient management.

Ninety percent of our respondents agreed that practising EBM improves patient care. Despite this highly favourable belief, only half of the respondents rated their clinical practices to be typically evidence-based. This estimate was comparable to other studies done in the United Kingdom,[8] Canada,[16] and Saudi Arabia[12]; the rate in different studies was a little bit higher.[9,15]

Although the validity of this subjective assessment is untested, objective measures of the proportion of general practice that is evidence-based are also fraught with difficulties due to unclear definitions of diagnosis, interventions, and levels of evidence and availability and use of valid audit tools.[15] Family medicine, which centres on the individual patient-doctor relationship and the interaction between biomedical, personal, and contextual perspectives, might require different research strategies and allowance for more circumstantial evidence rather than the watertight evidence accrued by randomized controlled trials.[17]

More than 50% of respondents rejected the notion that EBM is of limited value in primary care. These findings were mirrored in Canada by Tracy et al.[16]

Evidence-based medicine involves defining the questions arising from the patient encounter, finding, critically appraising, and applying the evidence, and evaluating the outcomes. Of our respondents, 42.6% expressed that learning these skills of EBM was the most appropriate way to move from opinion-based practice to EBM. The similarities of this outcome to other studies[9,11,12] might be attributed to the fact that the implementation of EBM in Jordan is in its infancy.

McColl et al,[8] Young and Ward,[15] and Mayer and Piterman[18] found that most physicians were simply not interested in learning the fundamentals of critical appraisal. This suggests that a move away from a critical appraisal model of EBM toward a potential list of evidence-based resources to meet the information needs of clinicians might be necessary and is an area that requires further research.[19]

Only 25% of respondents were aware of EBM resources, which is considerably lower than the rate reported in the United Kingdom.[8] We found that only 4.3% of respondents had ever used the Cochrane Database of Systematic Reviews (which has been available since 1992[20]); this finding raises questions about the outcomes of the management of patients. Research from other countries suggests that general practitioners are reluctant to embrace information technology to support evidence-based clinical decision making.

To practise EBM, clinicians need to understand and use terms that are important in critical appraisal. Our respondents showed fractional understanding of the technical terms used in EBM, which is supported by other surveys.[8,9] It is noteworthy that the self-rating of these skills was not validated, so attestation might give us different results.[21]

The most commonly mentioned barrier to the practice of EBM was insufficient time (68.8%); this might be attributed to extremely heavy workloads, as most governmental family practices in Jordan are walk-in clinics (ie, no appointment system). The obstacle of insufficient

time was echoed in many other studies.[8,9,13,22,23] One way to increase the time available to practise EBM would be to change the emphasis of postgraduate education from lecturing to training in the access and interpretation of evidence and in the use of these skills in practice.[5]

Lack of investment by health authorities was a second commonly identified barrier to practising EBM (55.3%). This arises from the perception that training in EBM might add more of a financial burden to the health authorities; this is a fundamental misunderstanding of its financial consequences. Physicians who practise EBM will identify and apply the most efficacious interventions to maximize the quality and quantity of life for individual patients; this would raise rather than lower the cost of their care.[1] Some other studies found that lack of knowledge is the main barrier,[11,24] while others found the main barrier to be limited access.[12,23]

Formal training in EBM was found to be relatively low: 20% and 17% in literature searching and critical appraisal, respectively. This could be explained by the fact that EBM is a relatively new concept in Jordan and consequently training courses in EBM are rare.[12]

Limitations

We are aware of the methodologic shortcomings of our study, as the questionnaire relied on the doctors' self-rated assessment of their own knowledge and beliefs. Research participants might have felt pressured into completing the questionnaire or might have been unwilling to divulge their knowledge and skill deficiencies. This might shed doubt on the objectivity of the responses, introducing potential biases. Our findings cannot be generalized to all primary health care doctors; we only studied trained family physicians who will be the only doctors serving as primary care providers in the future.

Further study

Family medicine is an evolving discipline in Jordan; effecting change and introducing new concepts to the discipline is still feasible. The results of this study merit the consideration of planners, educators, professionals, researchers, and health authorities.

A paradigm shift is needed within the ranks of family medicine and primary health care in general in order for practitioners to become clinically more accountable. This requires increasing the belief in the scientific basis of family medicine, education, and training in EBM, as well as the implementation and application of EBM guidelines. Strategies to improve access to EBM and encourage change among family physicians in order to overcome the barriers to using EBM should be adopted.

A prospective randomized controlled study should follow to assess the improvement in health care professionals' knowledge and understanding of the medical literature and critical appraisal skills; the use of evidence; and evidence-seeking behaviour after appropriate educational interventions that enhance the evidence-based practice of family physicians.

Although health status assessment is one of the difficult areas of research, evaluating evidence-based practice intervention in a certain community might be another study to propose.

Conclusion

Jordanian family physicians showed eagerness to learn about and implement EBM in daily practice. Nevertheless, they need more guidance and training to ensure correct application of EBM ideals in daily practice. The results observed in our study would help in devising local strategies to practise EBM in family practice. Punctual commissions are needed to improve awareness and implementation of EBM, taking into consideration the barriers and finding ways to overcome them.

Dr Barghouti is an Assistant Professor in the Department of Family and Community Medicine at the University of Jordan in Amman, and Head of the Family Medicine Unit at Jordan University Hospital (JUH). **Drs Halaseh** and **Said** are family practitioners at JUH. **Dr Mousa** works at the United Nations Relief and Works Agency for Palestine Refugees. **Dr Dabdoub** is Director of Food Safety Division in Food and Drug Administration at the Ministry of Health in Amman.

Contributors

Drs Barghouti, Halaseh, Said, Mousa, and **Dabdoub** contributed to concept and design of the study; data gathering, analysis, and interpretation; and preparing the manuscript for submission.

Competing interests

None declared

Correspondence

Dr Farihan Barghouti, University of Jordan, Department of Family and Community Medicine, Amman 11942, Jordan; telephone 962 6 5523447; fax 962 6 5521420; e-mail **farihan0@mailcity.com**

References

1. Sackett DL, Rosenberg WM, Gray JA, Haynes RB, Richardson WS. Evidence-based medicine: what it is and what it isn't. *BMJ* 1996;312(7023):71-2.
2. Mears R, Sweeney K. A preliminary study of the decision-making process within general practice. *Fam Pract* 2000;17(5):428-9.
3. Evidence-Based Medicine Working Group. Evidence-based medicine. A new approach to teaching the practice of medicine. *JAMA* 1992;268(17):2420-5.
4. General Practice Strategy Review Group. *General practice. Changing the future through partnerships.* Canberra, Australia: Commonwealth Department of Health and Family Services; 1998.
5. Dawes MG. On the need for evidence-based general and family practice. *Evid Based Med* 1996;1:68-9.
6. Ridsdale L. Evidence-based learning for general practice. *Br J Gen Pract* 1996;46(410):503-4.
7. Grol R, Grimshaw J. Evidence-based implementation of evidence-based medicine. *Jt Comm J Qual Improv* 1999;25(10):503-13.
8. McColl A, Smith H, White P, Field J. General practitioners' perceptions of the route to evidence based medicine: a questionnaire survey. *BMJ* 1998;316(7128):361-5.
9. Al-Ansary LA, Khoja TA. The place of evidence-based medicine among primary health care physicians in Riyadh region, Saudi Arabia. *Fam Pract* 2002;19(5):537-42.
10. Al-Baghlie N, Al-Almaie SM. Physician attitudes towards evidence-based medicine in eastern Saudi Arabia. *Ann Saudi Med* 2004;24(6):425-8.
11. Al-Almaie SM, AL-Baghli N. Barriers facing physicians practicing evidence-based medicine in Saudi Arabia. *J Contin Educ Health Prof* 2004;24(3):163-70.
12. Al-Omari FK, Al-Asmary SM. Attitude, awareness and practice of evidence based medicine among consultant physicians in Western region of Saudi Arabia. *Saudi Med J* 2006;27(12):1887-93.
13. Amin FA, Fedorowicz Z, Montgomery AJ. A study of knowledge and attitudes toward the use of evidence-based medicine among primary health care physicians in Bahrain. *Saudi Med J* 2006;27(9):1394-6.

14. McAvoy BR, Kaner EF. General practice survey: a questionnaire too far? *BMJ* 1996;313(7059):732-3.
15. Young JM, Ward JE. Evidence-based medicine in general practice: beliefs and barriers among Australian GPs. *J Eval Clin Pract* 2001;7(2):201-10.
16. Tracy CS, Dantas GS, Upshur RE. Evidence-based medicine in primary care: qualitative study of family physicians. *BMC Fam Pract* 2003;4:6. Epub 2003 May 9.
17. Jacobson LD, Edwards AG, Granier SK, Butler CC. Evidence-based medicine and general practice. *Br J Gen Pract* 1997;47(420):449-52.
18. Mayer J, Piterman L. The attitudes of Australian GPs to evidence-based medicine: a focus group study. *Fam Pract* 1999;16(6):627-32.
19. Smith R. What clinical information do doctors need? *BMJ* 1996;313(7064):1062-8.
20. Silagy C. Randomised controlled trials; the challenge of Archie Cochran. *Med J Aust* 1993;158(10):656-7.
21. Young JM, Glasziou P, Ward JE. General practitioners' self ratings of skills in evidence based medicine: validation study. *BMJ* 2002;324(7343):950-1.
22. Chan GC, Teng CL. Primary care doctors' perceptions towards evidence-based medicine in MELAKA State: a questionnaire study. *Med J Malaysia* 2005;60(2):130-3.
23. Scott I, Heyworth R, Fairweather P. The use of evidence-based medicine in the practice of consultant physicians. Results of a questionnaire survey. *Aust N Z J Med* 2000;30(3):319-26.
24. McAlister FA, Graham I, Karr GW, Laupacis A. Evidence-based medicine and the practicing clinician. *J Gen Intern Med* 1999;14(4):236-42.