

Article

Challenges and Opportunities in the Implementation of Competency-Based Medical Education for Undergraduates in Northern India

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Abstract

The competency-based medical education (CBME) curriculum was introduced recently for undergraduate courses in medical institutions in India. The program needs a paradigm shift in the teaching and assessment methods. Therefore, challenges at the individual as well as organizational level are expected in the initial years of implementation. We used a mixed-method approach through focus group discussions (FGD) and an online survey to assess the perception and attitude of MBBS phase 1 and 2 teachers towards CBME. Themes were generated from FGD, and quantitative data were collected using a structured questionnaire through an online survey. Nearly 80% of the participating faculty perceived that the CBME curriculum was better than traditional teaching methods. Major challenges were either related to a deficiency of curriculum-optimized learning material (85%), material infrastructure (38%), and manpower (46%), or increased documentation (74%), and time constraints (52%). The faculty felt attitudinal change (63%), better acquaintance with the professional environment (60%), improved participation (58%), and the performance of students (38%) were major commendations of CBME. The CBME curriculum is a welcome change in Indian medical teaching institutes, and faculty intend to improve it through feedback mechanisms. The perceived complexities need to be addressed at different levels through collaborative approaches.



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Keywords: competency-based medical education; curriculum development; curriculum-optimised learning

1. Introduction

The governing body of medical education in India has recommended the implementation of competency-based medical education (CBME) in India in a phased manner [1]. Competency is defined as the ability to perform something successfully and efficiently [2]. Hence, CBME means imparting medical education in such a way that learners can acquire knowledge and skills successfully for the efficient delivery of health services. Thus, CBME is a learner-centric strategy in which the learner must demonstrate their learned knowledge and skills to achieve pre-decided competencies [3]. The concept of CBME was

introduced by the World Health Organization in 1978 [4]. Twenty years later, the Accreditation Council on Graduate Medical Education, United States, recommended six domains of clinical competence -patient care, medical knowledge, practice-based learning and improvement, interpersonal and communication skills, professionalism, and system-based practice [5]. The curriculum developed for CBME requires a paradigm shift in traditional teaching methods and endorses practical-based training. The implementation of the CBME curriculum would require faculty training, upgrading of infrastructure, and changes in teaching and assessment methods [1]. The faculty training has been addressed through faculty development programs (FDP), an integral part of the implementation of CBME [1]. Notwithstanding, the implementation would have some challenges related to students, faculty, and administration [6]. This has been discussed in many sessions at major international conferences [7]. Challenges associated with this paradigm shift in teaching techniques have been addressed in countries where CBME has been implemented [8]. However, the challenges associated with its implementation may vary across the globe, as each country follows different policies for medical education and health care. Medical education researchers in India have attempted to understand the challenges involved in the implementation of CBME [9–12]. These studies were questionnaire-based, had a limited sample size, and mainly focused on phase I faculties and students. The appropriateness of the design and implementation of the CBME curriculum is a must to achieve the desired results [13]. The research has focused mainly on perceptions of stakeholders, but implementation fidelity is understudied [14–16]. Similarly, specific hurdles in implementing self-directed learning (SDL), and reliable and objective assessment of Attitude, Ethics, and Communication (AETCOM) modules need more research [14–16].

The evaluation of challenges perceived in the implementation of CBME has been mostly quantitative, and qualitative analysis is very limited [6–12,14–16]. A mixed-method approach seems appropriate because it has the advantage of weaving together the numerical data and the narrative analysis [17]. Since its introduction in 2019, the CBME-based curriculum has been implemented in two phases of MBBS. Therefore, in this study, we focus on understanding the challenges faced by faculties of two phases of MBBS in medical institutes in northern India related to the design and implementation of a CBME-based curriculum, including SDL and AETCOM, for medical undergraduates using a mixed-method approach.

2. Materials and Methods

2.1. Study Design and Study Subjects

The cross-sectional study was conducted between April 2021 and March 2022 using a mixed-methods approach [18]. We adopted a mixed method comprising focal group discussions (FGDs) and an online survey. The FGDs were planned to generate themes (qualitative data), which were used to prepare questionnaires for online surveys (quantitative data). The participants were faculties of MBBS 1st I and 2nd year professional faculties in medical colleges situated in northern India.

2.2. Sampling, Recruitment, Data Collection, and Analysis

Faculties were invited to participate after seeking the prior permission of the respective dean or principal of the concerned medical colleges through email. Faculties were selected based on non-probability purposive sampling. Those who gave consent for participation were initially sensitized about the objectives of the work by a telephonic conversation at a mutually agreed-upon time. Later, the details were shared through email. The local faculties were invited for face-to-face interaction with the permission of the director and the medical education unit (MEU) coordinator of the institute.

2.3. Focal Group Discussions

A pilot FGD was initially conducted at the departmental level to identify shortcomings, if any. Based on these interactions, the discussion guide questions were prepared, which were later validated by the members of the medical education unit (MEU). The study methodology is summarized in a flowchart in Figure 1.

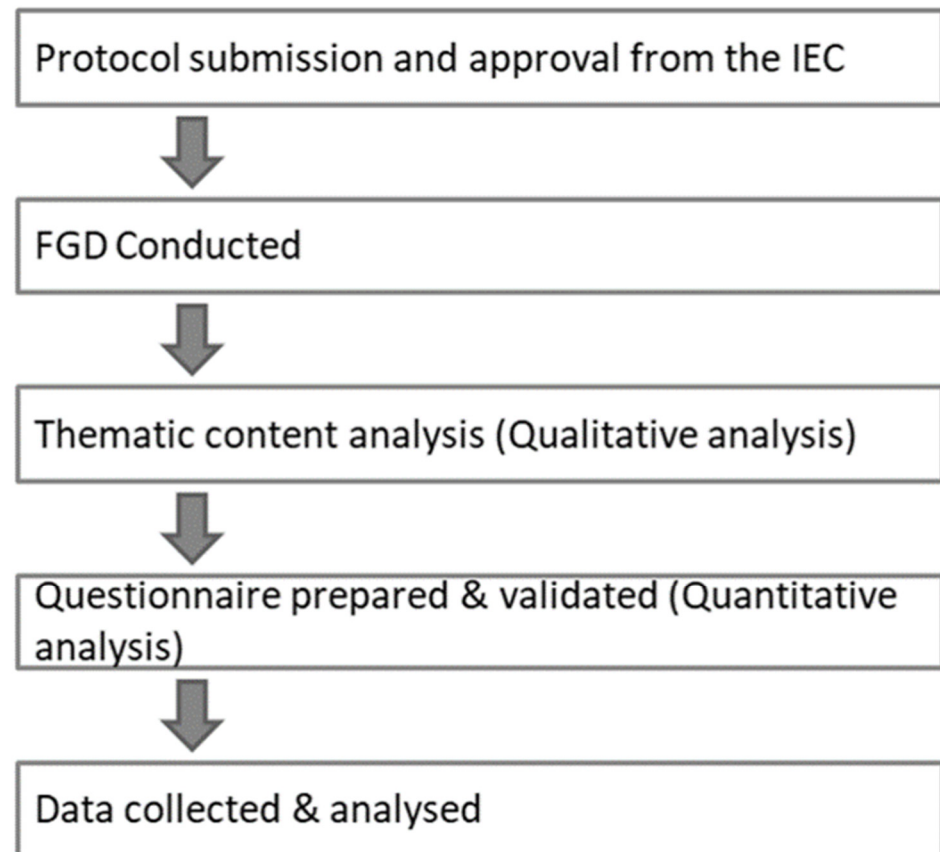


Figure 1. Flow-chart depicting the study methodology (ICE = Institutional ethical committee, FGD = Focus group discussions).

Faculties of MBBS I and II, who had at least 5 years of undergraduate teaching experience and who had attended any of the FDPs, were eligible to participate in FGDs. The FGDs were conducted in hybrid mode. Local faculties were engaged face-to-face, and out-station faculties were connected through online meeting platforms like Zoom, GoToMeeting, etc. The basic biographic and professional information of participating faculties is summarized in Table 1.

Table 1. The biographic and professional information of faculties who participated in the online survey (n = 81).

Variable	Number (%)
• Teaching experience	
0–5 years	10 (12%)
5–8 years	21 (26%)
>8 years	50 (62%)
• MBBS phase teaching	
Phase I	25 (31%)
Phase II	56 (69%)

Table 1. Cont.

Variable	Number (%)
• FDP training	
Yes	68 (84%)
No	13 (16%)
• FDP Program	
Revised basic course workshop (RBCW)	65 (91%)
Training in Attitude, Ethics, and Communication Module (ATECOM)	43 (61%)
Curriculum Implementation Support Program (CISP)	53 (75%)
Advanced Course in Medical Education (ACME)	12 (17%)
Foundation for Advancement of International Medical Education and Research (FAIMER)	3 (4%)
• Role in the medical education unit (MEU) of the institute	
MEU coordinator	4 (5%)
MEU member	21 (26%)
Resource Faculty for RBCW/CISP/AETCOM	23 (28%)
None	41 (51%)

The participant faculties were sensitized one week prior to the smooth conduct of FGD. Informed consent for participation and an audio recording of the discussion were obtained from the participating faculty. A moderator, note keeper, audio recorder, and timekeeper were appointed during FGD. Two sessions were conducted, each lasting 60 min (Figure 2). The first session involved faculties for MBBS 1st subjects, and the second session was with faculties of MBBS 2nd professional subjects.



Figure 2. A session of focus group discussion is in progress.

Manual transcription of the audio recording of the FGD was performed. The narratives were organized and subjected to manual content analysis and inductive coding. The common themes were deduced, and results were presented using the conceptual

framework of the experience-based learning model [19]. FGD measured dimensions were primarily guided by previously published research [6–14]. It was expanded to include new dimensions based on the discussion in the FGD. Four domains primarily introduced to initiate FGD were faculty, students, administrative logistics, and infrastructure. Themes that emerged from quantitative analysis of transcriptions of audio recordings of FGD are summarized in Table 2.

Table 2. Themes emerged from quantitative analysis of transcriptions of audio recordings of FGD.

Themes Emerged from FGD	Verbatim Quotations
Participation & performance Participants felt that CBME has improved students' interest in the subject and has promoted self-directed learning.	"Students are actively participating in discussions" "Cramming among students is reduced" "Students more confident in facing the practical"
Systematic and integrated Participants felt that students realize the importance of basic sciences as they can correlate them with their clinical application.	"Amalgamation of clinical orientation with basic sciences is good" "Better orientation of terminologies"
Well-planned curriculum Attitude and communication	"Assessment strategy in the curriculum is very good"
The implementation of ATCOM has improved communication skills and attitude.	"When dealing with patients during the practical demonstration and clinical posting, students looked more empathetic and concerned."
Time constraints Participants felt that the time allotment for the foundation course and some of the competencies were not proportionate.	"Foundation course time of one month is too long." "Number of competencies in pathology more but the time has been reduced for phase II" "Duration of II phases is not adequate"
Learning resource material Participants felt that the currently available books and materials are suitable for traditional teaching	"Books based on new curriculum are few" "Only competency list is added in the already available text"
Infrastructure Participants indicated that there is a lack of infrastructure for implementing CBME	"We have to take our laptops to lecture theaters" "Technical support is not adequate during class" "Skill Lab facility is lacking" "No facility for video conferencing" "No availability of vehicles for taking students for community visits"
Manpower Participants indicated that the available teaching and non-teaching staff are not sufficient	"Multiple courses in the department" "Separate faculty for each course" "With a limited number of staff, small group discussion is not possible"
Administrative support Participants felt that the administration of the institute does not address their concerns Guidelines are not being released on time from the university	"Everyone is not an expert in technology" "MEU not supportive" "Even after reminders adequate logistic support not provided" "University guidelines come at the last moment"
Integration Participants indicated that the vertical integration is challenging at times	"Awareness about the importance of CBME lacking in clinical faculty" "Lack of understanding of the seriousness of things" "Casual attitude of clinical faculty" "On paper support for integration"

2.4. Online Survey

Based on the themes generated from FGDs, a structured questionnaire was prepared. A small group initially took up the questionnaire for validation. Based on the feedback mechanism, changes were incorporated in the questionnaire, and a final, validated version was prepared. The validated questionnaire was sent to participating faculties through an online platform (Google Forms, Google, Mountain View, CA, USA) for the collection of additional information. External experts conducted the validation. The questionnaire consisted of three sections. Section 1 dealt with the consent, biographic, and professional information of the participants. Section 2 dealt with the awareness and attitude of faculties towards CBME and FDP. Section 3 investigated perceived barriers and difficulties faced by the faculty in implementing CBME-based teaching (Supplementary Materials). The survey included all faculties, regardless of their teaching experience and FDP status. All teaching faculty presently serving medical institutes in India were eligible to participate. The sample size was calculated using Cochran's formula ($n = z^2pq/E^2$). The eligible participants were calculated by averaging the number of MBBS Phase I and II faculties recommended by NMC for MBBS batches of 50 through 250. The calculated average faculty for MBBS Phases I and II came in at 30 per medical institute. At the time of conducting this study, there were 562 medical colleges in India in "2020-2021"; hence, the calculated total MBBS Phase I and II faculty (eligible participant population) was 16,860 [20]. With this eligible participant population, the required sample size was 376 at a 95% confidence interval (CI) and 5% precision.

The data collected through the Google Forms questionnaire was organized in a Microsoft Excel Sheet (Office 2024, Microsoft Co Ltd.; Redmond, WA, USA), and consolidated data was analyzed using InStat software (GraphPad Software, San Diego, CA, USA). The data was analyzed using descriptive statistics of frequency distribution.

3. Results

3.1. Demographics of Participants

A total of 71 faculty members were invited for FGD. With a response rate of 48 percent, 34 faculties participated; of them, 13 took part face-to-face, and another 21 joined through online mode. This included 16 (48%) phase I and 18 (52%) phase II teachers.

The questionnaire was sent through Google Forms to 376 faculty members, of which 81 faculty members from 23 medical colleges submitted their responses, with a response rate of 22 percent. It included 25 (31%) Phase I faculties and 56 (69%) Phase II faculties. Of the total respondents, 28 (32%) faculties were working in private medical institutes, and 53 (68%) were working in government institutes.

3.2. Themes from FGDs

The combined qualitative data from the FGD are presented in Table 2. Based on the themes that emerged from FGD, the quantitative analysis of the perception of faculties about CBME, and the challenges associated with its implementation was performed.

3.2.1. In-House Training

A suggestion in FGD was to have regular in-house training sessions to improve the implementation of CBME-based teaching, a view upheld by 85% of faculty during the survey. Another way to overcome the hurdle was through a constructive feedback system involving both students and co-faculties to improve teaching methodology, as agreed by 86% of faculty who participated in FGD.

3.2.2. Time Constraints

The structural teaching methods endorsed by the CBME-based curriculum are at times difficult to incorporate into the timetable, for example, “some competencies need small group discussions within the limited allotted time.” Phase II faculties expressed “that the reduced time for Phase II subjects, which is 1 year in the revised curriculum, is too short to cover competencies.” Another concern was that the time allotment for some of the competencies was disproportionate. Some clinically significant topics have less time allotted, whereas clinically less important competencies have been allotted more time. In the survey, 52% (n = 40) of the faculty felt competency-time allotment was not sufficient to cover the CBME-based curriculum. Another 28% (n = 22) found that time was sufficient, whereas 20% (n = 15) were not sure about it. Further, in FGD, it was highlighted that faculty members receive insufficient time for the preparation of their lecture or discussion classes.

3.2.3. Foundation Course

In the survey, 60% of the faculty members felt that students became well acquainted with a new professional environment after attending the foundation course. However, during FGD, Phase I faculty indicated that the one month allotted to the foundation course is disproportionately high compared to the abridged duration of 12 months for Phase I. The faculty felt a period of 15 working days might be sufficient for the foundation course. Moreover, they felt there was overlap in some activities across the modules.

3.2.4. Course Design

Nearly 40% of faculty perceived that curriculum design is suitable for the smooth implementation of CBME, but 30% of faculty did not feel so, and another 30% were neutral about this.

3.2.5. Learning Resource Material

In FGD, faculty pointed out that the available teaching material and textbooks are not appropriate for the successful implementation of a CBME-based curriculum. The textbooks continue to endorse traditional teaching methods. In the survey, 83% of faculty (67 of 81) felt that there was a need to improve teaching resources for the implementation of a CBME-based curriculum.

3.2.6. Attitude, Ethics, and Communication (AETCOM)

Faculties in FGD endorsed the implementation of AETCOM and were of the view that it has improved communication skills and attitudes. Though the actual impact would be known when students face patients in clinics, when dealing with patients during practical demonstrations and clinical postings, students looked more empathetic and concerned. In the survey, 63% of participant faculty perceived that the AETCOM module is helpful for students in acquiring necessary competencies in the attitudinal, ethical, and communication domains.

3.2.7. Early Clinical Exposure

FGD endorsed the utility of early clinical exposure. In the survey, this notion was upheld by 71% of faculty, who agreed that early clinical exposure has enhanced students' comprehension of how basic disciplines are integrated clinically.

3.2.8. Clinical Demonstration

In FGD, teachers' challenges in providing clinical examples of pertinent situations came to light. It had practical problems, which were challenging at times. When a sizable group of students is brought to wards or outpatient departments, it disrupts the regular

operations of these locations and often draws criticism from the paramedical staff. There are situations when bringing patients into the classroom is inappropriate and entails other related errors. Opposition generated by patients or their companions when a case is repeatedly examined is another issue encountered during practical demonstrations. In less frequent or uncommon circumstances, where there is only one patient accessible, this becomes considerably more difficult. Furthermore, actual demonstration is difficult for many topics. For instance, it can be challenging to establish and demonstrate in the little time given to the topic the immunological or genetic foundation of a disease. In the online survey, 58% of teachers faced difficulties related to clinical demonstration.

3.2.9. Horizontal and Vertical Integration

Faculty members in FGD expressed worry about challenges in organizing the vertical integration. Clinical specialty teachers were not always available because of a staffing shortage in their departments. This made it more difficult to implement the CBME-based curriculum's planned method of instruction. However, most departments were able to easily integrate horizontally. Most educators (93%) concurred in the online survey that horizontal integration was feasible and problem-free; however, 59% of respondents found vertical integration to be difficult.

3.2.10. Infrastructure

Faculty during FGD pointed out that the infrastructure available in departments is not sufficient for the implementation of CBME-based teaching methods. Some of the inadequacies related to infrastructure that surfaced during the FGD were the unavailability of dedicated vehicles for taking students to the community, a lack of audio-visual support, a lack of fast and stable internet connection, and well-equipped lecture theaters.

This view is echoed in the survey, where 38% ($n = 29$) felt there was a lack of infrastructure in their respective departments. Another 21% ($n = 16$) held a neutral view, whereas 41% ($n = 32$) said the infrastructure in their department is sufficient for the implementation of CBME-based teaching.

3.2.11. Inadequate Man-Power

In the FGD, most of the faculty members voiced their concerns about the department's insufficient staffing to carry out the CBME curriculum. It was also brought up that faculty members' non-teaching assignments consume a large portion of their working time, which could be spent on teaching. In certain locations, there is insufficient support staff for secretarial and lab attendant duties. In the survey, 46% ($n = 35$) of the faculty believed that their department did not have an adequate number of teachers and supporting staff available. Nonetheless, 40% ($n = 31$) of the faculty members said that their department had enough staff members to carry out the CBME-based program.

3.2.12. Administrative Support

During the FGD, most faculty members stated that there is not enough administrative support to put CBME-based teaching into practice. The institute's authorities neglected to address issues of infrastructure upgrades and hiring clerks to manage paperwork. Yet, just 38% of respondents to the survey agreed with this assertion.

3.2.13. Documentation and Record-Keeping

According to faculty members in the FGDs, CBME-based education has significantly increased paperwork, which takes up a lot of their time. Maintaining records without the assistance of department attendants or helpful clerical staff can be difficult for certain faculty members. In the survey, 74% of faculty members agreed with this viewpoint, compared to

8% who disagreed and 18% who were unsure. Nearly 92% of the faculty (n = 71) said that they were working on more paperwork because of CBME-based instruction.

3.2.14. Student Participation and Performance

Faculty members noticed a shift in the mindset of students who believed that they could learn without teachers through SDL. Nonetheless, in the online survey, 58% of the faculty felt that the introduction of the CBME-based curriculum had boosted student participation. However, just 36% (n = 28) of the faculty believed that students' performance had improved because of CBME-based instruction. Faculty explained in FGD that there was a lack of continuous, consistent effort from students because internal assessment was no longer included in final marks, but was just necessary to participate in exams. Moreover, there are no topic-specific recommendations accessible to support SDL, a viewpoint agreed upon by 70% of faculty in the online survey.

3.2.15. Awareness and Attitude Towards CBME

A moderate number of faculties had either participated in the program or were part of bodies associated with the implementation of CBME (Table 3).

Table 3. The participation and views of participants on CBME implementation-related programs.

• Do you feel FDP helps implement the CBME curriculum?	
Yes	67 (83%)
No	2 (3%)
Not sure	12 (14%)
• Have you accessed the curriculum implementation support program module?	
Yes	61 (75%)
No	20 (25%)
• Have you been sufficiently trained for the implementation of the CBME curriculum?	
Yes	63 (79%)
No	11 (13%)
Not Sure	7 (8%)
• Do you have clarity about the objectives of CBME?	
Yes	69 (85%)
No	2 (3%)
Not Sure	10 (12%)
• Do you feel assessment tools have ease of usage?	
Agree	39 (48%)
Not Agree	10 (12%)
Neutral	32 (40%)

The objectives of CBME were clearly understood by 85% of participants. A majority (80%) of the faculty considered the CBME curriculum better than traditional teaching, but only 53% of faculty found themselves adequately motivated for the successful implementation of the CBME curriculum. Nearly 78% of faculty received sufficient training for the implementation of CBME, and 83% found that the faculty development program (FDP) was helpful. The curriculum implementation module was used by 75% of the participants, and another 11% of the faculty did not receive training modules from their respective institutes.

The awareness about different assessment tools was not uniform. Nearly 9% of faculty were not aware of any assessment tool. The majority (86%) of the faculty were aware of the objective structured practical examination (OSPE), and 81% were aware of the objective

structured clinical examination (OSCE) tool. Awareness about other tools was relatively low (Figure 3). Only 48% were at ease with using the assessment tools.

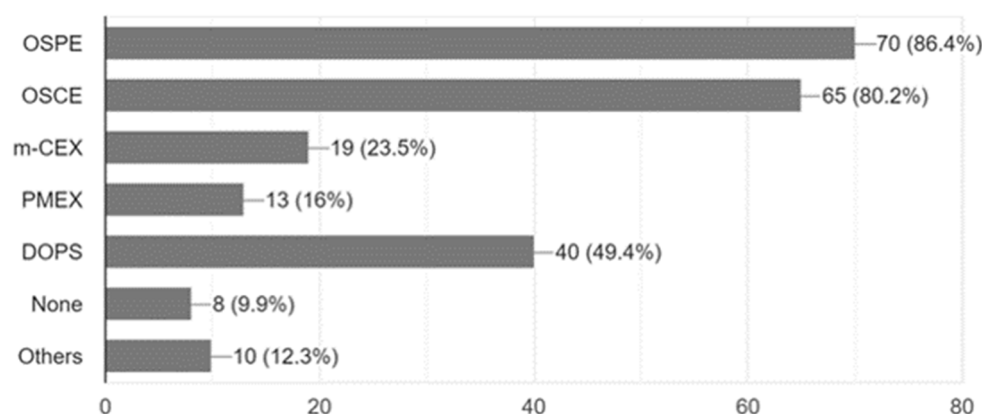


Figure 3. Bar chart representing responses of faculty about awareness of assessment tools.

In this study, we tried to identify gaps and discuss measures that may be helpful in better implementation of the CBME-based curriculum (Table 4).

Table 4. Gaps identified in the implementation of CBME in India and suggested measures to fill the gaps.

Areas/Themes	Gaps Identified	Suggested Measures
CBME related		
Small group teaching	Time constraints for the number of lectures required	Simultaneous teaching by different teachers Rationalize student–teacher ratio
Learning resources material	Lack of optimum material implement the learning in its true essence	Development of model material by a similar governing body as performed by NCERT for the school curriculum
Self-directed learning	No subject-wise guidelines are available	Develop guidelines at the central or peripheral level Teaching in small batches
Clinical demonstration	Lack of space in the outpatient department Objections from patients to repetitive examination Some competencies are not demonstrable	Adopt a video-based demonstration lecture Rationalize competencies through a feedback mechanism
Vertical integration	Lack of time for clinical stream teachers due to time devoted to clinical work	The minimum number of teaching faculty in medical institutes should be based on the number of students as well as the daily clinical workload
Early clinical exposure	Lack of practical demonstration Difficulty in vertical integration	Use of additional audio-visual resources Rationalize clinical work-teaching time allotment

Table 4. Cont.

Areas/Themes	Gaps Identified	Suggested Measures
Assessment	Lack of formative assessment tools	Sensitize faculty to develop such methods and techniques through inter-college workshops
Logistics related		
Course design	Teachers are not adequately sensitized and are unaware of implementation techniques	Conduct a teacher sensitization program
Student–teacher ratio	A high student–teacher ratio	Standardize the student–teacher ratio
Administrative support	Lack of administrative support in providing infrastructure	Regulations and inspections by governing bodies to ensure adequate infrastructure
Documentation	Increased time spent	Simplify data collection and use digital modes

4. Discussion

This study assessed the perception and attitude about CBME and the challenges associated with its implementation among MBBS Phase 1 and 2 teachers in medical colleges in northern India. The majority of participant faculty felt that they had received sufficient training for the implementation of CBME, had accessed the curriculum implementation support program module, and found FDP helpful in this regard. However, there was a lack of sensitization and training for teachers about understanding the implementation of the CBME curriculum assignment tools. Some faculties did not receive training modules from the respective institutes or authorities. Due to these constraints, some teachers continue to use the traditional teaching methods.

With the introduction of CBME, medical education in India is undergoing a landmark transformation. The CBME curriculum focuses on practical aspects of learning, and therefore, the focus has shifted from knowledge-based training to skill-based training. In addition, through AETCOM-based competencies, undergraduate medical profession training aims to prepare medical professionals who can serve society with compassion and good skills. The successful implementation of CBME would depend on several factors. Since the teaching faculty is at the center of implementing the CBME curriculum, this study tried to identify challenges faced by the faculty using a mixed-method approach, through FGD and a questionnaire-based survey.

Major challenges perceived by faculties included the need for improvised learning material (83%), increased paperwork and record-keeping (74%), time constraints (52%), an inadequate number of teaching faculty (46%), a lack of infrastructure (38%), and inadequate administrative support. Medical educators believe that the implementation of CBME will not be successful due to a high student-to-faculty ratio, poor infrastructure, time constraints, and a lack of commitment [21,22]. Gopalakrishnan et al., in their questionnaire-based online, multicentre cross-sectional study involving 251 faculties across three phases of MBBS, reported that faculties perceived poor teacher-to-student ratio (67.7%), ill-developed infrastructure (41.4%), and difficulties in assessment as major challenges in the road to implementing CBME [12].

Deficiency of trained faculty has been reported as a major challenge in the successful implementation of CBME [16,23,24]. The high student-to-faculty ratio or lack of adequate faculty has been perceived by faculty (84%) as a major challenge in implementing CBME in a cross-sectional study by Ramanathan et al. [23]. The high student-to-teacher ratio is going to be an even bigger challenge for clinical subjects' faculties. The dual responsibility

of patient care and teaching may pose difficulties. The NMC, the implementing and regulatory body for CBME in India, has not addressed this issue while rolling out CBME in 2019. The student-to-teacher ratio in medical institutes in India remains the same as it was before the introduction of CBME. The student-to-teacher ratio in medical institutes is based only on the number of undergraduate seats, and factors like patients' workload and research are not taken into consideration [25]. Furthermore, the regulatory body's guidelines are exactly what they purport to be, the minimum faculty requirement and not the optimum requirement [25]. It is very paradoxical that the institute implementing CBME, the tenet of which is quality health care, is itself tackling a high student-teacher and poor patient-doctor ratio.

Integrated learning is an important domain of CBME. It has been recommended that 20% of the curriculum in each specialty and 25% of the allotted time in each professional should be utilized for integrated learning [26]. In our study, horizontal integration was found to be optimum, but vertical integration was perceived as a challenge. The desired, optimum vertical integration could not be achieved due to a lack of inter-departmental coordination [23,24].

In our study, 63% of faculty perceived AETCOM as an important tool to improve communication skills among students. A majority of Phase I faculty and students held a positive perception of AETCOM in a study performed to know perceptions of 1st year students and faculty about AETCOM [16]. However, in this study, the author did not mention what constituted a positive or negative perception. In our study, the perception of students towards AETCOM was not evaluated. The acceptance of AETCOM modules among phase I students is high [27–29].

CBME de-emphasizes time-based learning and endorses continuing training until the desired competencies are achieved [30]. However, in our study, faculty have faced several issues related to time constraints in implementing the CBME. The time constraint primarily in this study was due to a lack of adequate manpower in the departments. Nearly 50% of the faculty in our study felt that the teachers in their department were inadequate for implementing the CBME curriculum, which involves teaching in small groups for several competencies. The CBME endorses small group discussions (SGD) and hands-on training for acquiring skills and OSCE and OSPE for assessment of skills [1]. SGD has been found to have greater acceptance among students [6]. Such teaching and assessment tools require more time for preparation and execution compared to didactic lectures [7]. Hence, the CBME curriculum is designed to enrich students with a sound and balanced foundation, but its implementation might not be successfully achieved in the absence of adequate manpower and time allotment.

During FGD, some faculty members felt that the duration of the foundation course should be shortened. Similar views of students as well as faculty have been reported in some studies performed to evaluate foundation courses [31,32]. The foundation course is accommodated in the phase I curriculum, which itself was abridged to 12 months from 15 months. Nearly 30% of faculty in our survey felt that the duration of Phases I and II was not sufficient to cover the CBME curriculum. Hence, faculty tend to condense the duration of the foundation course to milk extra time [33,34]. Participants in this study cited similar reasons during FGD.

Inadequate infrastructure has been perceived as an important hurdle in the implementation of CBME in India [12,16,24]. In our study, 38% of the faculty held a similar perception. Infrastructure availability may have a wide inter-institute variation. Inadequate availability of skill labs, demonstration rooms, audio-visual aids, and equipment hampers training.

Administrative authorities of any institute are important stakeholders in implementing the CBME. The need to align all regulatory stakeholders is recommended to optimize

training and learning in CBME [35]. In other studies, faculty also had the perception that administrative support should be increased [12]. Faculty in our study indicated that their concerns related to the implementation of CBME were not adequately addressed by the administration. Currently, the regulatory body has not fixed any accountability for the implementation of CBME, and it is solely the responsibility of the concerned teacher [26]. The optimum solution for this is to fix accountability at all levels, including the administrative authorities.

The CBME curriculum demands a more careful and mature selection of assessment tools, based on the competency and its expected level of achievement. Several assessment tools are available [36]. Therefore, awareness about the availability of various assessment tools is essential for faculty, so that relevant assessment tools are selected. In our study, nearly 10% of participants were not aware of any assessment tool, while the majority were aware of OSPE (86%) and OSCE (80%). Teachers need to be aware of different assessment tools, as no single assessment tool can capture all aspects of clinical competencies [37].

The learning resources available for the implementation of CBME are not suitable, as felt by most faculty. Currently, available books endorse old traditional teaching with minimal changes incorporated for CBME. There is a need to develop a model teaching document like that performed by the National Council for Educational Research and Training (NCERT) in India for the school curriculum.

The study has some limitations worth mentioning. The online survey received a lower response rate. A higher response rate would have resulted in more reliable statistics to back up our qualitative conclusions. Online surveys tend to produce a lower response rate than other modes of survey [38]. Participation in research among health care providers has been reported to be challenging because of time restrictions and direct interaction between participants and researchers [39]. Response rate in our study for FGD was higher than for the questionnaire survey, but since the participants in the FGD were from the same institute, perceptions may differ among the faculties of other medical colleges. So, it is imperative to carry out FGD involving faculty from different institutes and regions to support the findings of this study. In addition, follow-up FDG can be carried out with the same set of faculties later, when the next batch is passed out. This will lead to better understanding and judgment related to different aspects of CBME.

Due to the limited response rate, some correlations, like the type of institution, the years of teaching experience of faculty, and sanctioned undergraduate strengths, could not be derived through inferential statistics. The understanding of such variables may help in understanding the impact of each on CBME implementation-related challenges.

5. Conclusions

This study explored faculty perspectives regarding the transition to CBME in medical schools situated in northern India using a mixed-method approach. The study highlights both the educational benefits and significant logistical hurdles. While medical faculty find that the new competency-based approach is superior to the traditional curriculum in enhancing student engagement, improving communication skills, and the integration of clinical concepts, they face critical resource shortages, including insufficient man-power and inadequate infrastructure, to implement it. Many participants expressed concern over severe time constraints, an overwhelming increase in administrative paperwork, and a lack of updated textbooks tailored to the new curriculum. Although horizontal integration is functioning well, the study identifies a need for better vertical integration and more robust support from institutional leadership. Ultimately, the data suggest that while teachers understand the goals of the curriculum, systemic improvements in training and facilities are necessary for successful long-term implementation. Aligning all stakeholders and

assigning roles to each will undoubtedly aid in achieving the goal. Kotter states that “the real power of a vision is unleashed only when most of those involved in an activity have a common understanding of its goals and direction” [40].

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Abbreviations

The following abbreviations are used in this manuscript:

CBME	Competency-based medical education
FGD	Focal group discussion
MEU	Medical education unit
FDP	Faculty development program

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