British Journal of Medicine & Medical Research
7(11): 895-903, 2015, Article no.BJMMR.2015.403
ISSN: 2231-0614

SCIENCEDOMAIN *international*
www.sciencedomain.org

Evidence Based Medicine: Assessing Knowledge, Attitudes and Barriers in Post-graduate Training

Shuvankar Mukherjee[1*], Biswanath Sharma Sarkar[2], Soma Mukhopadhyay[3] and Soma Chakrabarti[1]

[1]Department of Community Medicine, Calcutta National Medical College, West Bengal University of Health Sciences, Kolkata, West Bengal, India.
[2]Department of General Medicine, Bankura Sammilani Medical College, Bankura, West Bengal University of Health Sciences, Kolkata, West Bengal, India.
[3]Department of Anaesthesiology, R.G. Kar Medical College, West Bengal University of Health Sciences, Kolkata, West Bengal, India.

Authors' contributions

This work was carried out in collaboration between all authors. Authors SM, BSS and SoM were involved in study designing, collection, analysis and interpretation of data, drafting the article and revising it critically for the intellectual content. Author SC was involved in literature review, analysis and interpretation of data and drafting the article. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/BJMMR/2015/16398
Editor(s):
(1) Boyd D. Burns, Department of Emergency Medicine, The University of Oklahoma School of Community Medicine-Tulsa, USA.
Reviewers:
(1) Anonymous, Brazil.
(2) Andrea Melani, Respiratory Pathophysiology, Hospital Le Scotte, Siena, Italy.
Complete Peer review History: http://www.sciencedomain.org/review-history.php?iid=951&id=12&aid=8717

Original Research Article

Received 30th January 2015
Accepted 30th March 2015
Published 8th April 2015

ABSTRACT

Aims: To assess the knowledge and attitude of post- graduate medical students regarding evidence based medicine (EBM) and to find out the barriers against its implementation, if any.
Study Design: Medical college based cross-sectional survey.
Place and Duration of Study: The study was carried out between October 2013 to March 2014, at a medical college in Kolkata, West Bengal, India.
Methodology: Altogether 145 post-graduate medical students of clinical disciplines filled up a pre-designed, pre-tested, structured questionnaire and data were analyzed by standard statistical procedures.

**Corresponding author: Email: shuvankarin@yahoo.com;*

Results: The mean knowledge score was found to be 13.46±3.10. The score was arbitrary, ranged from 0 to 20 and higher score corresponded to higher knowledge. The distribution of the mean knowledge score among <30 years (13.34±3.28) and ≥30 years (13.67±2.62) was the same across these two categories (*P* =.62). Large proportions of the respondents were not familiar with reputed EBM resources such as Cochrane data base (66.9%) and Best Evidence (67.6%). Use of Medline was also quite poor (35.9%). Nearly half of them did not think that EBM was focused on patient's values and preferences and many believed that EBM would place another demand on the already overburdened residents and doctors. Quite a large proportion thought that EBM would be of limited value in clinical practice. However the mean attitude score (21.23±4.06) showed an overall favorable attitude towards EBM. There was a positive correlation between the mean knowledge and attitude scores (*P* =.008). The common barriers against the implementation of evidence-based medicine were "no ready access to resources" (68.3) and "never taught on the subject" (56.6%).
Conclusion: Although many of the respondents were not adequately knowledgeable about evidence-based medicine and also quite a few had a negative attitude towards its practicality, the positive correlation between knowledge attitude scores suggested that imparting proper knowledge could bring about a positive change in this attitude.

Keywords: Evidence-based medicine; research; medical post-graduates.

1. INTRODUCTION

Evidence based medicine (EBM) is the process of systematically reviewing, appraising and using clinical research findings to aid the delivery of optimum clinical care to patients [1]. It is the conscientious, explicit and judicious use of current best evidence in making decisions regarding the care of individual patients [2] and include the integration of best research evidence with clinical experience and patient values [3].

Sackett DL et al. [2] stated that "External clinical evidence can inform, but can never replace, individual clinical expertise and it is this expertise that decides whether the external evidence applies to the individual patient at all and if so, how it should be integrated into a clinical decision. Similarly, any external guideline must be integrated with individual clinical expertise in deciding whether and how it matches the patient's clinical state, predicament and preferences and thus whether it should be applied" [2]. EBM is not a purely academic or financial exercise and its implementation has major clinical implications [4]. The importance of integrating EBM into both medical teaching and postgraduate medical training is highlighted by studies that show only minimal EBM interventions can have a positive impact on the cognitive and technical skills of medical residents [5].

Post-graduate medical students in different clinical disciplines are supposed to be trained in clinical decision making based on research evidences. But in reality it is the intuitive approach which predominates. At a practical level, EBM has not been widely incorporated into clinical decisions, drawing attention to the potential barriers related to its implementation [6,7]. The present study was hence conducted with the following objectives to assess the knowledge and attitude of post- graduate medical students regarding evidence based medicine and to find out the barriers against its implementation, if any.

2. MATERIALS AND METHODS

After obtaining institutional ethical clearance (approval number: CM/CNMC/2013/17) this cross-sectional survey was carried out between October 2013 to March 2014, among post-graduate (P.G.) medical students of clinical disciplines at a medical college in Kolkata, West Bengal, India. Out of the 155 P.G. students of clinical disciplines including internal medicine, chest medicine, pediatrics, dermatology, general surgery, ophthalmology, otorhinology and gynecology and obstetrics, a total of 145 could be approached (rest of them i.e did not participate) and after obtaining their informed consent they were given a pre-tested, pre-designed structured anonymous questionnaire (Appendix I) to be filled up within half an hour time at the end of the inter-departmental integrated classes. The items included in the questionnaire were adopted after literature evaluation [8,9] and was reviewed and approved by senior faculty members of the department of Community Medicine at the medical college where the study was conducted. The pre-testing of the questionnaire was done among 15 of the

then currently passed P.G. students from this institution who had just joined as senior residents in the respective clinical departments.

Knowledge about EBM was mainly assessed by the respondents' level of familiarity with the different EBM terminologies concerned with statistical implications which were supposed to help in formulating a research question, carrying out relevant literature search, critically appraising them for their validity and usability and applying that knowledge in practical situations. Attitude towards EBM was assessed by analyzing the responses to a set of statements concerning implications and significance of implementation of EBM in clinical practice.

Knowledge about different terminologies of EBM was scored as "yes and can explain =2", "yes but can't explain =1", and "not familiar = 0" (total score of 0 – 20 for 10 items). On the other hand statements with favorable attitude towards EBM was scored as "strongly disagree =1", "disagree =2", "don't know =3", "agree = 4", "strongly agree =5", while those statements expressing unfavorable attitude were scored in a reversed manner (total score of 6 – 30 for 6 items).

Data collected were analyzed by SPSS version 19 and was presented by simple proportions and as mean ± standard deviation (SD). For the non-parametric data, Mann-Whitney U test was applied to test the significance in difference between the mean knowledge and attitude scores across age groups and Spearman rank correlation test was done to correlate between knowledge and attitude scores. A "p" value of less than 0.05 was considered as statistically significant.

3. RESULTS AND DISCUSSION

3.1 RESULTS

Mean (± SD) age of the respondents was 29.32±4.23 years; 64.8% (94/145) belonged to less than 30 years age group while 35.2% (51/145) were than 30 years of age. Males were 72.4% (105/145) while 27.6% (40/145) were females.

It was found that most of the respondents knew and could explain the terms relative risk (91.0%), absolute risk (74.5%), odds ratio (74.5%) and randomized controlled trial (77.9%). However this was found to be poor when terminologies like meta-analysis, systematic review, clinical effectiveness, number needed to treat, confidence interval and publication bias were concerned (Table 1).

The mean (± SD) knowledge score was found to be 13.46±3.10. It was found that the distribution of the mean knowledge score among <30 years (13.34±3.28) and ≥30 years (13.67±2.62) was the same across these two categories (*P* = .62). No significant difference in knowledge score was found between male and female P.G. students [13.40±3.33 vs. 13.60±2.23; *P* = *.59*] or among P.G. students belonging to medical or surgical disciplines [13.87±2.59 vs. 14.76±3.48; *P* = *.085*]. Large proportions of the respondents were not familiar with reputed EBM resources such as Cochrane data base (66.9%) and Best Evidence (67.6%). Even the use of Medline as resource base was also quite poor (35.9%) (Table 2).

The mean (± SD) attitude score (21.23±4.06) showed an overall favorable attitude towards EBM. Among the respondents 77.9% (113/145) agreed that EBM could bring about quick knowledge update. But at the same time 45.5% (66/145) indicated that EBM would place another demand on the already overburdened residents and doctors and 71.7% (104/145) believed that EBM would be of limited value in clinical practice (Table 3).

It was found that the distribution of mean attitude score among <30 years (21.86 ± 3.05) and ≥30 years (20.06±5.28) was the same across the two categories (P = 0.14). No significant difference in attitude score was found between male and female P.G. students [20.90±4.45 vs. 22.10±2.62; *P* = *.23*] or among P.G. students belonging to medical or surgical disciplines [20.68±3.97 vs. 23.06±3.60; *P* = *.41*]. However it was also observed that there was a positive correlation between the mean knowledge and attitude scores (r =.221 *P* = 0.008) (Fig. 1).

According to the respondents the most common barrier against the implementation of EBM was "no ready access to resources" (68.3%). Other barriers cited by the respondents were "never taught on the subject" (56.6%) and "not universally acceptable" (40.0%). Some had even perceived EBM as "threat to clinical freedom" (31.7%) (Table 4).

Table 1. Familiarity with terminologies associated with evidence based medicine (n = 145)*

Terminologies	Familiar with the terminologies		
	Yes and can explain	Yes but cannot explain	Not familiar
Relative risk	132 (91.0)	13 (9.0)	–
Absolute risk	108 (74.5)	37 (25.5)	–
Odds ratio	108 (74.5)	29 (20.0)	8 (5.5)
Randomized controlled trial	113 (77.9)	32 (22.1)	–
Meta-analysis	62 (42.8)	78 (53.8)	5 (3.4)
Systematic review	38 (26.2)	71 (49.0)	36 (24.8)
Clinical effectiveness	59 (40.7)	69 (47.6)	17 (11.7)
Number needed to treat	24 (16.6)	63 (43.4)	58 (40.0)
Confidence interval	51 (35.2)	61 (42.1)	33 (22.7)
Publication bias	23 (15.9)	62 (42.7)	60 (41.4)

**Figures in parentheses indicate percentage*

Table 2. Familiarity with information resources on evidence based medicine (n = 145)*

Resources	Familiar with the resources		
	Yes and use	Yes but do not use	Not familiar
Cochrane data base of systematic reviews	38 (26.2)	10 (6.9)	97 (66.9)
Best evidence	28 (19.3)	19 (13.1)	98 (67.6)
Medline	52 (35.9)	39 (26.9)	54 (37.2)

**Figures in parentheses indicate percentage*

Table 3. Attitude towards evidence based medicine (n = 145)*

Statements	Strongly disagree	Disagree	Do not know	Agree	Strongly agree
Quality of care is improved by practicing EBM	12 (8.3)	16 (11.0)	67 (46.2)	–	50 (34.5)
Health care cost can be reduced by EBM	29 (20.0)	46 (31.7)	34 (23.4)	24 (16.6)	12 (8.3)
EBM brings about quick knowledge update	12 (8.3)	8 (5.5)	12 (8.3)	87 (60.0)	26 (17.9)
EBM is focused on patient's values	8 (5.5)	16 (11.0)	46 (31.7)	52 (35.9)	23 (15.9)
The adoption of EBM places another demand on already overloaded residents and specialists	20 (13.8)	34 (23.4)	25 (17.2)	61 (42.1)	5 (3.4)
EBM is of limited value in clinical practice	4 (2.8)	21 (14.5)	16 (11.0)	80 (55.2)	24 (16.5)

**Figures in parentheses indicate percentage*

3.2 DISCUSSION

While evaluating the respondents' knowledge about EBM the overall concept about the tool (comprised of different statistical terminologies) for carrying out evidence based literature review and critical appraisal was assessed. The present study revealed the existence of an overall fair amount of knowledge about the terminologies concerning EBM among the respondents. However their understanding regarding terminologies such as meta-analysis and systematic review were poor which would definitely hinder their search for the best evidence in a hierarchical manner. Also their poor knowledge about clinical effectiveness, number needed to treat, confidence interval and publication bias would pose as substantial obstacles into their quest for finding out the actual decision making. Similar findings were also reported in studies by Ghanizadeh et al. [8] from Iran and Amin et al. [9] from Bahrain.

Risahmawati RR et al. [10] from Japan found that 54.0% of the respondents understood the basic terminology of EBM while 3.0% could explain this to others. In a more recent study Ghahremanfard F et al. [11] from Iran observed that just about one third of the participants felt able to explain to others the meaning of some of the EBM terminologies. Respondents in the present study showed poor knowledge about the EBM resources and only a handful of them accessed these for practical use. Medline was found to be somewhat more commonly used than Cochrane database or Best Evidence. McColl A et al. [12] from England reported that only 40% of the respondents knew about Cochrane database of systematic reviews while in the same year another study from Canada [13] revealed that only 8% of the participants conducted Medline literature searches when they came across a difficult clinical problem. Later Ghanizadeh et al. [8] from Iran also identified Medline as most commonly used resource. However the recent study from Japan showed that most of the respondents had little or no awareness of EBM resources like Cochrane and other important clinical evidence databases.

In the present study the assessment of the respondents' attitude towards EBM mostly centred on their opinion about the implications and possible impact of applying the concept EBM in solving clinical problems and decision making. Though the respondents in the present study had an overall favorable attitude towards EBM, nearly half of them did not think that EBM was focused on patient's values and preferences, one of the important components of EBM. Many believed that EBM would place another demand on the already overburdened residents and doctors, a finding similar to the study from Iran [8] Quite a large proportion had the idea that EBM would be of limited value in clinical practice. However literature shows that busy clinicians who devote their scarce reading time to selective, efficient, patient driven searching, appraisal and incorporation of the best available evidence can practice evidence based medicine [12].

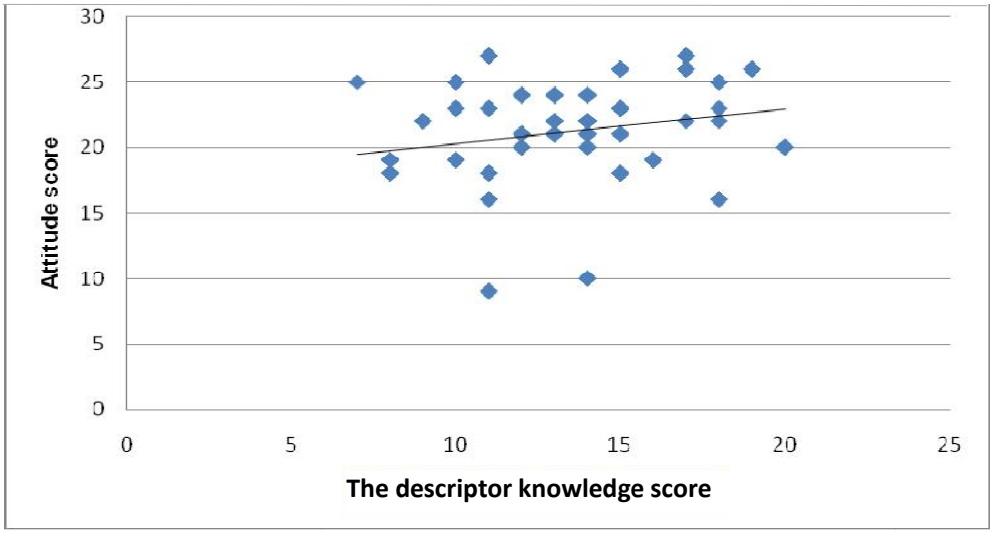

Fig. 1. Correlation between knowledge and attitude scores

Table 4. Perceived barriers against practice of evidence based medicine (n = 145)

Perceived barriers	Number (%)
Never taught on the subject	82 (56.6)
Lack of self-motivation	29 (20.0)
No ready access to evidence based medicine resources	99 (68.3)
Threat to clinical freedom/judgment	46 (31.7)
It is research and not applicable	13 (9.0)
Not universally acceptable	58 (40.0)
Difficult to understand	12 (8.3)

The positive correlation between knowledge and attitude scores in the present study indicated towards the scope for inculcating a favorable attitude towards EBM through steps concerning knowledge building among the respondents. The common barriers against the implementation of EBM, as cited by the respondents in the present study, were “no ready access to resources”, “never taught on the subject” and “not universally acceptable”. The study from England 71.0% revealed “lack of personal time” as a main barrier to practices EBM [14] while “lack of motivation” was the commonest perceived barrier in the study from Iran [8] “No time” (53.1%) and “no ready access to resources” (73.5%) were the most cited barriers in the study from Bahrain [9]. In a Norwegian study many respondents expressed difficulties in using the principles of EBM in their clinical practice because of lack of time and difficulties in searching EBM based literature [15]. A more or less similar picture was also depicted by Al-Wahaibi et al. [16] from Oman. Some of the respondents in the present study had even perceived EBM as “threat to clinical freedom” reflecting the apprehension probably due to their lack of knowledge about the entire gamut of the subject.

3.2.1 Limitation of the study

The measurement of knowledge was subjective, based on what the respondents reported and hence might not reflect their actual depth of knowledge.

4. CONCLUSION

It could be concluded from the present study that many of the respondents were not adequately knowledgeable about EBM and its practical application and quite a few had a negative attitude towards its practicality. However findings of this research suggested that imparting proper knowledge could bring about a positive change in this attitude.

The post-graduate medical students would be the future consultants and it will be worthwhile to motivate them to adopt the practice of EBM through hands-on training and conducting seminars and workshops periodically which will in turn improve their ability to make appropriate clinical decision and rational prescription. Similar studies involving the clinical teachers are needed to assess their role in implementation of EBM.

CONSENT

All authors declare that written informed consent was obtained from the participants for publication of this case report and accompanying images.

ETHICAL APPROVAL

Ethical clearance was obtained from the ethics committee of the institution before the study was undertaken.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Rosenberg W, Donald A. Evidence based medicine: An approach to clinical problem-solving. MJ. 1995;310(6987):1122–26.
2. Sackett DL, Rosenberg WMC, Gray JAM, Haynes RB, Richardson WS. Evidence based medicine: What it is and what it isn't. BMJ. 1996;312(7023):71–72.
   Available:http://bmj.bmjjournals.com/cgi/content/full/312/7023/71 (Accessed 12 Sep 2013)
3. Sackett DL, Strauss SE, Richardson WS, Haynes RB. Evidence-based medicine: How to practice and teach EBM. 2nd ed. London: Churchill Livingstone; 2000.
4. Belsey J, Snell T. What is evidence-based medicine? 2nd ed. Hayward Medical Communications Publisher, United Kingdom; 2009.
   Available:http://www.medicine.ox.ac.uk/bandolier/painres/download/whatis/ebm.pdf (Accessed 12 Sep 2013)
5. Smith CA, Ganschow PS, Reilly BM, Evans AT, McNutt RA, Osei A, et al. Teaching residents evidence-based medicine skills: A controlled trial of effectiveness and assessment of durability. J Gen Intern Med. 2000;15(10):710-15.
6. Hakkennes S, Dodd K. Guideline implementation in allied health professions: A systematic review of the literature. Qual Saf Health Care. 2008;17(4):296-300.
7. Saillour-Glenisson F, Michel P. Individual and collective facilitators of and barriers to the use of clinical practice guidelines by

physicians: A literature review]. Rev Epidemiol Sante Publique. 2003;51(1 Pt 1):65-80.

8. Ghanizadeh A, Imaniyeh MH, Kadivar MR. Knowledge and attitude of medical students and lecturers toward evidence-based medicine: Evidence from Shiraz. Journal of Medical Education Summer. 2006;9(2):65-69.
9. Amin FA, Fedorowicz Z, Montgomery AJ. A study of knowledge and attitudes towards the use of evidence-based medicine among Primary Health Care Physicians in Bahrain. Saudi Med J. 2006;27(9):1394-96.
10. Ghahremanfard F, Nassaji M, Mirmohammadkhani M, Tanha A, Mosavi M, Ghaemi A, et al. Knowledge and attitude toward evidence-based medicine among medical students in Semnan, Iran. J Evid Based Med. 2014;7(1):32-37.
11. Risahmawati RR, Emura SS, Nishi TT, Koizumi SS. Japanese Resident Physicians' Attitudes, knowledge and Perceived Barriers on the Practice of Evidence Based Medicine: A Survey. BMC Res Notes. 2011;28;4:374.
12. 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):361-65.
13. Olatunbosun OA, Edouard L, Pierson RA: Physicians' attitudes toward evidence based obstetric practice: A questionnaire survey. BMJ. 1998;316:365 – 66.
14. Ellis J, Mulligan I, Rowe J, Sackett DL. Inpatient general medicine is evidence based. Lancet. 1995;346(8972):407-10.
15. Ulvenes LV, Aasland O, Nylenna M, Kristiansen IS. Norwegian physicians' knowledge of and opinions about evidence-based medicine: Cross-sectional study. PLoS One. 2009;4(11):e7828.
16. Al-Wahaibi A, Al-Adawi S, Al-Shehhi W, Rizvi SGA, Al-Kemyani N, Al-Amrani K, et al. Knowledge and Attitudes of Oman Medical Specialty Board Residents towards Evidence-Based Medicine. Oman Med J. 2014;29(3):178–84.

APPENDIX-1

A study on knowledge and attitude of post- graduate medical students about evidence based medicine in a medical college in Kolkata, West Bengal, India

Questionnaire

1) What is your age? _____ yrs
2) What is your sex? Male/Female
3) Which clinical course are you pursuing currently? _____
4) How many years of postgraduate training have you completed? <5yrs/5-10yrs/>10yrs (please put tick mark)
5) Have you ever heard of the term Evidence-Based Medicine (EBM)? Yes/No
   If yes, then
6) Are you familiar with the following terminologies? (tick the appropriate choice for each)
   a) Relative risk: yes and can explain/yes but can't explain/not familiar
   b) Absolute risk: yes and can explain/yes but can't explain/not familiar
   c) Systematic review: yes and can explain/yes but can't explain/not familiar
   d) Randomized control trial: yes and can explain/yes but can't explain/not familiar
   e) Odds ratio: yes and can explain/yes but can't explain/not familiar
   f) Meta-analysis: yes and can explain/yes but can't explain/not familiar
   g) Clinical effectiveness: yes and can explain/yes but can't explain/not familiar
   h) Number needed to treat: yes and can explain/yes but can't explain/not familiar
   i) Confidence interval: yes and can explain/yes but can't explain/not familiar
   j) Publication bias: yes and can explain/yes but can't explain/not familiar
7) Are you familiar with the following information resources? (tick each appropriate choice)
   a) Cochrane data base of systematic reviews: yes and use/yes but don't use/not familiar
   b) Best evidence: and use/yes but don't use/not familiar
   c) Medline: and use/yes but don't use/not familiar
8) What is your opinion about the following statements? (tick the appropriate choice for each)
   a) Quality of care is improved by practicing EBM:
      strongly disagree/disagree/don't know/agree/strongly agree
   b) Health care cost can be reduced by EBM:
      strongly disagree/disagree/don't know/agree/strongly agree
   c) EBM brings about quick knowledge update:
      strongly disagree/disagree/don't know/agree/strongly agree
   d) EBM is focused on patient's values:
      strongly disagree/disagree/don't know/agree/strongly agree
   e) The adoption of EBM places another demand on already overloaded residents and specialists:
      strongly disagree/disagree/don't know/agree/strongly agree
   f) EBM is of limited value in clinical practice:
      strongly disagree/disagree/don't know/agree/strongly agree
9) Which of the following do you think are the most important barriers to your using evidence-based medicine in your clinical practice? (Tick one or more appropriate answer)
   a) Never taught on the subject
   b) Lack of self-motivation
   c) No ready access to evidence-based medicine resources

d) Threat to clinical freedom/judgment
e) It is research and not applicable
f) Don't believe that Evidence is universally applicable
g) It is difficult to understand
h) I have no time

Others (Specify) _____

Peer-review history:
The peer review history for this paper can be accessed here:
http://www.sciencedomain.org/review-history.php?iid=951&id=12&aid=8717