IAP Journal of Medical Education and Research
Volume 2, Issue 2 - 2025, Pg. No. 13-18
Peer Reviewed & Open Access Journal

Research Article

Perceptions and Challenges in the Implementation of Competency-Based Medical Education (CBME) among Medical Students and Faculty: A Mixed-Methods Evaluation

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How to cite this article:
Panneerselvam S, Lakshmanan M. Perceptions and Challenges in the Implementation of Competency-Based Medical Education (CBME) among Medical Students and Faculty: A Mixed-Methods Evaluation. IAP J. Med. Educ. Res. 2025;2(2):13-18.

Date of Submission: 2025-12-08
Date of Acceptance: 2026-02-04

E D I T O R I A L

Background:India is transitioning from traditional teacher-centered medical education to Competency- Based medical education (CBME) to develop graduates as competent clinicians, communicators, and lifelong learners. Our study aimed to analyze faculty's and students' perceptions of CBME and identify the challenges in its implementation.

Materials and Methods: A mixed-methods approach was used. Faculty and CRMI (2019 batch) at Thanjavur Medical College, India have completed a validated structured questionnaire via Google Forms. Focus group discussions were conducted, and thematic analysis was applied to the data.

Results: A total of 83 students and 48 faculty members participated. Faculty rated the utility of the Foundation Course ($p=0.015$), small-group discussions ($p<0.001$), large-group discussions ($p=0.009$), formative ($p<0.001$) and summative assessments ($p=0.024$), self-directed learning ($p<0.001$), and logbooks ($p<0.001$) higher than students, who strongly disagreed on the utility of logbooks. Both groups equally endorsed early-clinical-exposure, AETCOM, alignment and integration, skill training, and feedback. Students were more positive about electives enriching career goals ($p<0.001$) but questioned CBME's effectiveness in preparing them for the NEXT exam. Key challenges included faculty shortages and time constraints impacting early clinical exposure, small group discussions, skills training, and assessments. Students advocated for a shorter foundation course, interactive teaching, better interdepartmental coordination, uniform skill training, and standardized assessments. They also found logbook maintenance tedious and unproductive.

Conclusion: Both students and faculty value early clinical exposure, AETCOM, and skill training. Addressing the challenges such as faculty shortage, time constraints, and standardized assessment is crucial for successful CBME adoption.

Keywords: competency-based medical education, CBME, faculty perceptions, student perceptions, implementation challenges

Introduction

Medical education in India is undergoing a paradigm shift with the introduction of Competency-Based Medical Education (CBME).[1] CBME aims to produce clinically competent medical graduates who are effective communicators, lifelong learners, and ethical professionals. It emphasizes outcome-based learning, ensuring students acquire predefined competencies essential for medical practice.[2] Unlike traditional teacher-centered methods, CBME fosters active student engagement through small group discussions, self-directed learning, and formative assessments.[3] Key features include early clinical exposure, subject integration, and the development of communication and ethical skills through the AETCOM module. Despite its potential, CBME implementation in India faces significant challenges.[4] Faculty shortages, time constraints, and the need for continuous training hinder its adoption. Students also struggle with maintaining extensive logbooks and adapting to new assessment methods.[5] Given these challenges, understanding student and faculty perspectives is crucial for refining and improving CBME implementation. This study examines CBME perceptions among medical students and faculty at Thanjavur Medical College and evaluates the challenges in its implementation.

Methods

Our study followed a mixed-methods design. The protocol was submitted to the Institutional Ethics Committee, and approval was obtained (TMC-IEC/1271/2024). The study was conducted from March to December 2024 at Thanjavur Medical College, India. The study population included faculty involved in CBME implementation for undergraduates and students who had completed their third professional year and were entering internships. Faculty and students who did not consent to focus group discussions (FGDs) were excluded.

As our study was a mixed model-study, we adopted convenience sampling without performing an a priori sample size calculation. However, a minimum of 30 participants per subgroup was ensured for meaningful representation. The study was conducted in two phases: Phase 1 involved non-probability sampling through voluntary response, while Phase 2 used convenience sampling techniques.

Data collection also occurred in two phases. In Phase 1, a validated, structured questionnaire was developed separately for faculty and students. The student questionnaire used a five-point Likert scale to assess perception of various CBME components, while the faculty version included an additional "Don't know/Not sure" option besides the five-point Likert scale to capture uncertainties. Open-ended sections were allowed for qualitative insights into implementation challenges, which informed the FGD framework. The questionnaire was distributed electronically via Google Forms.

Phase 2 involved FGDs to identify key challenges using a structured discussion guide. Study tools included validated semi-structured questionnaires and an FGD guide. Variables examined included socio-demographic characteristics, faculty experience, prior medical education training, and students' schooling background, including medium of instruction and educational board.

Statistical Analysis

For quantitative analysis, the Likert scale scores were summarized using the median and interquartile range. The Mann Whitney U test was used to compare the mean rank between the subgroups. A p-value < 0.05 was considered statistically significant.

For qualitative analysis, the responses summarized in the FGD were coded using induction coding. The codes were grouped into categories and finally merged to form themes. Conclusions were drawn and reported.

Results

All 150 pre-final year students at Thanjavur Medical College were invited to participate, and 83 provided consent. Similarly, 48 faculty members participated in the study.

Figure 1 and Table 1 compare the Likert scale scores between faculty and students for various CBME components. Faculty rated the Foundation Course ($p=0.015$), Small Group Discussions ($p<0.001$), Large Group Discussions ($p=0.009$), formative ($p<0.001$) and summative assessments ($p=0.024$), Self-Directed Learning (SDL) ($p<0.001$), and logbooks ($p<0.001$) higher than students, who strongly disagreed on the utility of logbooks ($p<0.001$). Both groups appreciated early clinical exposure, AETCOM sessions, alignment and integration, skill training, and feedback. Students valued electives ($p<0.001$) but questioned CBME's effectiveness in preparing them for the NEXT exam.

Table 2 presents the thematic analysis of challenges in CBME implementation. Common concerns included time constraints and faculty shortages. Students additionally highlighted the prolonged foundation course, less interactive teaching methods, insufficient skill training, non-standardized assessments, poor interdepartmental coordination, and the burdensome nature of logbook maintenance.

Table 1.Comparison of Likert scale scores for various components of curriculum based medical education implementation between student and faculty

Parameter	Student			Faculty			Mann Whitney U	p-value
	n	Median	IQR	n	median	IQR		
Foundation course	83	0.0	0 - 1	47	1.0	0 - 2	1451	0.015*
ECE	83	1.0	1 - 1	47	1.0	1 - 2	1792.5	0.443 (NS)
AETCOM	83	1.0	0 - 1	45	1.0	1 - 1.5	1676	0.339 (NS)
A&I	83	1.0	0 - 1	45	1.0	0 - 1	1819	0.808 (NS)
SGD	83	0.0	-1 - 1	48	1.0	1 - 2	705.5	<0.001*
LGD	83	0.0	0 - 1	47	1.0	0 - 1	1411.5	0.009*
Skill training	83	1.0	1 - 2	43	1.0	1 - 2	1714.5	0.718 (NS)
Electives	83	1.0	1 - 2	44	1.0	0 - 1	1163.5	<0.001*
Formative	83	0.0	-1 - 1	48	1.0	0 - 1	1242	<0.001*
Summative	83	1.0	0 - 1	46	1.0	0.75 - 1	1452.5	0.024*
Feedback	83	1.0	0 - 1	45	1.0	0 - 1	1555	0.118 (NS)
SDL	83	0.0	-1 - 1	46	1.0	1 - 2	1142	<0.001*
Logbook	83	-2.0	-2 - -1	47	1.0	0 - 1	401.5	<0.001*
NEXT	83	0.0	-1 - 1	35	0.0	0 - 1	918.5	0.001*

Data are expressed as median with interquartile range. Mann Whitney U test was used to compare the scores between the student and faculty response. *indicates p<0.05 and considered significant. NS = Not significant. Don't know responses were omitted for analysis. ECE= Early Clinical exposure, SGD = Small group discussion, LGD = Large group discussion, A&I= Alignment and Integration, SDL = Self directed learning, NEXT = National exit exam.

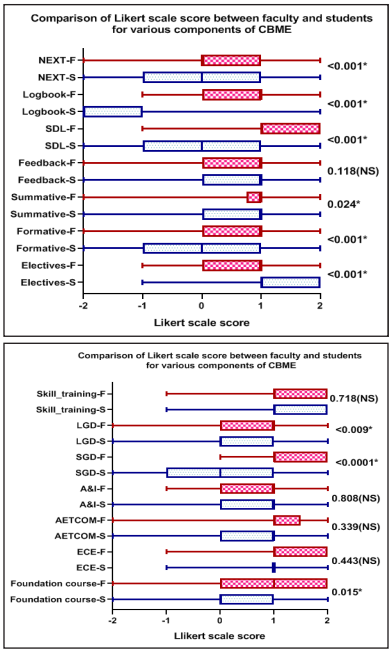

Figure 1.Comparison of Likert scale score between faculty and students for various components in CBME using Box-Whisker plot. Mann Whitney U test was used to compare the mean ranks between faculty and students. *indicates p<0.05 and considered significant. NS = Not significant. F= Faculty, S= Students, SDL = Self-directed learning, A&I = Alignment and integration, ECE = Early clinical exposure, SGD = Small group discussion, LGD = Large group discussion

Table 2.Thematic analysis of the challenges in implementing CBME

Students		CBME Components	Faculty	
Themes	**Responses**		**Themes**	**Responses**
Schedule & Duration	"...Tightly packed..." Too long	**Foundation Course**	Exposure	"...Student transfer after course commencement..."
Utility	"...Hindered by language barrier..."		Duration	"...Too long..."
Faculty strength	"...Too few..."	**Early Clinical exposure**	Execution	"...Small work force..." "...Inter-departmental coordination poor..."
Teaching method	"...More theoretical..."	**AETCOM**	Implementation	"...Faculty untrained..."
Authenticity	"...Role play repetitive..." "...Need real time exposure..."		Impact	"...Hard to change student attitudes..."
Implementation	"...Inter-departmental coordination lacking..."	**Alignment & integration**	Planning	"...Scarce..." "...Need for uniform timetable..."
Content	"...Overlapping & repetitive..."			
Interaction	"...Not interactive..."	**Small Group Discussion**	Resource availability	"...Manpower shortage..."
Outcome	"...Not effective..."		Facilitation	"...Difficult due to faculty concern..."
Content delivery	"...Monotonous..." "...No interaction ..."	**Large Group Discussion**	Student engagement	"...Distracted..." "...Short attention span..."
Media	"...Hundreds of slides..." "...Paragraphs & texts..."		Assessment	"...Difficult..."
Opportunities	"...No equal opportunities..."	**Skill Training**	Time availability	"...Limited time..."
Teaching aids	"...Inadequate..."		Resources	"...Manpower deficit lack of skill lab..."
Duration	"...Too short..."	**Electives**	Opting reason	"...Wrong reasons ..." "...Leisure posting..."
Allocation	"...Not to my choice..."			
Frequency	"...Occasional tests..."	**Formative Assessment**	Time	"...Time constraints..."
Time	"...Time consuming..."		Manpower	"...Shortage..."
Perception	"...Too stressful..."	**Summative Assessment**	Assessment method	"...Variable..."
Question type	"...Fact based..." "...Not application based..." "...Less analytical ..."		Standardisation	"...Skill assessment not uniform..."
Topic choice	"...Often inappropriate..."	**Self Directed Learning**	Students response	"...Not all students participate..." "... Lack of interest..." "...Cut copy paste..."
Faculty guidance	"...Inadequate..."			
Progress assessment	"...No use..." "...Waste of time..." "...Just for completion..."	**Log Book**	Maintenance	"...Bulk filling. "...Not every day..."
Faculty supervision	"...Not done on daily basis..."		Supervision	"...Time constraints..."

Discussion

The findings of our study revealed significant differences in the perceptions of CBME between faculty and students, highlighting both positive aspects and areas for improvement. Faculty generally viewed CBME reforms more favorably, appreciating the structured elements such as the Foundation Course, small and large group discussions, formative assessments, and self-directed learning. Their support for these components likely stems from the belief that these methods foster better clinical preparedness

and communication skills among students. However, the faculty also faced constraints related to time management and faculty shortages, which impeded effective CBME implementation.

On the other hand, students exhibited mixed responses. While they valued aspects like early clinical exposure and the integration of ethics and communication modules, they expressed dissatisfaction with the laborious nature of logbook maintenance and perceived inefficiencies in skill training sessions. A recurring concern was the lack of standardized assessment methods, which students believed did not adequately prepare them for the NEXT examination—a key benchmark for their medical careers.[1] This finding was consistent with our study.

The thematic analysis further underscored the importance of enhancing interactive teaching methods and fostering better interdepartmental coordination. Addressing these challenges through targeted interventions, such as faculty training programs and adopting more engaging pedagogical approaches, can improve the overall efficacy of CBME. Continuous feedback mechanisms between faculty and students will also play a crucial role in refining the curriculum and aligning it with the evolving needs of medical education.[2,3]

The implementation of Competency-Based Medical Education (CBME) has sparked significant discussion among educators, students, and policymakers. [4] This study's findings align with existing literature on CBME, highlighting its benefits, challenges, and the perception of various stakeholders.

Faculty and student perceptions play a crucial role in the successful adoption of CBME.[6] Studies have shown that while faculty members acknowledge the importance of CBME in fostering essential competencies, they also express concerns about increased workload and the need for adequate faculty development.[1,2] Faculty members appreciate the structured framework but find challenges in adapting to the assessment-driven approach.[3] Similarly, students recognize the practical relevance of CBME but sometimes struggle with its self-directed learning aspects.[6]

Several studies indicate that CBME implementation faces structural and logistical challenges. A study has identified the faculty resistance, lack of training, and inadequate resources as major barriers in the Indian context.[7] Similar difficulties were also observed globally, where resource constraints and faculty readiness impacted effective implementation.[8,9] Additionally, a shift from a traditional time-based curriculum to a competency-focused one has created resistance among stakeholders who are accustomed to the traditional assessment patterns.[10,11] One study argued that a less time-bound approach to competency acquisition might alleviate some of these concerns by allowing students to progress at their own pace.[12]

CBME has been associated with improvements in student competency and preparedness for clinical practice. A study has demonstrated that students trained under CBME frameworks exhibit better clinical performance and problem-solving skills. However, students often find the transition challenging, especially in early years when they are adapting to self-directed learning methodologies.[13-15] Another study has compared CBME and traditional curricula using the Dundee Ready Education Environment Measure and found that while CBME students reported greater engagement, they also highlighted concerns about increased workload and expectations.[8]

The effective CBME implementation requires ongoing faculty training and institutional support. There is a need for continuous professional development programs to equip faculty with the necessary skills to assess competencies effectively.[16,17] Faculty development workshops and structured training modules have been shown to improve CBME adoption rates.[4] Additionally, curriculum revisions must ensure that CBME principles are applied in a way that does not overburden educators and students alike.[18,19] Moreover, an early collaboration between faculty and students in curriculum design could enhance the effectiveness of CBME implementation.[20]

The experiences of CBME implementation in different countries provide valuable insights for India. Studies from Sub-Saharan Africa, Canada, and Europe indicate that well-structured CBME frameworks lead to enhanced student engagement and competency acquisition.[12] Early clinical exposure and case-based learning have been particularly effective in making CBME more relevant and engaging for students.[16] Drawing from these global experiences, India can focus on incremental CBME adoption, ensuring proper faculty training and resource allocation.

The limitations of this study include its single-center design, which may limit the generalizability of findings to other institutions. Additionally, the study population comprised CRMIs from the first batch of CBME, whose perspectives might differ from those of subsequent cohorts due to initial challenges encountered during the curriculum's early implementation. Furthermore, the high participation rate of faculty members with formal training in medical education may have influenced the outcomes, potentially introducing bias into the findings.

Conclusion

The study highlights differing perceptions of CBME, with faculty viewing reforms more favorably than students. Both groups appreciate the introduction of early clinical exposure, AETCOM, skill training, and feedback. Though

students are more positive about electives, they question the utility of logbooks and the program's preparation for NEXT. Key challenges include faculty shortages, time constraints, and the need for more interactive teaching and standardized assessments. Addressing these issues is crucial for the successful adoption of CBME. Future research should explore long-term outcomes of CBME in India to evaluate its impact on medical graduates' competencies and healthcare delivery.

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