Organizing an Effective Continuous Medical Education Session

AK Ghosh

Abstract

Maintenance of professional competence remains an exercise of lifelong learning and an essential requirement for evidence-based medical practice. Physicians attend continuing medical education (CME) programs to update their knowledge. Often CME programs remain the main source of updating current information. CME organizers have considerable responsibility in determining appropriate curriculum for their meeting. Organizing an effective CME activity often requires understanding of the principles of adult education. Prior to deciding on the curriculum for a CME, course organizers should conduct needs assessment of physicians. CME planners need to be organize activities that would consistently improve physician competence. CME sessions that are interactive, using multiple methods of instructions for small groups of physicians from a single discipline are more likely to change physician knowledge and behavior. Effectiveness of a CME program should be evaluated at a level beyond measuring physician satisfaction. CME planners need to incorporate methods to determine the course attendees improvement of knowledge, skills and attitudes during the CME activities. Pre and post test of physicians using multiple choice questions form a useful method of assessment. Course organizers would need to ensure that the questions are appropriately constructed to assess the ability to use knowledge in real life situations.

INTRODUCTION

Medical knowledge continues to advance at a burgeoning pace. Physicians often find information that were taught during their postgraduate training either obsolete or transformed with the availability of newer evidence. Most physicians lack a formal course of study for most of their professional life, hence, maintenance of professional competence remains an exercise of lifelong learning and an essential requirement for evidence-based medical practice. Physicians adopt different methods to update their knowledge from reading journals, attending continuous medical education (CME) activities to attending hands-on workshops that deal with updating a skill or learning newer techniques. Physician usually attend CME's lectures to meet their educational needs, however CME lectures alone have not shown to change physician behaviour. Medical licensing bodies are increasing pressured to ensure to the public, payers and press, that physicians are engaging in meaningful activities of life long learning and self assessment in the field of medical education and provide credit for competency based education. CME organizers have considerable responsibility in determining appropriate curriculum for their meeting.

In the following review, we will summarize essential requirements for organizing CME activity based on recent evidence. The current review is not meant to provide an exhaustive step by step guideline for arranging a CME program, but meant to serve as a review of the current evidence on adult learning behavior and provide directions to enhance physician competence. We present an evidence-based summary of 1) the principles of adult education, 2) needs assessment-CME, 3) present emerging guidelines for CME instruction and provide 4) helpful guidelines to write Multiple choice questions (MCQ). These four topics have been chosen as they provide the maximum information in our understanding of CME as a source of life long learning and improve physician competence.

PRINCIPLES OF ADULT EDUCATION – BASIS OF A LEARNER CENTRIC APPROACH

Adult education presumes that every adult learner will assess their learning needs and identify topics for life long learning. Background experience and prior learning are critical to adults in assessing how they would interpret new information in their work situations. Malcolm Knowles describes this form of learner centric adult learning as ‘andragogy,’ to differentiate it from teacher centric learning called ‘pedagogy’ (Fig. 1).

Andragogy assumes that adults are independent and self directed learners, who have already accumulated a great deal of experience. Adults are interested in an immediate
problem centered approach and are driven to learn by internal demands to integrate learning with a problem at work. Hence, adult learning is often problem centered rather than subject centered. The difference between the pedagogy and andragogy are summarized in Table 1.

Adult learning is based on the following seven principles, 1) to promote effective environment for learning, adults should feel that the environment is safe where all opinions are respected, 2) learners should be self-directed and involved in assessing their gaps in knowledge, 3) learners should be involved in planning their curriculum, 4) learners accept responsibility for their own learning and design their own learning objectives, 5) Learners need to identify resources and devise strategies for using these sources to achieve their objectives, 6) they need to be supported in an informal and personal environment and 7) involved in self-reflection and evaluation of their own learning experience.

Prior to embarking on the acquisition of knowledge on a topic, adults often have to recognize that they have a problem in their knowledge gap. They then strive to find out whether the problem is large enough that they should spend their time addressing it in a manner that their would be a likely solution. They also have to find out whether they have the necessary resources available at hand to solve the problem and finally need to be willing to change their behavior based on what they learnt.

Adults learn in different educational settings. However, research indicate that the efficacy of different modalities of education result in varying degree of retention of information. The retention of information is only 10% of what is read, 20% of what is heard, 30% of what is observed or demonstrated, 50% of what is discussed, 70% of what is practiced and 90% of what is taught. Hence, adults remember best when they actively involve themselves in learning, practicing and teaching the material.

While designing a strategy to involve adults to learn curriculum, developers need to design sessions that would allow the adults to work in groups (or have opportunity to discuss) on topics that concern adults in their work environment. Organizers of adult education need to explain why they selected the topics (based on need assessment) and provide documentation of the adult learners participation in the learning process. Finally, the education needs to be taken keeping time in perspective as adults have several other responsibilities. CME organizers would therefore require understanding of the principles of adult education to plan an effective scientific program.

**Needs Assessment in Continuing Medical Education (CME) – The Essential First Step**

Continuing medical education strives to improve physician behavior with an ultimate goal of improving patient outcomes. Recent research show that CME programs that are designed on the basis of well conducted needs assessment are more effective in changing physician behavior. Need assessment is often the first step in identifying what the physicians need to recognize in order to change behavior, knowledge and skill. Need assessment identifies the gap between what the physician need to know to practice effective medicine and what they actually know.

Need assessment should to be identified both at the level of individual physicians (learning needs assessment) and CME course organizers (educational needs assessment). Learning needs of individual physicians are personal and specific to the individual. They are identified through personal experience, reflection, self assessment tests, audits and peer review. However there is little evidence that physicians create self directed learning around their individual learning needs. Educational need assessment often reflect the perceived needs of a large target audience. These are usually identified through surveys, focus groups, CME evaluations and practice patterns.

Need assessment planning forms the basis of a successful CME. There are several types of need assessments 1) Inferred need assessment based on current evidence, 2) specific practice needs, 3) Proven need assessment based on objective external data. Table 2. summarizes the various sources of need assessment. Hence, in a learner centered CME, the course and objectives of all sessions should be based on the prioritization of different need assessment, rather than a potpourri of random topics. (Fig. 2 ) . There are several useful web resources that provide additional information on need assessment (http://www.jcehp.com; http://www.medicalteacher.org)

**Newer Guidelines For CME Instruction**

Most medical institutions have a rigorous under and postgraduate curriculum for education of medical students and residents respectively. Every step of the medical education is supervised and graded to assess and establish the competence of the students and access their readiness to step into clinical practice. Experts, however have been concerned about a lack of formal course of study in the
Most experts agree that CME constitute the longest phase of medical education, however, CME lectures alone is insufficient in changing physician behaviour. Physicians attend CME lectures with an idea to update their knowledge, learn new skills and obtain CME credits. Research show that CME activities differ in their ability to increase physician competence, and performance and have variable effect on health care outcomes. In a review of 50 randomized controlled trials assessing the impact of diverse CME interventions on physician performance and health care outcomes, CME interventions that used practice – enabling strategies like (facilitating the desired change in practice site by using clinical policy and practice guidelines, practice protocols, information from patients, algorithms and flow charts) or reinforcing strategies (feedback and reminders) consistently improved physician performance and in some case health care outcomes. Mere dissemination and communication of medical information had little effect in changing health care outcomes. A more recent meta-analysis on the effectiveness of CME suggest a medium increase in physician knowledge and small increase in physician performance and patients outcomes. The effect size was large when the CME sessions where interactive, using multiple methods of instructions for small groups of physicians from a single discipline. Physicians are expected to self assess their competence and engage in a life long self directed learning process. Most physician’s determine which CME sessions to attend based on their perceived needs for increased competency in selected areas. Recent evidence, however indicate that physicians often possess a limited ability to accurately self assess their competency and maybe inaccurate in evaluating their own competency. Hence educators who plan CME activities need to plan a diverse group of education activities to ensure that they address strategies of improve physician competence and performance in these educational sessions.

Many accreditation organizations like the Accreditation Council for Continuing Medical Education (ACCME) in USA believe that CME providers need to provide physicians with learning activities that update their existing skills and lead to continuous professional development. The ACCME suggested that CME activities should include Miller’s framework of clinical assessment (knowledge, competence, performance and action). The ACCME model suggests that physicians should start by asking a question that they encounter in practice and seek for data and information (Fig. 3). Through analysis, synthesis and reflection, the information is processed to new knowledge. The physician then uses their best judgment to process this knowledge into wisdom and use the new strategy to enhance their competence. This competence when put into practice could enhance physician performance. In order to organize a CME activity and incorporate the ACCME model to enhance practice-based learning CME course organizers have to incorporate different activities that would implement different aspects of this model (Fig. 4). Hence, properly selected CME activities could lead to continuous professional development of physicians.

While evaluating the effectiveness of a CME course, organizers often rely on the post conference feedback of attendees. Very often these feedback is used to determine whether the learners objectives were met during the session, and determine whether their attitudes have changed. Hence an effective feedback should strive to determine whether the teaching and learning improved as a result of the session.

Table 2: Sources of need assessment used for continuous medication education

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<tr>
<th>Inferred Need Assessment</th>
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<th>Proven needs based on external data</th>
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Last 30 to 40 years of a physician’s professional career. Most experts agree that CME constitute the longest phase of medical education, however, CME lectures alone is insufficient in changing physician behaviour.

Physicians attend CME lectures with an idea to update their knowledge, learn new skills and obtain CME credits. Research show that CME activities differ in their ability to increase physician competence, and performance and have variable effect on health care outcomes. In a review of 50 randomized controlled trails assessing the impact of diverse CME interventions on physician performance and health care outcomes, CME interventions that used practice – enabling strategies like (facilitating the desired change in practice site by using clinical policy and practice guidelines, practice protocols, information from patients, algorithms and flow charts) or reinforcing strategies (feedback and reminders) consistently improved physician performance and in some case health care outcomes. Mere dissemination and communication of medical information had little effect in changing health care outcomes. A more recent meta-analysis on the effectiveness of CME suggest a medium increase in physician knowledge and small increase in physician performance and patients outcomes. The effect size was large when the CME sessions where interactive, using multiple methods of instructions for small groups of physicians from a single discipline.

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There are several assessment tools to determine the effectiveness of learning. Some of the commonly used assessment tools are Miller’s pyramid (knows, knows how, shows how and does) and Kirkpatrick criteria of learning (Fig. 5). The four level of Kirkpatrick’s evaluation model is often used to evaluate learning. Level 1 - Reaction to learning and it measures participants satisfaction with the program. Most CME programs incorporate a post course survey to assess for satisfaction and use the data for post hoc program assessment. The problem with level 1 evaluation is that a positive reaction by the attendee does not guarantee learning and hence considered by many as an incomplete measure to determine effectiveness of training. Level 2 assesses learning and goes beyond learners satisfaction and attempts to measure the students change in skills, knowledge and attitude as a result of CME activity. Examples for this kind of activity would be a pre and post test multiple choice question (MCQ) to determine amount of learning. Level 3 measure the change in behaviour that occurred due to the CME course and occurs after the learning event. Individuals would need to answer if any of the new acquire skills, knowledge and attitudes are being used in the work environment of the attendee. This form of measurement is difficult due to the inherent uncertainty in determining when the change in behavior occurred. Level 4 evaluation is a measure of outcome evaluation and is highest achievement of a learning session. A level 4 evaluation seeks to determine whether a change in behavior of the physicians as a result to the CME session improved patient outcomes. Improved patient outcomes could be better patient outcomes, reduced frequency of adverse effects, improved quality of care.

Though evaluation of experienced physicians is complex as most practice in dynamic environment that are influenced by many factors, recent recommendations suggest that CME course organizers construct programs that would measure learning (Level 2). Hence, CME sessions should have some form pre and post self assessment using MCQ’s or evaluation of a skill or task in their program to ensure learning. In the next section we will discuss on how to write effective MCQ’s for a CME course.

**GUIDELINES TO WRITE MULTIPLE CHOICE QUESTIONS (MCQ)**

Multiple choice questions are frequently used to assess the knowledge of learners. MCQ’s are frequently used in competitive examinations to differentiate the different level of understanding among candidates, assess the effectiveness of different kinds of educational efforts and also identifying the needs of the learner.

Many CME activities currently revolves around a pre and post testing using MCQ’s and interactive audience response system. It is likely that in the near future, evaluation of learners newly acquired skills or knowledge using MCQ’s will become a standard practice during CME activities. Hence, there is lot of current literature that has been written on how to avoid writing a poor MCQ.

Each multiple choice question has three parts, a) stem describing the clinical scenario with laboratory tests, b) question line – that asks a specific question and c) list of answer options containing one correct and 3 to 4 realistic distractors (wrong options). Certain principles need to be adhered closely while writing a MCQ. They include, 1) the MCQ should have one and only one testing point, 2) the
stem of the MCQ should have all the information required to answer the questions without too much distracting information, 3) there should be only one completely correct answer and 4) the incorrect answers should appear plausible to learners with partial knowledge.

The complexity of the stem of the question would depend mainly on what is the intended goal of testing. MCQ can be written to test recall of knowledge only (assess knowledge of a subject). However there is increased tendency to write MCQ questions that test the ability of physicians to synthesize information and use judgment to solve problems that mimic real life situations. These questions are harder to write (often taking as long as one hour per question) and test understanding and application of new information rather than knowledge of a subject alone. Table 3, provides a template that is often used by most examining bodies to construct their MCQ. An example of a well constructed MCQ is given in Table 4. Special attention need to be taken to revise the question and options to ensure that the MCQ tests only one testing point. Readers are recommended to review the excellent research of Haladyna and colleagues on how to write effective MCQ's.

In summary, planning a CME activity requires insight on how adults learn and knowledge of needs assessment of physician’s based on information gathered from various sources. CME planners need to organize activities that would consistently improve physician competence. There is mounting pressure to assess the effectiveness of a CME program beyond a measure of physician satisfaction and incorporate some measure in the program to assess that physicians have learnt the information discussed during the CME activities. Pre and post course test of physicians using Table 3: Guidelines for developing multiple choice questions (MCQ)

| 1. | Identify a General Content area |
| 2. | Write the learning objectives (testing point) |
| 3. | Determine what you want to test |
| 4. | Write the clinical vignette (Stem of question) |
| 5. | Write the question line |
| 6. | Write the List of answer options |

* Highest form of testing

Table 4: Construction of a multiple choice question – the steps

| Testing point: A board certified internists should be able to: Determine the duration of venous thromboembolism (VTE) thrombosis prophylaxis after hip surgery |
| Task: ____Testing ____Diagnosis ____Treatment |
| ____Prognosis ____XX_Prevention ____Pathophysiology |

Answer: Recent evidence suggest continuing anti-coagulation for VTE prophylaxis for 30 days after hip replacement. The choice of anticoagulation could be low molecular weight heparin (LMWH) or Coumadin. Aspirin is not recommended. A 2 week anti-coagulation of VTE prophylaxis is recommended after knee surgery (Chest 2004:123 (3 Suppl) :338-S-400S)

A less qualified physician will think the answer is:
LMWH 7 days or Coumadin for 14 days
LMWH 14 days or Aspirin

Sketch of scenario
70 year old male undergoing hip surgery
Absence of previous VTE
Patient on aspirin

Physical examination: Negative other than left hip arthritis

Question Line: What would be the most appropriate recommendation for this patient?

Example:
A 70-year-old-man is seen in the clinic for preoperative evaluation prior to left elective total hip replacement surgery. His medical history is significant for hypertension and hyperlipidemia. He has no prior history of thromboembolism, or coronary artery disease. Family history is positive for diabetes mellitus and hyperlipidemia. His medications include amlodipine 10 mg/d, aspirin 81 mg/ day, Simvastatin 40 mg/day. You have been consulted for clearance for surgery.

What would be the most appropriate recommendation for this patient?

#Correct Answer to the question in Table 4: is 2
MCQs form a useful method of assessment, though the course organizers would need to ensure that the questions are appropriately constructed to assess the ability to use knowledge in real life situations.

**REFERENCES**


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**Announcement**

7th Annual All India Conference of Diabetic Foot Society of India is to be held from 10th – 12th October, 2008 at Kolkata.

For Further Details Please Contact : Dr. Ghanshyam Goyal, Organising Secretariat, IB-127, Sector III, SaltLake City, Kolkata – 700 106, West Bengal.

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