Review Articles

Modern aspects of continuous medical education

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ABSTRACT

Continuous medical education represents the final and often most poorly understood stage of physician education. It is defined as any and all ways by which doctors learn after the formal completion of their training. While evidence-based medicine is defined as "the conscientious, explicit and judicious use of current best evidence in making decisions for the care of individual patients. The practice of evidence-based medicine means integrating individual clinical expertise with the best available external clinical evidence from systematic research." The primary purpose of this article is to discuss the modern and technological aspects of continuing medical education and how it helps to maintain and improve clinical performance of practicing doctors and patient care. The article also emphasizes evidence-based medicine as a newly evolved, rapidly growing discipline for learners and researchers, which has extended the application of its principles to all professions associated with health care, including purchasing and management.

Keywords: Continuous medical education, evidence-based medicine, computers.

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Continuing medical education (CME) represents the final and often most poorly understood and not clearly defined stage of physician education.[1] Continuing medical education has been defined as "any and all the ways by which doctors learn after formal completion of their training."[2] Grant and Stanton[3] distinguished between continuing medical education and continuing professional development. Continuing medical education is seen as representing a more teacher based, didactic style whereas continuing professional development implies a more learner centered and self directed approach to learning. These terms are used interchangeably in the literature.[4] In this article we will consider and refer to all postgraduate educational events as continuing medical education. Evidence-based medicine (EBM) is also discussed in this article as a modern aspect of CME with special emphasis on computers and internet-based medical education which is a more recent and effective way of a self-directed approach of learning.

Developments in continuous medical education. Continuing medical education has undergone enormous changes in recent years in terms of its theoretical base, the methodologies used, and the expectations of what it should deliver.[5] The arrival and explosive growth of internet has particularly revolutionized continuing medical education. Another valuable development in CME is brought by EBM. An overwhelming shower of knowledge in medicine led to the evolution of new more practical methods of learning called as EBM. Except for problem based and more practical evidence-based learning,[6] the traditional "lecture and test" method of teaching loads the learners with plenty of information and facts, but does not give them the skills. The question arises, "How to update and replace this knowledge, How to keep abreast with new research?" One result is the inability of CME to affect the actions of doctors.[7] What is needed is to develop new research skills of problem oriented EBM and to develop more awareness with the recent

advances in computer and communication technologies in our doctors for their CME and better skills. Changes in the theoretical basis of CME led to changes in international ways of how medicine is practiced, regulated, and taught.[8] The ideas of mainstream educationalists was widely incorporated into undergraduate and postgraduate medical education, which resulted in adult learning theory as the standard way by which CME is measured and appraised. Now the recognition that learning not teaching causes doctors to change their practice has led to a new educational focus.[9] Self directed and lifelong learning are aspirations common to many curricula and educational programs. Arrival of EBM, computers and Internet has especially revolutionized and enhanced self-directed life long learning. Despite this theoretical shift in thinking, traditional styles of expert led teaching still prevail in postgraduate CME for general practitioners.[10]

What is evidence-based medicine? Evidence-based medicine is a newly evolved, rapidly growing discipline for learners and researchers. It is defined as "the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients. The practice of EBM is very important in CME and means integrating individual clinical expertise with the best available external clinical evidence from systematic research."[11] Evidence-based medicine has became a renowned and hot topic and many centers for evidence-based practice have been established. It is also planned in adult medicine, child health, surgery, pathology, pharmacotherapy, nursing, general practice, and dentistry; some centers for review and dissemination are providing systematic reviews of the effects of health care; also new evidence-based practice journals are constantly being launched, so it has become a common topic in the lay media.[5]

Solutions provided by evidence-based medicine. Evidence-based medicine provides practical solution by summarizing and spotting scientific papers and research works that have a direct and useful message for practice in patient care. Critical summaries of scientific papers are published in EBM Journals. The questions, which are usually used to evaluate papers, are; 1) Are the results valid? (Randomized? Blinded? Were all patients accounted for who entered the trial? Was follow-up complete? Were the groups similar at the start? Were the groups treated equally, apart from the experimental intervention?) 2) What are the results? (How large was the treatment effect? How precise was the treatment effect?) 3) Will the results help my patients (cost-benefit sum).[12] In this way, the EBM provides summary of keep in the point useful information to the busy clinicians, saving their time and proving them maximum and best useful knowledge for patient care.[11] Evidence-based medicine is important for many reasons. It will not kill off the standard

medical textbooks, but book publishers would do well to recognize the new trend and adjust their thinking. More confirmation of the ease and success with which EBM techniques can be incorporated into the undergraduate curriculum will be required before students can set fire to their copies of large standard text books. The main advantages of EBM are: 1) It improves our learning and knowledge retaining habits. It gives us best evidence in brief summary and saves our time. 2) It leads us to ask questions, and then to be skeptical of the answers. 3) As taxpayers, we should like it (wasteful practices can be abandoned). Only the required and useful information and practice is provided. 4) Evidence-based medicine presupposes that we keep up to date, and makes it worthwhile to take trips around the perimeter of our knowledge. 5) Evidence-based medicine opens decision-making processes to patients.

Continuous medical education and the role of computer-based technology. Broadly considering CME as any and all ways by which doctors learn and acquire knowledge, and not considering continuous professional development as a separate category there are basically 2 main types of medical education: one is teacher based, didactic style and the other is self-directed. In this article, we have concentrated more on various self-directed ways of effective learning and the role of computers, multimedia and Internet in CME. Internet and multimedia are more important and recent ways that have brought a constructive revolution in self-directed CME. Brief list of various categories by which CME can be delivered are by means of computers, multimedia compact disc (CD), Internet and web-based education, video-conferencing system, or telephony, significant audits, peer review, group based learning, Web surfing, online and e-mail discussions and reminders and so forth.[4] Various surveys by different international organizations have rated the various methods of learning among General Physicians (GPs);[13] in one, self directed learning was rated by 65.3% of respondents as a preferred method of maintaining professional standards, a rating that corresponded significantly to familiarity with this approach to learning (p = 0.006), and even more so among younger GPs. This was 2nd only to the usual teacher based CME at 85.6%. By comparison, there was a low orientation toward some learning methods identified elsewhere as effective, such as clinical audit (15.6%) and peer review (14.5%). The results of this survey indicated that self-directed learning is a major learning preference of GPs. There is also a need to strongly promote the effectiveness of less preferred modes of education, such as peer review and clinical audit, given the stronger preference indicated for less effective modes.[14] Regarding computers-based technology as an effective way of CME a huge survey was conducted by American

College of Physicians-American Society of Internal Medicine (ACP-ASIM) on their members, which revealed that the majority of physician respondents (82%) use computers.[15] Most physicians connected to the Internet from home, but fewer from their offices. Approximately two thirds of respondents connected to the Internet from home or the office on a daily or weekly basis. Finding time to connect to the Internet was a problem, and concerns were expressed about the accuracy, security, and confidentiality of information on the Internet. Knowing what is available on the Internet is also important to members. Physicians younger than 50 years old reported greater use of computers, especially if they had academic affiliations.[15]

Continuing medical education is now a requirement among practicing physicians to promote continuous enhancement of clinical knowledge to reflect new developments in medical care. The availability of Internet has greatly enhanced the access to information in various effective ways. Now multiple complete pathology CME case studies including history, images, diagnoses, and discussions are online available to the medical community to improve their skills and knowledge. World Wide Web and compact disc-read only memory (CD-ROM) technologies have introduced new prospects for delivering CME to physicians.[16] However, evidence concerning the effectiveness of these technologies in providing CME, and approaches to their evaluation, is limited. But few available papers revealed in their results that computer-mediated instruction was effective in delivering CME at a distance.[22,23] In the future, with the introduction of very fast wired (cable and telephone) and wireless communication, there may be greater integration of these services and information sources into the clinical workflow.[10] If so, more physicians will use the Internet from their home and office on a more regular basis. Finding time to use the Internet will continue to be a problem for the busy physician, but the security and confidentiality of information on the Internet are currently being addressed with Federal regulations. Assuring the accuracy of information on the Internet and informing physicians about medical Web sources will be an opportunity and a challenge for medical organizations. In survey by ACP-ASIM,[15] in the future, most physicians will continue to use computers in clinical practice for administrative functions. At home, physicians will continue to use personal e-mail and web surfing to seek medical and nonmedical information. In survey by ACP-ASIM, Physicians rated their own computer skills as average and were not satisfied with their computer expertise. Physicians believe that it is very important to develop their computer skills to increase their efficiency and effectiveness in the future. This represents a great opportunity for medical organizations to help physicians increase their

computer knowledge through a variety of learning formats. Physicians continue to like the delivery of new medical knowledge by printed material and CD-ROM products. Although, the computer industry believes that very fast Internet connections will replace the CD-ROM as a means of delivering information, printed materials will still be important to physicians. In addition to traditional printed books and journals, physicians will increasingly print materials from electronic sources.[15]

In conclusion, we wish to convey the necessity for practitioners to embrace the coming of the information age, and to learn how to use new communication tools to their advantage.[13] The current medical practitioners require new skills and understandings.[14] Physicians need to increase their computer skills and use information technologies to enhance their clinical practice. Physicians have reported a desire to learn about current general computer applications, new uses of telemedicine, including e-mail with colleagues, staff, and patients, and general Internet issues in published surveys. Physicians also reported a need to increase their knowledge of computer-based information sources of patient care through use of various ready-made software systems, electronic medical books and journals, electronic clinical guidelines, and electronic sources of CME.

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