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A Systematic Review Of The Roles And Competencies Of Medical Information Professionals(Mips) In Evidence-Based Medicine In Thailand

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ABSTRACT
The aim of this study was to systematically review the roles and competencies of Medical Information Professionals (MIPs: non-medical personnel who are information technology and medical library literacy) in supporting clinicians in the practice of evidence-based medicine (EBM) as reported in the published literature. It analysed and synthesized information from textbooks on EBM and research and review articles drawn from MEDLINE using the following keywords: “evidence-based medicine”, “information seeking and physician”, “information need and physician”, “EBM librarian”, “clinical librarian”, “library service”, “informationist”, and “knowledge management”. Information from research articles published in local journals and conference proceedings was also included evidence-based medicine (EBM) is defined as the conscientious, explicit and judicious use of current best evidence in making decisions about patient care. The impact on the medical profession has been to emphasize information processing such as the searching of and appraising medical evidence. Important obstacles to the practice of EBM, from the point of view of the clinicians, include: lack of time; the complexity in the use of the resources; the quality and quantity of evidence resources; lack of infrastructure, technology and information seeking ability; attitude of information service providers; and location of clinicians’ office. MIPs can help support clinicians by taking on, and acquiring, new roles and competencies such as: quality filtering; literature searching; teaching and managing medical information and associated technology; basic knowledge of EBM and critical appraisal; and preparing systematic reviews. Studies have shown that MIPs can improve their roles and competencies in helping the implementation of EBM. Outcomes indicate the clinician’s satisfaction and their improvement in patient care. Supporting the practice of EBM will challenge MIPs in Thailand to adjust their roles and competencies following Thai clinician information seeking behaviour, and thus will set the new roles and competencies for MIPs in Thailand.

Keywords: ‘evidence-based medicine’, ‘information seeking and physician’, ‘information need and physician’, ‘EBM information seeking’

INTODUCTION

Evidence-based medicine (EBM), new paradigm, has been introduced since 1990 by Evidence-Based Medicine Working Group. Traditional patient-care decision depends on clinician's experience, basic knowledge, textbooks and the consultation of clinical expert. In EBM, clinicians in daily practice use the best available evidence and patient preferences for patient-care decisions making. EBM process has improved the medical care and lessened clinical malpractice. EBM is now widely accepted for clinical practice worldwide especially in United and several countries in Europe. In Thailand, interest in EBM has been increasing continuously since the last decade. The important steps for the practice of EBM include identify the patients' problem, searching and appraisal the evidence, clinical application and assessing the outcomes.

Clinicians using EBM should have skill in information technology. They should be enthusiastic to continue their professional development and life long learning. However most clinicians are usually busy with their clinical works and so, to facilitate the EBM practice, some assistance from the non-medical personnel should be useful. The roles of MIPs in EBM process are increasing in many foreign institutes. However in Thailand, this concept is quite new. MIPs may come from medical librarian, medical informationist and educator. These personnel should be active with service mind and continuous professional improvement. Apart from information technology they should learn more about EBM process. Cooperation between clinicians and MIPs should be benefit to the patient care. The new paradigm is challenge to all concerned health personnel and medical librarians as well as informationists in Thailand.

RELATED WORKS

EBM and concept

Evidence-based medicine (EBM) is a new paradigm, defined as the consciousness, explicit and judicious use of current best evidence in making decisions about the care of individual patients. EBM has been introduced since 1990 by Evidence-Based Medicine Working Group, Department of Epidemiology of Biostatistics McMaster University of Canada (Guyatt & Rennie, 2002). They made comment that the information was exploded daily and the medical researches proceeded and fast. But the traditional patient-care decision was not systematic. It relied on clinician's experience, basic knowledge and textbooks including the consultation of clinical expert. These were, however, not enough for patient care at present.

The EBM group proposed that clinician's experience being restricted because patients' symptoms were so different (Eldredge, 2000). The physiopathology and basic knowledge from textbooks are useful but they are not suitable for all patients. The clinical practice should be integrated between the clinical experience, up to date, critical evidence and patients' preferences, values including economic and other proper variables. Therefore, the EBM group proposed EBM as the new paradigm shift with the concept as the following: the only one evidence was not enough for clinical decision making but realizing the patient's profit, risk, inconvenience and economy including the consent and belief from patient himself and family. (Sackett et al., 2000)

The practice of EBM process

The practice of EBM process comprises 5 important steps. The details of the 5 steps of practice of EBM process are as follow: (Bigby, 2000 ; Sackett et al., 2000; Guyatt & Rennie, 2002; Pwee, 2004)

Step 1: Well-built clinical question

Clinician poses the clinical question for each patient's symptom. The details of the clinical question should be well built to find out the best and suitable evidence for patient decision making. The clinical question is the first step to search from the best evidence so as to make clinician careful to build the clinical question. There are 2 kinds of clinical questions.

1. Background question: The question in general practice such as: what is hypertension? What is the moderate of hypertension? etc.

2. Foreground question: The question specific on each patient's symptom comprises 4 parts as: the patient himself or population, the intervention, the comparable intervention and the outcome.

Step 2 Clinical evidence
Clinician tries to find out the clinical evidence to answer the clinical question as much as possible and the best evidence should be the information for answering the clinical question. After analysing and synthesizing the literatures emerged 3 kinds of the clinical evidence such as 1) patient history, 2) clinical background and 3) clinical research.

Step 3 Critical appraisal evidence.
The best clinical research should be appraised. Clinician appraises clinical research from methodology and the international to standard of each medical care as follow: diagnosis, therapy, prognosis, and risk/harm, etc.

Step 4 Apply the evidence to specific patient.
For clinical practice, the appropriate clinical importance of the evidence should be applied to each patient. In step 4 clinician uses is own experience and knowledge of the practicing patient including the respect and wishes of patient's value.

Step 5 Assess the outcome
Outcomes of the clinical practice for the patient should be assessed with the realizing of patient's satisfaction. Clinician should review that the former steps are precise and help the patient. The improvement might be set for the next time if the outcome is not satisfied.

The EBM process should be systematic including the identification of the patients' problem or well built questions which lead to search the best critical and appraisal evidence as applied to each patient by realizing the patient preferences, values and assessing the outcomes. In EBM process, clinicians in daily practice use the best available evidence and patient preference for patient-care decisions making. The EBM process has improved medical care, lessened clinical malpractice, protects patient rights and assigned to medical curriculum. (Rosoff, 2001 ; Finkel et al. 2003 ; McDonagh & Hurwitz, 2003 ; Albert & Easton 2004 ; Coleman et al, 2004 ; Dorsch et al. 2004 ; Lewis & Orland, 2004 ; Lucas et al., 2004). EBM is now widely accepted for clinical practice worldwide, especially in the United States of America and several countries in Europe. In Thailand, interest in EBM has been increasing continuously since the last decade.

Behavior of information seeking
Leckie (1996) explained that the roles and related tasks undertaken by professionals in the course of daily practice prompt particular information needs that could stimulate the behaviour of information seeking, in which person will finally process the information seeking, retrieve the information and use the information following the work roles in society of the personnel as shown in Figure 1.

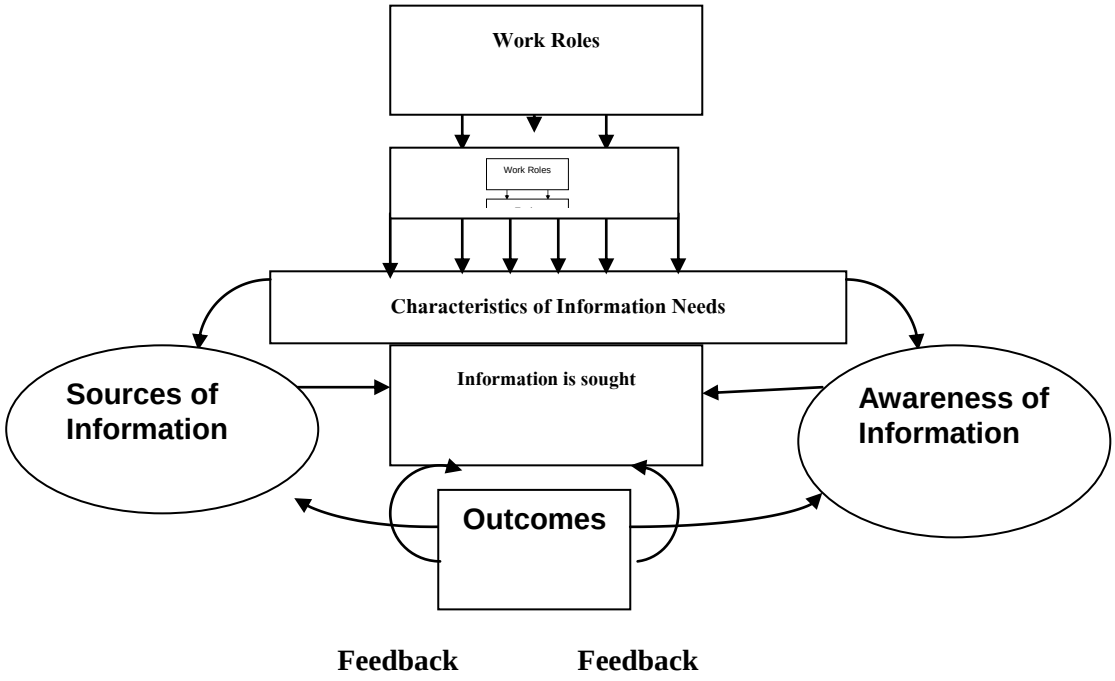

Figure 1 : Leckie"s Model

Source: Leckie, G. Pettigrew, Karen E. & Sylvain C. Modelig the information seeking of professionals: a general model derived from research on engineers, health care professional and lawyers. Library Quarterly, 66 (2), 1996, 161-193.

The EBM process impacts the clinicians in practicing EBM. Clinicians should have the competency in searching the relevant information, appraising the evidence and integrating with value and preference of patient's decision, finally adapt to clinical practice. As the concept of EBM emphasizes clinical research evidence, the quality of the clinical evidence is based on the research methodology and the explicit international standard. EBM clinicians should develop a willingness to seek out and choose high quality appraised evidence and secondary sources of evidence from amongst what is available.

The clinical evidence should be reliable, valid, up to date, fast and useful because the patients' life are the most important. The best evidence derived from critical appraisal of the literature, evidence-based abstraction services, online and other forms of electronic literature searching. Systematic review is the best clinical research which is the critical evidence synthesizing and integrating the results of multiple original primary investigations by using strategies that limit bias and random error. Today systematic reviews are growing numerously, the clinicians should try to find out the high quality evidence for many of the clinical decisions as shown in Figure 2

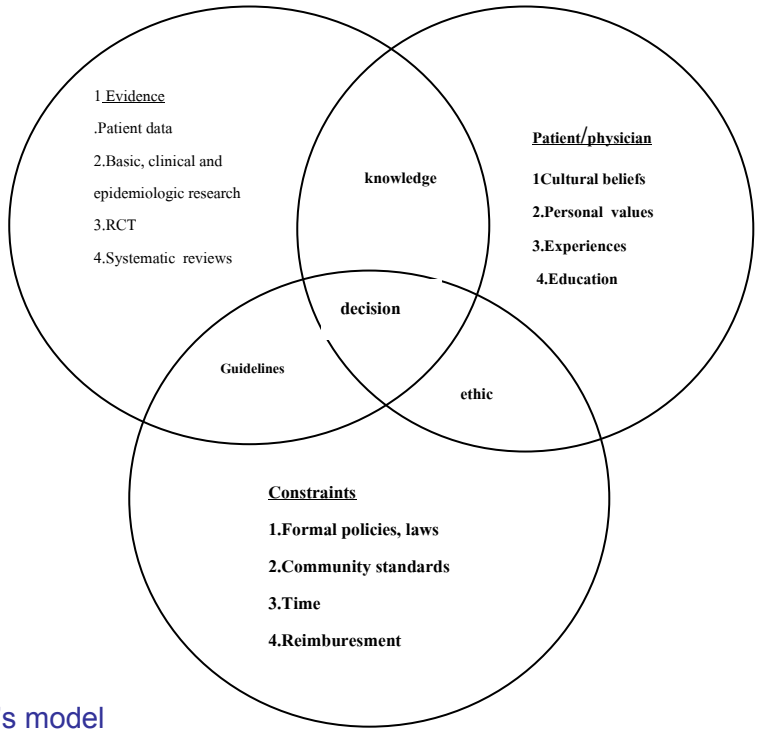

Figure 2 : Murlow's model

Source: Murlow, C. D. Cook, D. J. & Davidoff, F. (1997). Critical links in the great chain of evidence. Ann of Int Med,126(6), 389-391.

Behaviour of information seeking in EBM differs from the others because of the role of the clinician. In EBM process, the clinician uses the integration of experience, critical evidence and patient's value. Patient's life is the most important so and therefore accurate decision making in patient care should be of the greatest concern and information to support the patient care decision making is crucial. It impacts on the clinicians using EBM who should have skills in information technology. They should be enthusiastic to continue their professional development and life-long learning. By the way, clinician should concentrate to choose the appropriate resources and use the strategy to search for concluding the result of searching by critical appraising and decision making in select the best evidence for patient care.

Types of clinical information and resources
The outcome of the study of information seeking behaviour and information needs implement to the management of useful and suitable information for the respondents. There are numerous studies of information seeking behaviour and information need of clinician in EBM process. The outcome of the studies indicates 2 major objectives information seeking: 1) answering the clinical question and 2) receiving the new clinical information. (Bryant, 2000 ; Green, 2000 ; Hess, 2003 ; Bennett et al. ; 2005).

Clinicians mostly use many kinds of information as they need. In EBM process, the information is very important which could be emerged in 4 kinds as follow:

1. Patient information: patients' history of physical examination including clinical data, laboratory report, MRI report, etc. from patient/family interviewed, medical record, demographic, etc.
2. Background information: background information for answer the clinical question from textbooks and journals available in information service institute and online databases.
3. Experience/Expert information: clinical tacit knowledge from expert in medical specialty as teachers, colleagues and expertise. This type of information resource is preferred for clinician use. The studies have shown that this resource is easy to access for face-to-face contact, so the rate of using is still constant.

4. New clinical innovation: systematic review(SR) is defined as the best evidence from online databases such as PubMed, Cochrane Library, Ovid, Embase, UpToDate and ACP Journal club, etc. These databases are available in medical library service. Usually medical library is concerned with the useful information of the EBM databases and to manipulate the information management including information service. SR is the best clinical research which is the critical evidence synthesizing and integrating the results of multiple original primary investigations by using strategies that limit bias and random error (Cook, Mulrow, & Haynes, 1997). SR is generated to answer specific, often narrow, clinical question in depth. The clinical question can be emerged from 4 steps: the population or patient problem, the ways of intervention, the comparable methods and the needed outcome. The synthesized studies indicated that SR is very useful for EBM process.

The various kinds of information resources are available such as the structured abstracts, updated high quality textbooks in online version, the structured excellent review Cochrane Library that disseminates of high quality SR of randomized controlled trials (RCT) including sources of primary literature: Medline(NLM), Medline Ovid, EMBASE, full-text online journals with free accessibility and subscription.

The best way to retrieve the best information for clinician is very helpful for decision making in patient care. The information from one stop service and on time retrieving strategy being acquired are essential to support the clinicians. The numerous clinical information scatters worldwide but the quite suitable information should be described.

Characteristics of clinical information seeking

The characteristics of clinical information differ from other subjects. Guyatt & Rennie (2002) proposed the 3 basic criteria of clinical evidence 1) Validity, 2) Usefulness and 3) Relevance. These characteristics show that clinical information is quite important. The best evidence should be selected and filtered as much as possible. Today is the information age, the information scatters worldwide, so the clinicians face the barrier for retrieving the critical evidence. To practice EBM, clinicians should have the competency in searching the information that is valid, useful and relevant. The information should be critical appraising and integrated with value of patient decision and finally adapted to clinical practice. There are many studies showing that the clinicians in EBM process needs the up-to-date, best, useful, relevant, simple accessible and high quality information (Bennett, Casebeer, Kristofco, & Collins, 2005 ; Haigh, 2006). The special characteristics of clinical information for clinical decision making are shown in Table 1.

Table1: Characteristics of clinical information

Up-to-date
Best-evidence
Relevant
Simple accessible
Useful
Fast
Valid

The information is useful for patient care because patients' lives are very important. Clinicians have an ethical responsibility to ensure the accuracy of the information given to the patients, whether it be in verbal, print, or electronic form.

Obstacles of clinical information seeking

The clinical questions often arise in daily practice. There are 2 kinds of questions such as the conscious or manifest and unconscious or latent questions. The conscious or manifest question could be answered but unconscious or latent question could not, so leaving of the answer open. Most practitioners use information to support patient care several times per week, and patients had to wait. (Andrews et al., 2005) The inherent obstacles such as: lack of time and no necessity to look for an answer were the most important reasons for leaving the questions answered. (Kapiriri & Bondy, 2005) The resources being relied are due to the simple, easy and convenient accession

such as colleagues, and personal experience being increased. The more is the spread of the clinical knowledge, the more is it difficult to find out the answer to pursue the clinical questions. The studies have shown that family physicians can be overwhelmed by many factors such as: the quantity of clinical information, their inadequate searching skills and their lack of confidence that they will be able to answer the question (Bennett et al., 2005).

The EBM process impacts clinicians in seeking information, so that they should keep up to date to retrieve the new information for patient care decision. Clinician information seeking is divided into 2 modes that are active mode and passive mode. The active mode is seeking by clinicians themselves and passive information is seeking from other providers such as pharmaceutical representatives or the stakeholders (Schaafsma et al., 2006). Nevertheless, clinicians couldn't pursue all clinical work due to time constraints(Andrews et al., 2005). Information overload is considered one of the key barriers to accessing the best evidence for decision making and effective knowledge updating and is being addressed through EBM methods. The lack of knowledge of resources includes its own interface and architecture, so it takes a long time to find out the answers from multiple resources that can be major barriers. There are several obstacles (Cohen et al, 2003; Sladeks 2004 ; Andrews et al., 2005; Schaafsma et al., 2006) that usually occur such as lack of time, the complexity in the use of the resources, the quality and quantity of evidence resources, inadequate infrastructure technology, information seeking skill/experience/knowledge, attitude in information service and location of clinicians' office.(Table2). These problems are great barriers for clinicians' seeking information.

Table2: Obstacles of clinical information seeking

Lack of time
Information overload
Complexity of information searching resources
Ineffective online network
Inadequately provide infrastructure technology
Inadequately support resources
Information seeking skill/experience/knowledge
Attitude in information service
Location of clinicians' office

The obstacles which are the great barriers remain homogeneous and may be increased if there are no responses from clinical stakeholders including clinician himself. EBM process is the new paradigm that is very beneficial to patients' profit. Clinician using EBM process should derive the information through convenient ways of information seeking.

Medical information professionals' roles and competencies

However, technology offers many promises for enhancing access and use of various knowledge-based sources such as primary care practice-based research network (PBRN) which offers the networks for studying and disseminating including offering a unique ''laboratory'' for investigating primary care information needs and related problems in real world practices serving patients in a variety of contexts. Kentucky Ambulatory Network (KAN) has to develop a practice-based research infrastructure because it lacks an integrated informatics infrastructure to support. (Labovitch, Bozic, & Hansen, 2006).The clinician must spend so long time to find out the answers from multiple sources that can be major barriers. Thus, tools that integrate resource access into a single interface should be further investigated for less time. That is, a more standardized interface would allow access to multiple, disparate resources without having to have special skills to search and synthesize the information from each. Many studies have shown that the models for retrieving the clinical information have been developed to adjust for EBM process (Sim, 1996; Tibbs, 1996; Seol, 2003; Lorence & Spink, 2004) for supporting the clinician information seeking including clinical information management.

For the best retrieval clinical information and using critical evidence, the investigation for suitable clinical information management is needed. As many studies have shown that the stakeholder realized the great barriers for clinician information seeking, medical information professionals

(MIPs) are the stakeholders who are assumed as the persons that could upgrade information-seeking skills through mentorship for clinicians (Haigh, 2006). They could decrease the information seeking obstacles. Numerous studies have found that the fast, up to date and electronic information support including new roles and competencies of MIPs in manipulate information management and service are required (Donald et al, 2005 ; Lindberg & Hamphreys, 2005 ; Ludwig & Starr, 2005).

To facilitate the EBM practice for busy clinicians, some assistance from non-medical personals is needed. They may be called “Medical information professionals (MIPs)” The possible roles and competencies of MIPs are shown in Table 3.

Table 3: Medical information professionals' roles and competencies

Quality filtering literature
Searching
Teaching
Managing medical information
Technology literacy
Evidence-supported to enhance the safety
Basic knowledge of EBM process
Critical appraisal
Preparing the systematic reviews

EBM has been accepted worldwide as a new paradigm in clinical practice and the roles of MIPs, who may come from medical librarian, medical informationist and educator, are accepted as supporter information in EBM process worldwide too. The studies have shown that MIPs’ roles and competencies require them to acquire new knowledge, especially the EBM process and develop their professional skills. MIPs try hard to improve their roles and competencies from continued study including training. They have implemented the best information management and excellent service to EBM process. The outcomes have satisfied the clinicians in improving the patient care and are beneficial to the clinicians.

In Thailand, the concept of EBM is quite new, however, it has been gradually accepted during the last decade, so the roles and competencies of MIPs in Thailand following the EBM process are quite rare too. The researcher does not interest to study about MIPs in EBM process in Thailand. However, MIPs’ roles and competencies in Thailand should be studied and set the accepted model for the new generations of MIPs in Thailand and that will support the clinician. These personnel should be active with service mind and continuous professional improvement. Apart from information technology they should learn more about EBM process. Cooperation between clinicians and MIPs should be beneficial to the patient care in Thailand. The new paradigm is to challenge all concerned about health personnel and medical librarians as well informationists in Thailand.

CONCLUSION

The important steps for the practice of EBM include identify the patients’ problem, searching and appraisal the evidence, clinical application and assessing the outcomes. Clinicians using EBM process should have skill in information technology. They should be enthusiastic to continue their professional development and life-long learning; however most clinicians are usually busy with their clinical works. The clinicians in EBM process face great barriers such as lack of time, inadequate searching skills and their lack of confidence in using technology. To facilitate the EBM practice, some assistance should be formed from many studies have shown that the stakeholders such as medical information professionals (MIPs) investigate the information-seeking behaviour of clinicians for promoting the library facilities and services include strategic planning for their end users. They realized the great barriers and encourage clinicians for effective information seeking due to effective clinical practice. Studies have shown that MIPs can improve their roles and competencies in helping the implementation of EBM. Outcomes indicate the clinician’s satisfaction and their improvement in patient care. Supporting the practice of EBM will challenge MIPs in Thailand to adjust their roles and competencies following Thai clinician information seeking behaviour; thus will set the new roles and competencies for MIPs in Thailand.

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