EVIDENCE-BASED MEDICAL PRACTICE IN DEVELOPING COUNTRIES: A CASE STUDY OF PAKISTAN

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Abstract - Attitude towards and knowledge of health professionals regarding evidence-based medicine (EBM) have been assessed worldwide. However, barriers to practicing evidence-based medicine arefound diverse in different countries. Though, little supportis there, on the place of evidence-based medicine among some developing countries, like Pakistan. The aim of this studyis to determine the attitudes and beliefs of Pakistani physicians towardspracticing evidence-based medicine. This study investigates barriers faced by the physicians while practicingevidence based medicine.This is a cross sectional quantitative study. Self-administered questionnaire is used to collect the data from 352 physicians. Data is analyzed by using SPSS. A declined trend is observed between the physicians' awareness of evidence-based medicine and their clinical experiences. Understanding of technical terms to practice evidence-based medicine is found poor among the participants. Journal papers are the most common source used by 69% physicians to access the research information followed by the conferences and organizational guidelines. Most of the participants (347) assess the reliability and quality of information by exploring credibility of the information source and author's affiliation. 40.2% physicians responded that they are good in adapting and modifying the relevant research information according to patient need while 34.6% were graded better and only 9.1% graded them asbest. Itcan be explored that linking research with the clinical practice is the most significant barrier in applying research information into practice. Clinical training must go beyond searching and critical appraisal toreachan expert judgment and shared decision making skillsare vital for evidence-based medicine practice.

Index Terms - Evidence based medicine, physician's knowledge, and EBM skills.

I. INTRODUCTION

Evidence-based medicine is a methodology for clinical decision-making in which the physicians use the best available current evidence, to decide the best treatment or health care optionsfor patients [1-2]. Evidence based medicine promises to increase the quality of health care delivery [3] as it has a potential to address the current challenges in health care. These challengesinclude an increasein the cost of healthcare delivery, higher rate of medical errors and delays in themedical knowledge diffusion process.Evidence-based medicine aims to assess the quality and strength of medical interventions in terms of benefits and risks. Evidence-based medicine is useful for informed clinical decision making procedures. It also ensures better clinical outcomes and maintains the quality of medical care [4].

Knowledge base for health care professional document is very vast. A knowledge base is used to optimize the information collection, organization, and retrieval processes. This information can be used by an organization for the general or specific use.It isconstantly increasing and changing with the passage of time. Therefore, clinical decision making on the basis of the best available research evidences is very important. In traditional clinical practices, health care professionals make clinical decisions on the basis of their own professional knowledge and clinical skills.They also seek guidance from their peers and senior colleagues or the available literature.Certain limitations have been found in this traditional knowledge seeking process used byphysicians. First, periodic medical publications are laggard in updating evidence-based medicine; consequently, finding the latest clinical evidences, scientific literature and reports are not easy for physicians to take informed decisions in their clinical settings. The second limitation is that a manual search for finding the evidences is inefficient as it restricts their performance in clinical settings[5]. The third limitation is that evidence-based medicine is not a formal part of medicalcurriculum in Pakistan. Now, with theinternet and electronic health records, practicing evidence-based medicinehas become more convenient for doctors. A large number of online databases, medical and clinical information systems, are available (for example, ACP Journal Club, National Library of medicine, Evidence-Based Medicine, Medline, the Cochrane Database of Systematic Reviews, the Abstracts of Reviews of Effectiveness Database and the Cochrane Central Register of Controlled Trials).The aforesaid e-sources can be easily accessed by physicians to search the required information on standard guidelines based on evidence-based medicine [6]. The health care professionals, who practice evidence-based medicine in their professional routine are more efficient as compared to those who confinethemselves to their knowledge or peers' advice to make clinical decisions [7]. All clinicians should have information mastery skills to find the best available research evidence for every day practice. They must have ability to assess relevance before rigor, evaluate information about therapies and clinical decision rules, can comprehend

basic statistics, able to evaluate information gained by reviews and guidelines and can critically evaluate information [8]. In this study, the aforementioned skills are discussed in detail.

This study is significant as it seeks to explorethe physicians' approach and attitude towards practicing evidence-based medicine. This study will represent the inference of their concern and interest inpractingevidence-based medicine while using information services.In the long run, investment in the development of computer and information skills will promote the benefits of improved productivity and efficiency of evidence based medicine. As it is already understood that skill infrastructure is more important than physical infrastructure.

II. METHODOLOGY

This is a cross-sectional, quantitative surveystudy with a sample size of 352 physicians. The study is confined to Pakistani physicians' attitudes towards evidence-based medicine. The sample includes physicians from both publicand private hospitals in Rawalpindi and Islamabad, Pakistan. Simple random sampling technique was used to collect the data. Participants were asked to respond to the questionnaire according to their practice and perception and understanding of practicing evidence based medicine.

After a comprehensive literature review the questionnaire was developed. To ensure that the questionnaire encompasses all the dimensions of the construct in the proposed model, items of the questionnaire were created after focus group discussion with fourphysicians and interviews withtwo lecturers. Threephysicians were also interviewedto seek their expert opinion on the design of the questionnaire.Two research experts assisted in analyzingthe content validity of the data collecting instrument for current research.Initial reliability was established with the help of a pilot study with 50 randomly selected physicians. The value of cronbach's alpha was 0.8 which confirmed the presence of reliability of the questionnaire. The final questionnaire included 25 items. Fourquestions were asked to determine the criteria used by physicians to have an access to their required information andthen the criteria used to check the reliability and quality of information. Six questions were asked to identify the barriers faced by physicians in the research in practicewhile one question was asked to explore their ability to adapt relevant research information into their clinical practice. Knowledge and understanding of technical terms of physicians forevidence-based medicine were analyzed by asking 8 different evidence-based medicine terms. Responses to questions about understanding of the technical terms for evidence-based medicine required 'yes/no' replies. We calculated general knowledgeof terms by summing the responses of all terms. Items related torespondents' views about the possible barriers to the use of evidence-based medicine were assessed with a 'yes/no/do not know' choice set.
850 questionnaires were distributed but only 400 responses were received thus a total response rate was 47.05%. 48 responses were incompatible.Thus, usable response rate was only 41.41% with a sample size of 352.SPSS is used to analyze the data.

III. RESULTS

Demographic Characteristics of Participants:
Results of participant's demographic features such as gender, age, organization in which they are serving, clinical experience and the highest education degree are shown in table 1.

Table 1: Demographic profile of survey respondents (n=352)

Variable	Category	Frequency	%
Gender	Male	203	57.7
	Female	149	42.3
Age	25-30 years	103	29.3
	31-35 years	92	26.1
	36-40 years	55	15.6
	Above 40 years	102	29.0
Organization	Private	246	69.9
	Public	106	30.1
Clinical Experience	1-5 years	125	35.5
	6-10 years	91	25.9
	11-15 years	50	14.2
	More than 15 years	86	24.4
Highest degree	Bachelors	159	45.2
	Entry level Masters	90	25.6
	Advance Master	57	16.2
	Entry Doc	26	7.4
	Advance Doc	20	5.7

Gender: Table 1 shows that more than half (57.7%) of the respondents aremale while the femaleis 42.3%.
Age: Results show that the 29.3% of the participants of the survey belong to the age group between 25-30 years and descriptive statistics of the clinical experience also support this finding as most of the participants have a clinical experience of 1-5 years. The second highest percentage i.e. 29% isfrom the respondent above 40 years.
Organization: Most of the participants in this survey are serving in the private sector (69.9%) followed by the public sector (30.1%).
Clinical Experience: 35.5% respondents have clinical experience of 1-5 years followed by 25.9% with clinical experience of 6-10 years. 14.2%

participants have 11-15 years and 24.4% have clinical experience of more than 15 years.

Highest Degree: Majority of the participants (45.2%) have only a bachelor degree followed by 25.6% of the participants having an entry level master degree. It was found that 45.17% of the physicians reported themselves at the level of beginners in practicing evidence-based medicine in their clinical practice.

Steps for evidence-based medicine

All clinicians should have information mastery skills to find the best available research evidence for every day practice. They must have ability to assess relevance before rigor, evaluate information about therapies and clinical decision rules, can comprehend basic statistics, able to evaluate information gained by reviews and guidelines and can critically evaluate information.Consequently current researchstudy discusses the aforementioned skills in detail in the following results.

1. AccessingResearch Information:

Journals, conferences, medical forums, press releases, advisory committees, newsletters, organization's guidelines, research consultants and research-motivated individualsin staff are some of the sources are included in the questionnaire to know the information resources accessed by physicians usually to get information for evidence-based medicine. The respondent could mark more than one option. Results shown in figure 1 illustrate that journal papers are the most common source used by the physicians to access the research information followed by the conferences and organizational guidelines. The least used sourcesare the research consultants, press release and research motivated peers.

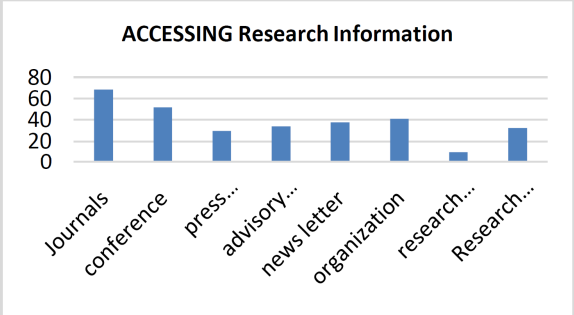


Figure.1: Source used by physicians to access research information

Assessing the Reliability and Quality

Following options are included in the questionnaire to know the criteria followed by physicians to assess the quality and reliability of the relevant information from the online information resources to practice evidence-based medicine

1. Seeking consultation or second opinion
2. Contacting expert
3. Considering credibility of source or author affiliation
4. Applying own research knowledge

The respondent could mark more than one option. It isrevealed that most of the participant (347) assess the reliability and quality of information by exploring credibility of the information source and author's institutional affiliation. Seeking consultation or second opinion (325) is found as the second mostly used source to assess the reliability by the physicians. Third major response isseekingthe experts' opinion (290) and the least number of respondents relied on their own research knowledge (270).

Adapting Relevant Research Information:

For evidence-based medicine practice, physicians need to adapt the relevant research information according to a patient's need. Most of the physicians (40.2%) graded themselves good, 34.6% graded themselves better, and only 9.1% graded themselves thebest in adapting and modifying the relevant research information according to a patient's need. Whereas16.1% declared they are not good enough to modify the available information. When these results were cross tabulated with the evidence-based medicine experience, it was found that 82.3% of the beginners are not good in modifying the relevant information.

Barriers in Applying Research Information:

Following options for studying barriers were selected from previous literature for this study

1. Difficulty to link research with practice
2. Lack of enough statistical knowledge
3. Research results often not generalizable to our patient's population(s)
4. Insufficient information available to enable implementation
5. Conflicting research findings
6. Clinical Relevance

Respondents were asked to rank all the above mentioned barriers on a scale of 1-5 where 1 is the most important barrier and 5 is the least important barrier. Figure 2 illustrates the responses. Linking research with the clinical practice is the most significant barrier in applying research information into practice. The reason can be justified that most of the research in clinical, medical and pharmaceutical domains is in the westerncontext and therefore it is somehow difficult to generalize and link those research findings into the clinicalcontext of a developing country. Although it is noted that physicians of developing country do not have a problem with the clinical relevance as this is found as the least important barrier for them in applying research information into their clinical practice.

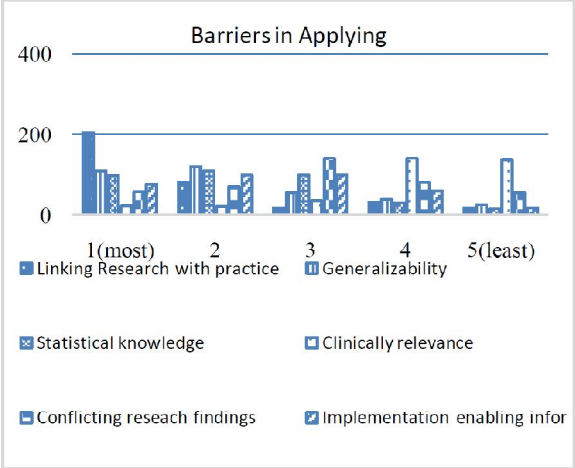


Figure 2.Barriers in Applying Research Information

Knowledge forevidence-based medicine terms:
Evidence-based medicine terms selected for this study were:

a) Relative risk
b) Absolute risk
c) Systematic review
d) Odds ratio
e) Meta-analysis
f) Confidence interval
g) Heterogeneity
h) Publication bias

The respondents were asked to give their response to the above mentioned evidence-based medicine terms from the options of: “yes understand and able to explain to others”, “some understanding”, “don’t understand but like to know”. Figure 3 demonstrates the responses on the understanding some of the evidence-based medicine terms. Only 28.12% of the respondents had complete understanding of the evidence-based medicine terms while most of the responses (39.3%) reflect some understanding of the terms. Whereas 32.51% of therespondents had no understanding of theseevidence-based medicine terms. Meta-analysis and odd ratio terms are found least understood terms.

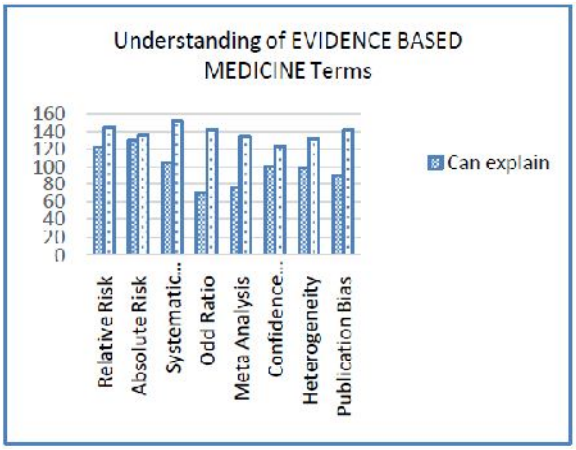


Figure 3.: Understanding level of EVIDENCE BASED MEDICINE terms

The above resultwas compared with the clinical experience of physicians. A declined trend was noted in the understanding of these terms used in evidence-based medicine as shown in Table 3.

Table2: Understanding of EBM terms according to age group

Terms	Positive Responses Percentage according to clinical Experience			
	1-5 years	6-10 years	11-15 years	More than 15 years
Relative Risk	96.8%	93.7%	92.1%	90.6%
Absolute risk	97.5%	96.2%	95.5%	92.1%
Systematic research	91.2%	90.1%	88.5%	84.7%
Odd ratio	90.2%	87.3%	85.7%	78.1%
Meta-analysis	90.0%	87.4%	84.5%	80.1%
Confidence interval	95.8%	90.4%	87.6%	81.5%
Heterogeneity	94.4%	90.7%	80.0%	78.4%
Publication bias	90.7%	87.1%	77.9%	71.0%

One reason for this declined trend was that evidence-based medicine concept is quite new and physicians who gottheir education many years ago have limited knowledge of the evidence-based medicine as these knowledge areas were not addressed in their educational tenure. Asbooksare the main source of information for physicians.

DISCUSSION

The figures are not surprising as a total male population is more than the female population according to gender statistics of 2009 issued by the statistical division of government of Pakistan. The overall increase ratio of male to female category itself is explaining the high percentage of male responses in this study. This finding is also supported by researchstudies revealing that in developing countries, typical online information users are male [9]. All the identified challenges includes

Physician’s knowledge and skills

This barrier can be categorized under personal, attitudinal or educational one. Doctors need to have competent computer skills to navigate the electronic information sources for the relevant evidences search [10]. A bulk of information is available through e-sources. David Shenk introducesterm “data smog” stating that huge explosion of information can be a barrier for users [11]. The only solution to handle this barrier is to use computers and their processing abilities for effective searching in electronic medical databases. Another barrier is to find the appropriate and authentic resource to search the information. Availability of these resources to the healthcare delivery setting is very crucial for any practical use [12]. No website or database comprising all the resources needed to practice evidence-based medicine

is available. Physicians have a limited ability to accurately self-assess the available information resources [13].

Patient and evidence-based medicine: Sometimes patients becomes the barrier in practicing evidence-based medicine as some patients take the final decision that whether they agree for a particular treatment (suggested by the evidences) or not [14]. This barrier can be overcome by empowering patientsby informing them the knowledge of all possible benefits and potential risks. This goal can be achieved by good communication skills of physicians with their patients [15]. During this communication,physicians need to be very careful as their own concern or views should not affect the explanation of the evidences [16].

Evidence-based medicineterms: In general, physicians do not have a good understanding of terms used in evidence-based medicine. In a study conducted by McColl, only 15% of the participants could satisfactorily explain "publication bias" term [17]. Another survey, conducted to determine the physicians' accuracy and self-assess compared with external observations of their competence,reveal that physicians have a limited ability to accurately self-assess and understand evidence-based medicine term [13].

Critical appraisal: Critical appraisal is time taking and skillful procedure for effective review of research articles. This skill comes with the information literacy and is helpful in determining the contextual reliability of research findings in real settings, as restrictive environment is considered by some clinical trials. Many organizations have developed tools for critical appraisal such as Critical Appraisal Skill Program (CASP) [18]. Some research studies revealthat identifying and selecting appropriate researchevidence is also a problem in critical appraisal procedure which indirectly highlights the weakness in literature searching skill [19].

Clinical Relevance Issue: This barrier is highlighted after a survey by McAlister. The survey reports that clinicalrelevance issue is highlighted by 26% of the physicians. They have the opinion that the evidence-based medicine focuses on a small proportion of the medical knowledge [20]. A hugeliterature is published every year which doubles in every 20 years [21]. Difficulty to find the relevant information from such a bulk of literature physicians haveinclination to consult expert opinion from their peers and colleagues, although chances of potential biasnessare always there [22].

Lack of Conclusive Proof:Lack of conclusive proof for a strategy, treatment or principle is another barrier in practicing evidence-based medicine. Blinding and contamination are the issues even in randomized control trials (RCT)[23]. There are a few empirical studies on the effectiveness and betterment of evidence-based medicine practiced by the physicians to their patients.

The research is delimited to medical doctors, dentists and pharmacists (as health care professionals) constrained geographically in one region of Asia, Pakistan. While outcomes of this study may be typical for a healthcare professional in the similar geographic area and contextual environment, the results might reveal the skills and competencies of physicians working in health care with a different type of ascendency or those in other parts of Asia. In addition, majority of the respondentsare working in the urban health care settings. So the demographics and cultural background of the data population may not be typical of those in other locations, such as in rural environments. While surveys are useful in obtaining data from large audiences, they do not capture the richness of qualitative data obtained in interviews [24].

CONCLUSION

Medical mistakes are very serious in clinical practice. Therefore,medical profession is very conscious of such mistakes in treating the patients. Evidence-based medicineaims at minimizing medicalmistakes.Evidence-based medicineis not only utilization of research but also a pervasive and comprehensive practice. Evidence-based medicinewould, seem a solution consisted of defining focused clinical question, critical thinking, critical appraisal of researches and evidence. Moreover synthesizing decisions based on all evidence, expertise and patients' preferences are necessary but not adequate for the implementation of evidence-based medicine.Eventually this research would create awareness of the need of information and computer literacy education among physicians which would enable them to practiseevidence-based medicine. Investment in the development of computer and information skills among the physicians would result in improved productivity and efficiency of evidence-based medicine.

Follow up research, including post-implementation of health informatics application in health sector along with interviews is recommended, but is beyond the temporal boundaries of this research.

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