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Designing a Continuing Medical Education Course for Family Physicians Using Kern's Six-Step Model: From Needs Assessment to Lessons for Learning in Practice

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Abstract

Background

Evidence-based medicine (EBM) is fundamental to high-quality family medicine practice, yet translating current evidence into routine clinical decision-making remains challenging for practicing physicians. Traditional continuing medical education (CME) often emphasizes knowledge acquisition rather than the application of evidence in authentic clinical settings. This study describes the systematic development and implementation of an EBM-focused CME course for family physicians using Kern's Six-Step Approach to Curriculum Development.

Methods

A six-session CME course was designed following Kern's six-step instructional model, including general and targeted needs assessment, formulation of learning objectives, selection of educational strategies, implementation, and evaluation. A mixed needs assessment informed curriculum development through literature review, analysis of common clinical conditions encountered in family medicine, and a learner survey. Six priority topics (diabetes mellitus, hypertension, chronic kidney disease, chronic obstructive pulmonary disease, asthma, and atopic dermatitis) were selected. The intervention incorporated pre-session reading materials, case-based discussions, interactive mini-lectures, pre- and post-tests, and reflective writing exercises to facilitate integration of EBM into clinical practice. The six-month course was implemented among practicing family physicians, with participant feedback and reflections to evaluate the educational experience.

Results

The curriculum was successfully developed and implemented as a structured, learner-centered CME program embedded within existing departmental teaching schedules. The targeted needs assessment identified strong learner demand for clinically relevant, case-based learning that directly supported evidence-informed decision-making. The intervention integrated contemporary clinical guidelines with real-world patient scenarios, reflective practice, and formative assessment to promote the translation of evidence into routine family medicine practice.

Conclusion

Kern's Six-Step Approach provided a practical and systematic framework for designing an EBM-focused CME program tailored to the educational needs of practicing family physicians. Integrating case-based learning, reflection, and evidence appraisal within routine CME has the potential to strengthen evidence-informed clinical decision-making and support lifelong learning.

Background

Effective clinical decision-making is a fundamental competency for family physicians, who are required to manage a broad range of health conditions across diverse spectrum of patients. As family physicians progress through independent clinical practice, competing clinical demands and the rapidly expanding medical literature can make it challenging to remain current with emerging evidence. Consequently, clinical decisions may rely more heavily on prior experience than on newly available research findings (1, 2) To maintain and strengthen these competencies throughout their professional careers, active engagement in continuing medical education (CME) is essential, which facilitates the translation of emerging evidence into routine clinical care (3)

CME is an established method that can facilitate lifelong learning. A core component of effective CME is the application of evidence-based medicine (EBM). There is broad consensus that evidence-based medicine (EBM) should be integrated throughout continuing medical education (CME) which enables family physicians to critically appraise and integrate the best available research evidence with their clinical expertise and advances in practice and enhances their problem-solving in everyday practice (4).This approach supports informed clinical decisions, promotes high-quality, evidence-informed care, and facilitates the adoption of current best practices in context to better patient care and improved health outcomes (1)

Within family medicine, rather than relying on isolated or didactic educational activities, contemporary continuing medical education (CME) increasingly incorporates EBM through a variety of educational models, including case-based discussions, interactive workshops, journal clubs, audit and feedback, clinical simulations, and practice-based learning activities. While these strategies provide a strong foundation for lifelong learning, there remains a need to further strengthen the integration of EBM into real time clinical decision-making by fostering evidence-based clinical reasoning, reflective practice within real scenarios, and the application of evidence within the context of individual patient care (5). Such approaches lead to positive changes in strengthening the professional acumen and the capacity to translate evidence into practice compared with passive educational approaches (5.6) Moreover, this process is essential for managing increasingly complex clinical presentations and delivering high-quality, patient-centered care (5)

Despite widespread recognition of the importance of EBM, studies continue to report variability in physicians' confidence and competence in evidence appraisal and its translation into everyday primary care practice (7). Furthermore, many CME programs continue to emphasize knowledge acquisition rather than the practical application of evidence in authentic clinical settings. Therefore, there is a growing need for educational interventions that explicitly integrate evidence appraisal, clinical reasoning, and decision-making within clinically relevant learning experiences. Guided by established principles of adult learning and instructional design, learner-centered, practice-oriented CME program have the potential to enhance evidence-based clinical decision-making and promote sustained improvements in the quality of family medicine practice (8).

Guided by Kern's six-step approach to curriculum development, educational interventions can be systematically designed by identifying learning needs, defining objectives, selecting appropriate learner-centered strategies, implementing educational activities, and evaluating outcomes to promote effective integration of evidence-based medicine into clinical practice. Using this same Kern's six-step model of Instructional Design, we aimed develop an intervention of a CME course based on a series of six sessions that would facilitate cognitive integration of medical knowledge into clinical practice (9). To achieve this goal, content-focused, session-oriented and learner-centered strategies were adopted.

Methods

Study design and setting

We conducted an educational intervention study involving the design, implementation, and evaluation of a structured CME program for practicing family physicians in the Department of Family Medicine at The Indus Hospital & Health Network.

Kern's six-step approach to curriculum development was used as the overarching instructional design framework (9). The educational needs assessment process follows a cyclical framework comprising general needs assessment, targeted needs assessment, formulation of goals and objectives, selection of educational methods and strategies, implementation, and evaluation. The results of the evaluation inform subsequent needs assessment, thereby creating a continuous improvement cycle (Figure. 1).

We chose to design, develop and implement a set of for Continuing Medical Education (CME) sessions for the practicing Family Physicians as an educational intervention. The project had the approval of the Institutional Review Board (IHHN_IRB_2024_10_019**)**

Results

STEP-1: Problem identification and general needs assessment

The need for fortifying the concept of evidence-based medicine in clinical practice was being felt through general feedback of practicing family physicians. There was a constant discussion in groups, academic meetings about the need for the family physicians to form a critical connection between the clinical condition and the evidence behind it. Anecdotal evidence from a few physicians also suggested the need for such an intervention citing difficulty in recalling the recent evidence-based treatment methods for chronic medical conditions during the morbidity meetings. To tackle this issue a core team of three got together. All three were medical educationists and practicing physicians. The team members were part of the various family medicine educational groups nationally and internationally and were closely involved in the development and delivery of medical curriculum at undergraduate and postgraduate levels.The team first conducted an extensive literature review to investigate various teaching strategies already in use for integrating evidence-based medicine into weekly CMEs which satisfies the basic principles and aim and would be a good fit for the practicing family physicians. The

committee concluded that there was not a single best recommended way and the team had to come up with an innovative solution to design, develop and implement educational strategies that would be practical and a feasible fit in our dynamics of busy practice with high patient volumes at the institution.

STEP-2: Targeted needs assessment

In the second step of Kern's approach of targeted needs assessment, the first step was to identify the top high diseases being seen in family medicine. Data from randomly selected 6 months was extracted to observe the top diseases seen by family physicians. The top 12 commonest clinical diseases encountered in family medicine were selected by the core team.

This was followed by a survey poll to be completed by the potential participants. Six highest polled topics that were most commonly encountered in family medicine clinics, were finalized to be included. The selected topics encompassed the management of common chronic conditions, including diabetes mellitus (DM), hypertension (HTN), chronic kidney disease (CKD), atopic dermatitis, chronic obstructive pulmonary disease (COPD), and asthma.

An open space on the survey poll was provided to inform of their challenges as that would help the core team to design the sessions during their busy service hours. The participants also said they failed to see the clinical application of existing didactic CMEs into their practice. And with the high-volume clinics and busy service hours, they did not get enough time to engage in educational activities.

As intended, the targeted needs assessment provided us the detailed information about the content needed to be taught and the gaps in the current instructional strategies that need to be addressed. We were in an excellent position to develop focused goals and objectives for new educational intervention for each session identified.

Table 1: Educational Needs and Corresponding Learning Strategies

Identified need	Educational response
Difficulty recalling current evidence	Pre-reading from current guidelines
Difficulty translating guidelines into patient care	Case-based discussion
Limited time	Existing CME slot
Didactic CME perceived as difficult to apply	Interactive cases rather than isolated lecture
Need for clinical reasoning	Facilitated discussion around patient scenarios
Need to consolidate learning	Post-session assessment
Need to translate learning into practice	Reflective note after clinical exposure

Table 1: Identified learner needs and the corresponding educational strategies used to address them.

STEP-3: Goals and objectives

Following the needs assessment, the goals and objectives of the CME program were developed to address the learning priorities identified by family physicians.

The overall goal of the CME program was to improve family physicians' knowledge and confidence in the evidence-based assessment and management of common chronic and acute clinical conditions encountered in primary care, with particular emphasis on the appropriate application of current NICE guideline recommendations in routine family medicine practice.

Overall Learning Objectives

By the end of the six-session CME program, participants will be able to:

- Describe the key principles of assessment and management of hypertension, diabetes mellitus, CKD, atopic eczema, asthma, and COPD in primary care.
- Identify important clinical findings, risk factors, complications, and red flags associated with these common conditions.
- Apply current relevant NICE guideline recommendations to the assessment and management of patients in family medicine practice.
- Recognize indications for treatment modification, escalation of care, and referral to specialist services when appropriate.
- Demonstrate improvement in knowledge following participation in the CME sessions, as assessed through guideline-based pre- and post-session MCQs.
- Identify areas for further learning and potential improvement in clinical practice.

STEP-4: Educational methods and strategies

After thorough review of the contents for the CME, we identified six case-based sessions to be given in CME course that had a focus on embedding EBM through an updated latest international NICE guideline that was anchored in real time cases and are reinforced by patient health outcomes.

We decided to use the existing opportunities by choosing the weekly CME slot previously used for didactic isolated topics so that time for their clinical service provision is not taken up. This CME course session was conducted on the last week of the month. We were mindful that the already busy family physicians are not overburdened. The educational intervention for the intended objectives was developed following the pre-post test model with a case-based interactive presentation covering the international guidelines along with the regional and institutional context to practice.

The relevant reading resources were identified and shared with the participants five days before the session. We prepared these pre-readings from the last's NICE guidelines along with national literature. Additional reading material / sites was shared and participants were encouraged to use them as an additional resource. The learning session used multiple case-based scenarios where the situations were extracted from their own clinical practices to relate and enhance discussion and relevance. This was also supplemented by brief interactive presentation to reinforce or clarify essential concepts while evidence-based medicine into clinical practice particularly within the given institutional dynamics and patient population. The session was preceded by a pre-test and followed by a post-test.

A sample session had the following components **as illustrated in Figure. 2.**

Figure 2. Process of the session. Sequential steps involved in conducting the session

A separate formative assessment was undertaken using a reflective note based on Gibbs' Reflective Cycle, to evaluate participants' retention of knowledge and their ability to reflect on and integrate the learning into their clinical practice.

STEP-5: Implementation

The educational intervention was implemented in the Department of Family Medicine. The CME course comprised of six sessions spread across six months (June to November 2025). Last week of the month was selected for the session. An orientation session was conducted with the participants where the consent was obtained, purpose of the educational intervention and the format of the intervention was discussed. A separate session on how to write reflective note was also conducted. The educational material for pre-reading was shared with the participants 5 days prior to the session. The sessions were developed and delivered by one of the core team members who were senior practicing family physician and medical educationist.

All the participants were sent emails at the start of the CME course with the link to the relevant pre-reading material. As mentioned in step 4, each session incorporated various educational strategies integrate concepts of EBM into real time clinical practice through case-based discussions. Throughout the duration of the course, the participants were reminded to write and share a reflective note 2 weeks after the session, to check for retention and translation of knowledge into practice.

At the end of the CME course, the pre and post test scores were shared with the participants via emails. It was clearly discussed the scores of the pre and post-test were in no condition, affect their annual performance appraisals.

STEP-6: Evaluation and feedback

Multiple evaluation methods were used to assess knowledge gain, participant experience, application of learning, and the overall implementation of the educational intervention.

- Pre- and post-session MCQ tests: Guideline-based MCQs were administered before and after each CME session to assess participants' baseline knowledge and changes in knowledge following the educational intervention.
- Participant feedback forms: At the end of the CME sessions, participants completed feedback forms to evaluate the relevance and quality of the content, effectiveness of teaching and delivery, usefulness of the sessions, and their overall experience of the CME program.
- Reflective notes: A formative reflective assessment based on Gibbs' Reflective Cycle was completed to explore participants' retention of knowledge and their ability to reflect on and integrate the learning into their clinical practice.

Discussion

Continuing medical education (CME) is widely recognized as a cornerstone of lifelong learning for physicians. Despite the increasing emphasis on evidence-informed healthcare, translating EBM principles into routine clinical practice remains a persistent challenge. Traditional CME has often focused on the dissemination of knowledge, whereas contemporary educational approaches advocate for integrating evidence appraisal, clinical reasoning, and patient-centered decision-making within authentic clinical contexts. Such integration enables family physicians to apply evidence alongside their clinical expertise and patients' values, thereby strengthening evidence-informed decision-making and improving the quality of care and health outcomes.

Family physicians routinely encounter patients with complex, multi-morbid conditions that rarely have straightforward management pathways. Consequently, effective clinical decisions require not only familiarity with current clinical guidelines but also the ability to critically appraise emerging evidence and determine its applicability to individual patients. Educational programs that contextualize EBM within real-world clinical care scenarios in family medicine are more likely to promote knowledge retention, facilitate transfer of learning to practice, and support reflective clinical reasoning. Therefore, the design and structure of CME programs should intentionally promote the integration of evidence appraisal with everyday clinical decision-making.

The present course was developed to address this educational need by designing a structured CME intervention aimed at strengthening EBM competencies among family physicians. Guided by Kern's Six-Step Approach to Curriculum Development, the intervention sought to identify learning needs, establish relevant educational objectives, implement learner-centered instructional strategies, and evaluate their impact on participants' confidence and application of EBM in clinical practice. Interactive educational methods, including case-based discussions, reflective exercise and facilitated group learning, were incorporated to encourage active participation and enhance the practical application of evidence during patient care.

Successful implementation of EBM-focused CME depends not only on curriculum design but also on the readiness and active engagement of facilitators and learners. Previous educational research has

demonstrated institutional support and the use of interactive teaching strategies are key determinants of successful educational innovation (8) Likewise, busy practicing physicians are more likely to engage with CME activities when learning is directly relevant to their clinical practice, immediately applicable to patient care, and supported by opportunities for reflection and discussion. These principles are consistent with adult learning theory, which emphasizes that meaningful learning occurs when educational content addresses learners' perceived needs and can be readily incorporated into professional practice (10)

The findings of this project are expected to inform the development of future CME initiatives by identifying effective strategies for embedding EBM into family medicine education. Establishing structured, learner-centered educational programs that reinforce clinical reasoning and evidence-informed decision-making may contribute to sustained improvements in physicians' clinical practice and ultimately enhance the quality and safety of patient care. Nonetheless, successful implementation requires adequate institutional support, faculty development in contemporary educational methodologies, and sufficient time for physicians to engage meaningfully with educational activities. These considerations should inform the design and scalability of future CME programs aimed at promoting lifelong, evidence-informed learning among family physicians.

Strengths and Limitations:

Strengths

This study is potentially unique as it focuses on an important educational need by developing and evaluating a structured CME course as an intervention to strengthen evidence-based medicine (EBM) competencies among practicing family physicians. A key strength is the use of Kern's Six-Step Approach to Curriculum Development, which provides a systematic and theory-informed framework. The intervention was grounded in principles of adult learning and emphasized interactive, learner-centered educational methods that closely reflected authentic clinical practice and promoted the practical application. Furthermore, focusing on practicing family physicians and not students or residents, this enhances the relevance of the findings, as this group is busy in practice dealing with complex clinical scenarios; and with restricted educational avenues to enhance learning; this is the evaluation of change in clinical practice ("learning in practice") during real-world implementation. These aspects are not evident in the studies and could strengthen the originality of this study.

Limitations

Several limitations should be considered when interpreting the findings. First, the study is conducted within a single institution and with only 13 participants which could limit the generalizability of the results to other CME contexts or healthcare systems. Second, the evaluation may have relied on participants' self-reported reflection, feedback and confidence which are susceptible to response and social desirability biases and may not accurately reflect changes in clinical behavior. Third, the absence

of objective measures of clinical performance or patient outcomes / satisfaction limits conclusions regarding the intervention's impact on healthcare quality.

Conclusion

Integrating evidence-based medicine into continuing medical education through a structured, learner-centered educational intervention offers a promising strategy for strengthening clinical decision-making among family physicians. Educational programs that combine critical appraisal, clinical reasoning, and the application within real clinical care scenarios can enhance physicians' confidence and competence in evidence-informed practice. The use of Kern's Six-Step Approach provides a practical framework for designing and implementing sustainable CME programs that align with learners' needs and contemporary educational principles. Future research should evaluate the long-term impact of such interventions using objective measures of physician performance and patient outcomes, while exploring their implementation across diverse healthcare settings.

Abbreviations

CME
Continuing medical education
EBM
Evidence-based medicine
CKD
Chronic kidney disease
COPD
Chronic obstructive pulmonary disease
DM
Diabetes mellitus
HTN
Hypertension
MCQ
Multiple-choice question
NICE
National Institute for Health and Care Excellence

Declarations

Ethics approval and consent to participate

All methods were performed in accordance with relevant guidelines and regulations, including the principles of the Declaration of Helsinki. Ethical approval was obtained from Institutional review board,

Indus Hospital & health Network. (IHHN_IRB_2024_10_019).Informed consent was obtained from all participants prior to their participation.

Consent for publication

Not applicable. No individual participant data or identifiable images are presented in this manuscript.

Availability of data and materials

The datasets generated and/or analyzed during the current study are not publicly available because they contain potentially identifiable participant-level educational data and are subject to institutional restrictions. De-identified data may be available from the corresponding author on reasonable request, subject to institutional approval.

Competing interests

The authors declare that they have no competing interests.

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No funding was received for this study.

Authors' contributions

NIS: Original idea and conception, design of the study; proposal development, data analysis critical review of inference of results and manuscript writing.

NA: Design of the study, proposal development, Implementation of study, data analysis, critical review of inference of results and manuscript writing.

HA: design of the study, critical review of inference of results and manuscript writing.

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Figures

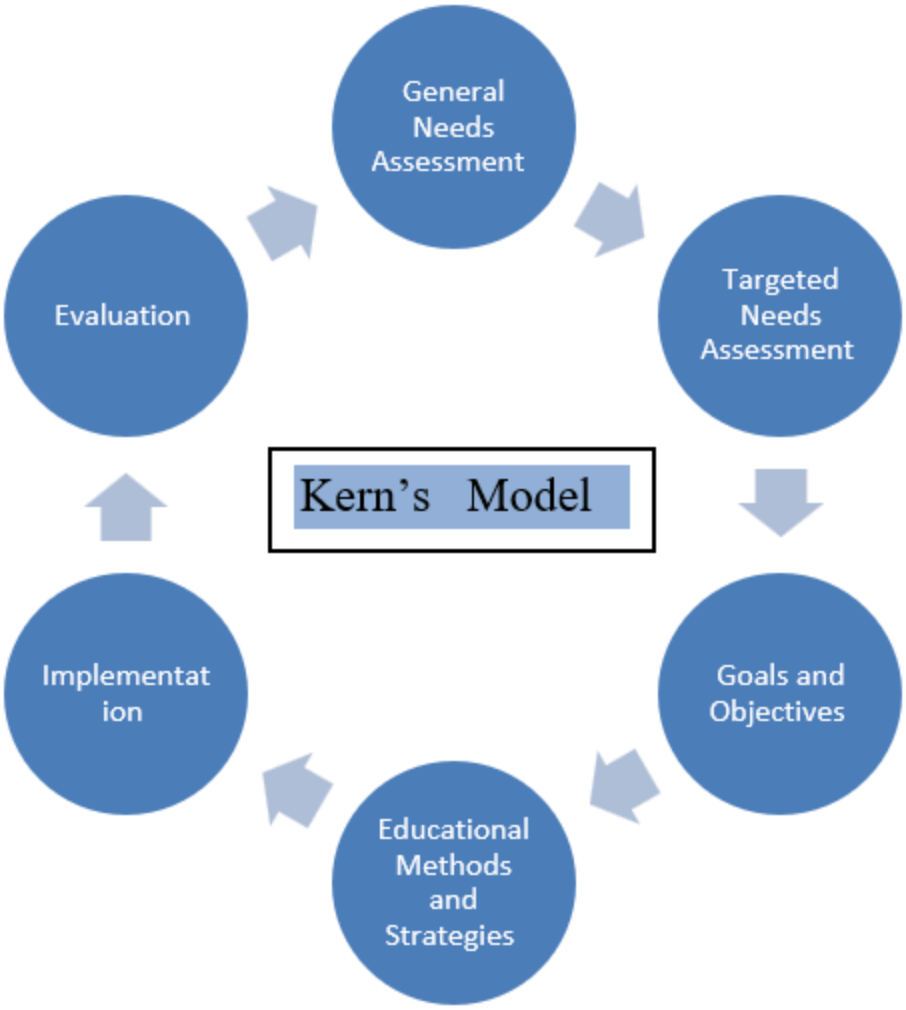


Figure 1

Kern's model of curriculum development

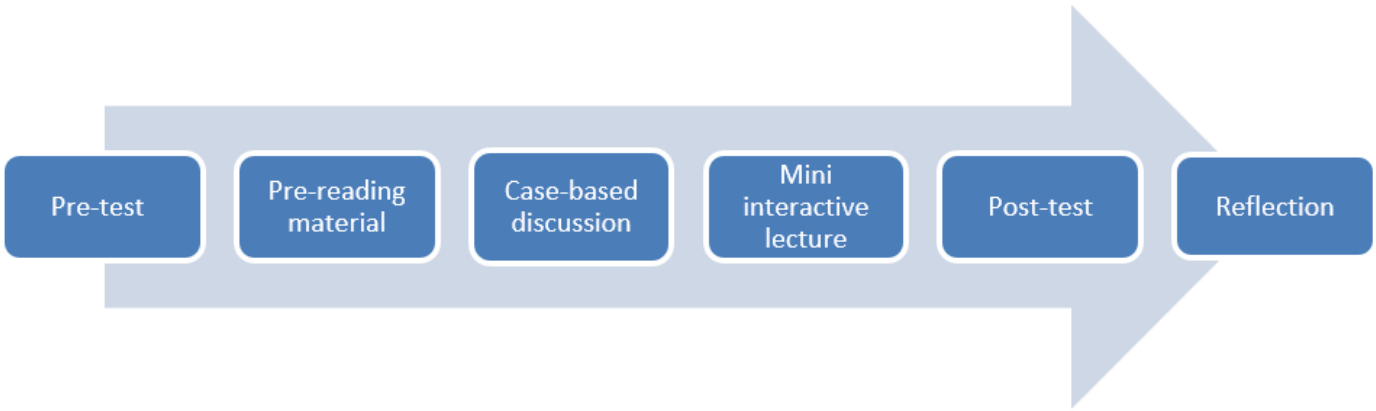


Figure 2

Process of the session. Sequential steps involved in conducting the session

Supplementary Files

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- SurveyFormforIdentifyingPriorityClinicalTopicsandEducationalNeedsinFamilyMedicine.docx