



Original Research Article

Reforming Medical Education Curriculum to Advance Health Research and Evidence-Based Practice

Article History:

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Received: 17-01-2026

Revised: 02-02-2026

Accepted: 25-02-2026

Published: 03-03-2026

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Abstract: Background: The medical curriculum shapes students' capacity for health research and evidence-based practice (EBP), but gaps in research training may limit competency development and practical application of EBP. **Objective:** To evaluate the impact of curriculum reforms on research capacity, evidence-based practice (EBP), assess integration of research and EBP in the curriculum and explore student faculty perceptions of curricular innovations.

Methodology: A cross-sectional mixed-methods study was conducted among undergraduate medical students and faculty in Dow university of Health sciences. Quantitative data were collected via questionnaires assessing research exposure, competencies and , evidence-based practice (EBP) application. Qualitative data were obtained through interviews and focus groups exploring perceptions of curriculum reforms. **Results:** The study involved 80 undergraduate students and 25 faculty members, revealed moderate student engagement in research (40% in structured projects, 30% in independent research). While 50-55% of students felt confident in research basics, only 35% were comfortable with statistical methods. About 60% knew about evidence-based practice (EBP), but just 45% applied it clinically. Most students (70%) and faculty (80%) agreed curriculum reforms improved research skills and EBP understanding, but hands-on experience, mentorship, and clinical integration remain lacking, highlighting the need for structured support. **Conclusion:** Curricular reforms positively influenced research capacity and , evidence-based practice(EBP) utilization but targeted strategies i.e, structured research opportunities, mentorship , competency-based training are needed to address existing gaps and strengthen evidence-based practice in medical education.

Keywords: Evidence-based practice (EBP), Curriculum reforms, Research capacity, Competency development, Research training, Hands-on research.

INTRODUCTION

Health research and evidence-based practice (EBP) are essential components of modern medical education, ensuring that graduates can critically appraise literature, make informed clinical decisions and contribute to the advancement of healthcare knowledge[1,2]. The integration of research and EBP into the medical curriculum equips students with competencies to formulate research questions, conduct studies, interpret findings and apply evidence to clinical practice[3]. Despite recognition of its importance ,in many medical institutes medical curricula historically emphasize theoretical knowledge and clinical skills while offering limited structured research training or practical exposure to EBP[4,5].

Curriculum reforms in medical education are increasingly focused on bridging the gaps in research and evidence-based practice (EBP) skills. To achieve this, medical schools are embedding research methodology, critical appraisal skills and EBP principles throughout the undergraduate program[6-9]. This integrated approach aims to equip students with the necessary competencies to apply research findings to real-world clinical scenarios.

The impact of these reforms is crucial to determining their effectiveness in enhancing students' research competencies and ability to implement EBP in clinical decision-making[10,11]. By assessing the outcomes of these reforms, medical schools can refine their curricula to ensure that graduates are equipped with the skills and

knowledge necessary to provide high-quality, evidence-based care. To bridge the gaps in research and evidence-based practice (EBP) skills, medical schools are implementing various strategies[12]. These include mandatory research projects that provide hands-on research experiences, allowing students to develop practical skills. Structured EBP modules offer a comprehensive understanding of research principles and methodologies, laying the foundation for evidence-based practice[13-15]. Additionally, mentorship programs pair students with experienced researchers and clinicians provided guidance and support. Furthermore, research activities are being integrated longitudinally alongside clinical training, enabling students to apply research skills in real-world settings and reinforce their learning. The ultimate goal of these reforms is to produce medical graduates who are proficient in applying research evidence to inform their clinical practice who can contribute to the advancement of medical knowledge through research and quality improvement initiatives. By prioritizing research and EBP skills, medical schools can help shape the next generation of healthcare professionals who are equipped to provide patient-centered evidence-based care. Previous studies have highlighted mixed outcomes, with some reforms improving research knowledge and attitudes, while practical application and sustained evidence-based practice (EBP) utilization often remain limited[16]. Additionally, faculty support, mentorship availability and institutional resources significantly influence the success of curricular innovations. Understanding student and faculty perceptions alongside objective assessments of competencies provide comprehensive insights into the effectiveness of curriculum reforms and identifies areas requiring further improvement[17-19].

This study has emphasis on competency-based medical education and the global need for physicians proficient in research and evidence-based practice (EBP), this study aims to assess the extent to which the current medical curriculum supports health research , evidence-based practice (EBP) and identify gaps in research training, to evaluate the impact of recent curriculum reforms on student knowledge, attitudes,skills.

METHODOLOGY

This study employed a cross-sectional mixed-methods design to comprehensively assess the extent to which the current medical curriculum supports health research and evidence-based practice (EBP). Mixed-methods research allows the triangulation of quantitative and qualitative

data, which enhances validity ,offers richer insight into both measurable outcomes and lived experiences.

The study population included undergraduate medical students across all clinical years and faculty members involved in teaching, curriculum development, and research supervision. Students were selected using stratified random sampling to ensure representation from each year, while faculty were recruited purposively based on their roles in curriculum implementation and research mentoring.

In Quantitative data collection, a structured questionnaire was administered to students to assess their research exposure, knowledge, attitudes, skills and utilization of evidence-based practice (EBP). The student instrument included validated scales measuring EBP competencies and research self-efficacy. Survey items were adapted from prior studies that emphasize competency in EBP and research methodology, which have shown to significantly predict research utilization and application in educational settings.

In Qualitative data collection, Semi-structured interviews and focus group discussions were conducted with both students and faculty. Interview guides explored perceptions of curriculum reforms, barriers and facilitators to engaging in research and experiences with EBP integration. Faculty discussions focused on curriculum development processes, perceived effectiveness of reforms and challenges in implementation and resource allocation.

Ethical considerations: Ethical approval was obtained from the institutional review board of Dow university Of Health sciences, informed consent was taken from participants and confidentiality of responses was maintained throughout the study.

STATISTICAL ANALYSIS

Data was analyzed using SPSS 22 using statistical software. Quantitative data were analyzed using descriptive and inferential statistics i.e, frequencies, means to identify trends in competencies and attitudes. Qualitative data were transcribed and analyzed using thematic content analysis, which allowed inductive generation of key themes related to curriculum strengths, gaps, and reform impact. The combined analysis provided both breadth and depth in understanding how curriculum supports research and evidence-based practice (EBP).

RESULTS

A total of 80 undergraduate medical students and 25 faculty members participated in the study. The analysis focused on students' research exposure, research competencies, evidence-based practice (EBP) knowledge and application and perceptions of curriculum reforms, alongside faculty perspectives on curriculum effectiveness and gaps.

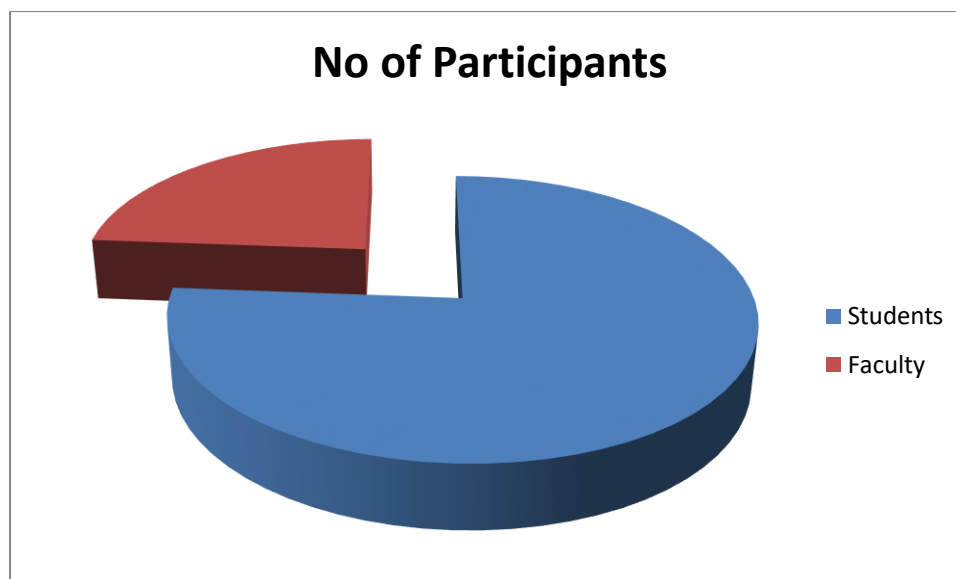


Fig 1 showed the distribution of the participants involved in the study

Among students, 40% (n = 32) reported participation in structured research projects, while 30% (n = 24) had engaged in independent research activities. Self-assessed competency scores showed that 50% (n = 40) felt confident in formulating research questions, 55% (n = 44) in conducting literature searches, and 35% (n = 28) in applying basic statistical methods. Students exposed to recent curriculum reforms reported higher confidence across all research competencies.

Table 1: Student Research Exposure and Competencies (n = 80)

Competency / Exposure	Yes (n, %)	No (n, %)	Mean $\pm$ SD*
Structured research project participation	32 (40%)	48 (60%)	2.3 $\pm$ 0.7
Independent research participation	24 (30%)	56 (70%)	1.8 $\pm$ 0.9
Formulating research questions	40 (50%)	40 (50%)	3.4 $\pm$ 0.8
Conducting literature search	44 (55%)	36 (45%)	3.6 $\pm$ 0.7
Applying statistical methods	28 (35%)	52 (65%)	2.9 $\pm$ 0.9

*Mean $\pm$ SD on a 5-point Likert scale (1 = low competency, 5 = high competency)

Knowledge of EBP concepts was reported by 60% (n = 48) of students, while 45% (n = 36) indicated that they had applied EBP principles in clinical decision-making. The mean evidence-based practice (EBP) competency score was 3.5 $\pm$ 0.7, reflecting moderate understanding and application among the study.

Table 2: Student EBP Knowledge and Application (n = 80)

Domain	Yes (n, %)	No (n, %)	Mean $\pm$ SD*
Knowledge of EBP concepts	48 (60%)	32 (40%)	3.5 $\pm$ 0.7
Application of EBP in clinical decisions	36 (45%)	44 (55%)	3.2 $\pm$ 0.8

*Mean $\pm$ SD on a 5-point Likert scale

Among students, 70% (n = 56) perceived that curriculum reforms had improved their research skills, 65% (n = 52) felt that evidence-based practice (EBP) understanding had been enhanced. Faculty members largely showed that reforms positively influenced students' theoretical knowledge of research and EBP, but 60% (n = 15) noted persistent gaps in practical application, mentorship, and integration into clinical rotations.

Table 3: Faculty Research Exposure, Competencies, and EBP Knowledge (n = 25)

Domain / Competency	Yes (n, %)	No (n, %)	Mean $\pm$ SD*
Participation in research supervision/mentorship	18 (72%)	7 (28%)	3.7 $\pm$ 0.7
Conducting independent research	20 (80%)	5 (20%)	4.0 $\pm$ 0.3
Formulating research questions	19 (76%)	6 (24%)	4.1 $\pm$ 0.6
Conducting literature searches	21 (84%)	4 (16%)	4.2 $\pm$ 0.5
Applying statistical methods	17 (68%)	8 (32%)	3.9 $\pm$ 0.7
Knowledge of EBP concepts	22 (88%)	3 (12%)	4.3 $\pm$ 0.5

Application of EBP in clinical teaching/decision-making	20 (80%)	5 (20%)	4.1 ± 0.6
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*Mean ± SD based on a 5-point Likert sc:

The findings of this study suggest that while curriculum reforms have led to a moderate improvement in students' research competencies and EBP knowledge, there is still a significant gap in translating this knowledge into practical skills and clinical application. Despite the reforms, students and faculty alike perceive that students lack sufficient hands-on experience and exposure to research and EBP in real-world clinical settings.

Table 4 showed the Perceptions of Curriculum Reforms (Students n = 80, Faculty n = 25)

Participant Group	Perceived Improvement in Research Skills	Perceived Improvement in EBP Understanding
Students	56 (70%)	52 (65%)
Faculty	20 (80%)	18 (72%)

To address this limitation, there is a pressing need for structured mentorship programs that provide students with guidance and support as they navigate research projects and EBP initiatives. Additionally, incorporating hands-on research opportunities and integrating EBP principles into routine clinical training can help bridge the gap between theory and practice. By doing so, medical institutes can equip students with the practical skills and confidence needed to apply EBP in clinical decision-making, ultimately enhancing patient care and outcomes.

DISCUSSION

This study provides important insights into the current status of research training and EBP integration within the medical curriculum and highlights the impact of recent curriculum reforms. The findings demonstrate that while structured reforms have moderately improved students' research knowledge, attitudes, and skills, there are still notable gaps remaining in formal research training and guided application of EBP[20].

Our quantitative results align with broader evidence indicating that EBP education enhances competencies when integrated longitudinally into medical programs. Studies suggest that curricula incorporating explicit EBP principles and longitudinal research opportunities consistently produce graduates who are better prepared to integrate research evidence into clinical decisions.

However, systematic reviews of EBP teaching underscore limitations in how EBP is currently delivered across health professions, conventional educational strategies often produce modest improvements in competency unless supported by interdisciplinary and clinically embedded interventions[21,22]. This supports our qualitative findings where students reported that while theoretical components of research and EBP were present, hands-on application, mentorship and clinical integration were insufficient, a gap that echoes global trends in medical education reform needs.

Faculty perceptions also mirrored this concern, with many identifying structural barriers such as limited protected time for research supervision, inadequate faculty development in EBP teaching and uneven institutional support[23-25]. Such barriers have been documented in a range of health education settings, where the effectiveness of EBP and research curricula heavily depends on faculty expertise and stable infrastructure for sustained implementation.

Importantly, this study's mixed-methods approach provided a more comprehensive understanding than either quantitative or qualitative data alone. Quantitative measures established the level of competencies and attitudes, while qualitative insights clarified why certain reforms may fall short in bridging theory and practice[26,27]. Together, these findings suggest that curriculum reforms must move beyond standalone research modules and embed longitudinal, mentored, and clinically contextualized research and EBP experiences to produce the intended competencies[28].

The study showed that recent curriculum reforms have contributed positively to strengthening undergraduate medical students' research capacity and understanding of evidence-based practice (EBP). Moderate improvements were observed in research knowledge, literature search skills, formulation of research questions, and conceptual understanding of EBP

CONCLUSION

The study concluded that curricular innovations enhanced theoretical competencies and awareness of research principles. However, significant gaps persist in practical application, hands-on research exposure, statistical skills, structured mentorship and integration of EBP within clinical rotations. While curriculum restructuring is a critical step toward competency-based medical education, sustainable impact requires longitudinal integration of research training, structured mentorship programs, protected faculty support, and clinically embedded EBP experiences.

Recommendations

Based on the findings, it is recommended that medical curricula incorporate longitudinal, competency-based research training integrated throughout clinical years. Structured mentorship programs should be strengthened to provide continuous guidance and supervision. Increasing hands-on research opportunities, protected

time for faculty supervision, and practical EBP application during clinical rotations are essential to bridge the theory–practice gap.

Faculty development programs focusing on research supervision and EBP teaching should also be implemented. Future studies should employ multi-institutional designs with larger sample sizes and include objective measures of competency to further validate the impact of curriculum reforms.

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