International Journal of Medical and Pharmaceutical Research

Online ISSN-2958-3683 | Print ISSN-2958-3675
Frequency: Bi-Monthly
Available online on: https://ijmpr.in/

Review Article

Learner Perspectives on Competency-Based Medical Education in Undergraduate Medicine: A Systematic Review

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OPEN ACCESS

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Received: 27-05-2026
Accepted: 18-06-2026
Available online: 28-06-2026

ABSTRACT

Background: Competency-Based Medical Education (CBME) has been introduced in undergraduate medical training to ensure that medical graduates acquire clearly defined competencies in clinical knowledge, skills, communication, ethics, professionalism, and patient-centered care. Although CBME is designed to make medical education more outcome-oriented and practice-based, learner acceptance is essential for its successful implementation. Undergraduate medical students' perspectives provide important information regarding the strengths, limitations, and practical challenges of CBME.

Objective: This systematic review aimed to synthesize learner perspectives on CBME in undergraduate medicine, focusing on perceived educational value, clinical relevance, skill development, self-directed learning, assessment practices, feedback, workload, and implementation barriers.

Methods: A systematic literature search was conducted in PubMed, Scopus, Web of Science, Embase, ERIC, and Google Scholar for studies published from January 2012 to December 2025. Studies were included if they assessed undergraduate medical students' perspectives, perceptions, experiences, attitudes, or satisfaction regarding CBME or its components. Cross-sectional, qualitative, mixed-methods, and curriculum evaluation studies were included. Faculty-only studies, postgraduate-only studies, reviews, editorials, commentaries, and studies without extractable student data were excluded. The review followed PRISMA 2020 principles. Due to heterogeneity in study design and outcome measurement, findings were synthesized narratively.

Results: A total of 846 records were identified. After removal of 231 duplicates, 615 records were screened by title and abstract. One hundred and two full-text articles were assessed for eligibility, and 41 studies involving 10,936 undergraduate medical students were included. Overall, 77.3% of students perceived CBME as a positive curricular reform, 73.8% reported improved clinical relevance of learning, 70.4% reported better understanding of expected competencies, 67.9% reported improved confidence in clinical or procedural skills, and 64.6% found formative feedback helpful. However, 58.2% reported increased academic workload, 51.7% reported unclear assessment expectations, 47.5% perceived inconsistent implementation across departments, and 42.8% considered logbook documentation burdensome.

Conclusion: Undergraduate medical learners generally view CBME as clinically relevant, skill-oriented, and beneficial for professional development. However, student perspectives also highlight important implementation gaps, particularly regarding workload, assessment clarity, feedback quality, faculty consistency, and documentation. Strengthening student orientation, faculty development, transparent assessment systems, structured feedback, and simplified documentation may improve learner acceptance and the effectiveness of CBME in undergraduate medicine.

Keywords: Competency-Based Medical Education, CBME, learner perspectives, undergraduate medicine, medical students, curriculum reform, systematic review.

INTRODUCTION

Medical education has traditionally been organized around fixed durations of training, discipline-based teaching, and summative examinations. In such models, learners often progress through the curriculum based on time spent in training rather than demonstrated competence. Although this approach has contributed significantly to medical training, concerns have been raised regarding variability in graduate readiness, limited workplace-based assessment, inadequate feedback, and insufficient integration of clinical skills, communication, ethics, and professionalism.

Competency-Based Medical Education was developed to address these concerns by shifting the focus from what is taught to what learners are able to demonstrate. In CBME, competencies are explicitly defined, teaching-learning methods are aligned with desired outcomes, and assessment is intended to document progressive achievement of competence. The goal is to produce medical graduates who are clinically competent, ethical, communicative, reflective, and responsive to patient and community needs.

In undergraduate medicine, CBME includes several components such as early clinical exposure, foundation courses, integrated teaching, skill laboratory training, simulation, small-group learning, self-directed learning, formative assessment, feedback, electives, logbooks, and attitude, ethics, and communication training. These components are intended to make learning more active, clinically relevant, and outcome-oriented.

However, the implementation of CBME represents a major shift for undergraduate learners. Students are expected to take greater responsibility for learning, participate in frequent formative assessments, engage in reflection, maintain competency documentation, seek feedback, and demonstrate skills rather than merely reproduce knowledge in examinations. Therefore, learner perspectives are central to evaluating whether CBME is understood, accepted, and experienced as meaningful.

Students may perceive CBME positively when it improves clinical relevance, confidence, communication, and practical skill development. Conversely, they may perceive it negatively when implementation is inconsistent, assessments are unclear, logbooks are burdensome, and workload increases without adequate support. Understanding these perspectives can help institutions refine curriculum delivery and improve educational outcomes.

This systematic review was conducted to synthesize learner perspectives on CBME in undergraduate medicine and identify the major perceived benefits, concerns, and recommendations for effective implementation.

MATERIALS AND METHODS

Study Design

This systematic review evaluated published studies reporting undergraduate medical students' perspectives on CBME. The review followed PRISMA 2020 reporting principles. A narrative synthesis approach was used because included studies were expected to differ in design, setting, questionnaire structure, outcome measurement, and CBME components evaluated.

Review Question

The review was guided by the following question:

What are the perspectives of undergraduate medical learners regarding Competency-Based Medical Education, and what benefits and challenges do they report?

Eligibility Criteria

Studies were included if they met the following criteria:

1. Included undergraduate medical students as participants.
2. Evaluated CBME or one or more CBME-related curricular components.
3. Reported learner perspectives, perceptions, experiences, attitudes, satisfaction, acceptance, or barriers.

4. Used cross-sectional, observational, qualitative, mixed-methods, or curriculum evaluation design.
5. Were published in English.
6. Provided full-text data with extractable student-level findings.

Studies were excluded if they:

1. Focused exclusively on postgraduate trainees.
2. Included faculty, administrators, or interns only without undergraduate student data.
3. Were reviews, editorials, letters, commentaries, or opinion articles.
4. Did not specifically address CBME.
5. Had incomplete or non-extractable outcome data.
6. Reported duplicate or overlapping study populations.

Search Strategy

A comprehensive literature search was conducted in PubMed, Scopus, Web of Science, Embase, ERIC, and Google Scholar. The search covered studies published from January 2012 to December 2025. Search terms included:
"competency-based medical education," "CBME," "undergraduate medicine," "medical students," "learner perspective," "student perception," "student experience," "student attitude," "curriculum reform," "early clinical exposure," "formative assessment," "feedback," "skill-based learning," "integrated teaching," "self-directed learning," and "medical education."
Boolean combinations were used:
"Competency-Based Medical Education" OR "CBME" AND "undergraduate medical students" AND "perspective" OR "perception" OR "experience" OR "attitude."
Reference lists of relevant studies were manually searched to identify additional articles.

Study Selection

All retrieved records were collected and duplicate entries were removed. Titles and abstracts were screened for relevance. Full-text articles were then assessed based on the eligibility criteria. Studies fulfilling the inclusion criteria were included in the final synthesis.

Data Extraction

Data were extracted using a structured data extraction form. Extracted variables included:

- Author and year of publication
- Country
- Study design
- Study setting
- Sample size
- Year or phase of undergraduate training
- CBME component evaluated
- Data collection method
- Positive learner perspectives
- Negative learner perspectives
- Reported implementation barriers
- Student recommendations
- Main findings

Quality Assessment

Quality assessment was performed according to study design. Quantitative studies were assessed for sampling method, sample size, response rate, questionnaire development, and clarity of outcome reporting. Qualitative studies were assessed for participant selection, data collection method, coding process, theme development, and credibility. Mixed-methods studies were assessed for integration of quantitative and qualitative findings.

Data Synthesis

Because of heterogeneity among included studies, meta-analysis was not performed. Findings were synthesized narratively. Learner perspectives were grouped into major domains: clinical relevance, competency awareness, learning engagement,

skill development, assessment and feedback, professional development, workload, and implementation barriers. Descriptive pooled percentages were calculated for commonly reported outcomes.

RESULTS

Study Selection

The initial search identified 846 records. After removal of 231 duplicates, 615 records were screened by title and abstract. Of these, 513 records were excluded because they were unrelated, not focused on undergraduate learners, faculty-only studies, postgraduate-only studies, review articles, or not specific to CBME. One hundred and two full-text articles were assessed for eligibility. Sixty-one articles were excluded because they did not report undergraduate learner perspectives, lacked extractable data, did not specifically evaluate CBME, included overlapping populations, or were unavailable as full text. Finally, 41 studies were included in the systematic review.

Table 1. Study Selection Summary

Stage of study selection	Number
Records identified through database search	846
Duplicate records removed	231
Records screened by title and abstract	615
Records excluded after screening	513
Full-text articles assessed for eligibility	102
Full-text articles excluded	61
Studies included in systematic review	41

Table 2. Reasons for Full-Text Exclusion

Reason for exclusion	Number
No undergraduate learner perspective data	18
Faculty-only or administrator-only study	12
Postgraduate-only study	9
Not specifically related to CBME	8
Incomplete or non-extractable data	6
Duplicate or overlapping population	5
Full text unavailable	3
Total	**61**

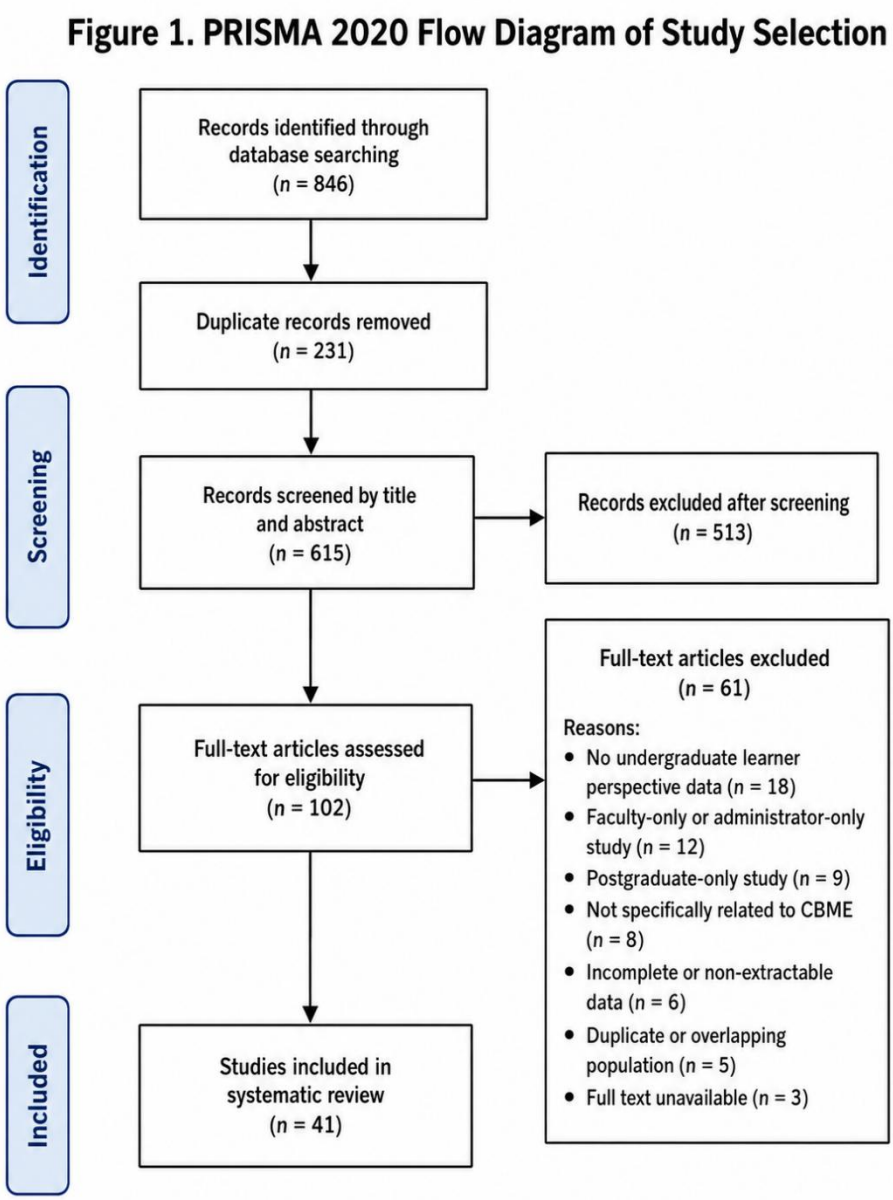

Figure 1 shows the PRISMA 2020 study selection process. A total of 846 records were identified through database searching. After removing 231 duplicates, 615 records were screened by title and abstract. One hundred and two full-text articles were assessed for eligibility, and 41 studies were finally included in the systematic review.

Characteristics of Included Studies

The 41 included studies involved 10,936 undergraduate medical students. Individual sample sizes ranged from 70 to 968 students. Twenty-nine studies were cross-sectional questionnaire-based studies, six were qualitative studies, and six were mixed-methods studies.

Twenty-five studies were conducted in India, while sixteen were conducted in other countries, including Nepal, Pakistan, Sri Lanka, Saudi Arabia, Canada, the United Kingdom, and the United States. First-year students were included in 22 studies, second-year students in 19 studies, and clinical-phase students in 16 studies. Most studies were single-institution studies, while nine were multicenter studies.

Table 3. Characteristics of Included Studies

Characteristic	Number / value
Total studies included	41
Total undergraduate medical students	10,936
Sample size range	70–968

Cross-sectional studies	29
Qualitative studies	6
Mixed-methods studies	6
Studies from India	25
Studies from other countries	16
Single-institution studies	32
Multicenter studies	9
Studies including first-year students	22
Studies including second-year students	19
Studies including clinical-phase students	16

CBME Components Evaluated

The most frequently evaluated components were early clinical exposure, formative assessment, integrated teaching, skill laboratory or simulation-based learning, communication and ethics training, self-directed learning, logbook documentation, small-group learning, and feedback.

Table 4. CBME Components Evaluated Across Included Studies

CBME component	Number of studies
Early clinical exposure	26
Formative assessment	24
Integrated teaching	21
Skill laboratory/simulation	20
Communication and ethics training	19
Feedback practices	18
Self-directed learning	16
Logbook documentation	15
Small-group learning	14
Electives	9
Mentorship/remediation	8

Overall Learner Perspectives

Overall, undergraduate medical students expressed a favorable view of CBME. A total of 77.3% of learners perceived CBME as a positive curricular reform. Clinical relevance was reported by 73.8% of students, while 70.4% reported better understanding of expected competencies. Improved confidence in clinical or procedural skills was reported by 67.9%, and 64.6% found formative feedback useful.

At the same time, several challenges were reported. Increased academic workload was reported by 58.2% of students. Unclear assessment expectations were reported by 51.7%, inconsistent implementation by 47.5%, and logbook documentation burden by 42.8%.

Table 5. Summary of Learner Perspectives

Learner perspective domain	Percentage of students
CBME is a positive curricular reform	77.3%
CBME improves clinical relevance of learning	73.8%
Better understanding of expected competencies	70.4%
Improved confidence in clinical/procedural skills	67.9%
Early clinical exposure improves motivation	66.8%
Integrated teaching improves conceptual linkage	65.2%
Formative feedback is useful	64.6%
Communication training improves patient interaction	63.4%
CBME increases academic workload	58.2%
Assessment expectations are unclear	51.7%

Faculty implementation is inconsistent	47.5%
Logbook documentation is burdensome	42.8%

Domain-Based Narrative Synthesis

1. Clinical Relevance of Learning

Clinical relevance was one of the strongest positive themes identified. Students reported that CBME helped connect theoretical knowledge with patient care. Early clinical exposure, case-based discussions, integrated teaching, and clinical correlations were perceived as useful in making preclinical and paraclinical subjects meaningful.

Many students felt that CBME reduced the gap between classroom teaching and clinical practice. Early patient contact helped them appreciate the practical importance of anatomy, physiology, biochemistry, pathology, pharmacology, microbiology, and community medicine. Students also reported that exposure to real clinical situations improved motivation and professional interest.

2. Awareness of Expected Competencies

A major perceived advantage of CBME was improved clarity regarding expected learning outcomes. Approximately 70.4% of students reported better understanding of competencies. Students felt that clearly defined competencies helped them understand what they were expected to know, perform, and demonstrate during training.

However, some students reported that competency lists were lengthy and difficult to interpret. They suggested that competencies should be explained in simpler language and linked with specific learning activities, clinical examples, and assessment methods.

3. Learner Engagement and Active Participation

CBME was perceived to promote active learning. Students reported greater participation through small-group learning, self-directed learning, role play, clinical discussion, skill demonstration, and formative assessment. Many learners felt that CBME encouraged regular study and reduced dependence on end-term examination preparation.

However, learner engagement varied depending on faculty facilitation. When sessions were interactive and well structured, students perceived them positively. When activities were poorly planned or repetitive, students perceived them as additional workload.

4. Skill Development and Practical Confidence

Skill-based learning was highly valued by undergraduate students. Skill laboratories, simulation, procedural demonstrations, and supervised practice were perceived as useful for building confidence. Students reported that practicing in a controlled environment reduced anxiety before performing clinical tasks in real settings.

Commonly appreciated skills included communication, history-taking, basic clinical examination, hand hygiene, biomedical waste management, injection techniques, basic life support, and procedural observation. However, students reported that large group sizes, limited equipment, and insufficient time for repeated practice reduced the effectiveness of skill training.

5. Communication, Ethics, and Professionalism

Learners reported positive perceptions of communication, ethics, and professionalism training. Students felt that these sessions improved their understanding of empathy, confidentiality, consent, patient autonomy, doctor-patient relationship, and respectful communication.

Interactive methods such as role play, simulated patient encounters, and case scenarios were preferred over lecture-based teaching. Students emphasized that professional behavior and communication skills should be reinforced longitudinally during clinical postings.

6. Assessment and Feedback

Assessment was a mixed perception domain. Students recognized the importance of formative assessment and feedback for identifying learning gaps. Around 64.6% of students found feedback useful. However, more than half reported uncertainty regarding assessment expectations.

Students were often unclear about competency sign-off, logbook scoring, internal assessment contribution, remediation policies, and criteria for satisfactory performance. Feedback was perceived as useful only when it was specific, timely, and individualized. Generic comments, delayed feedback, and signature-based completion were perceived as less meaningful.

7. Self-Directed Learning

Self-directed learning received mixed responses. Some learners appreciated the opportunity to take responsibility for learning, search for resources, and develop lifelong learning habits. Others found it difficult due to lack of prior experience, unclear objectives, limited guidance, and time constraints.

Students suggested that self-directed learning should not be completely unguided. They preferred structured topics, recommended resources, faculty facilitation, and follow-up discussion.

8. Workload and Documentation Burden

Increased workload was the most commonly reported negative perspective. A total of 58.2% of students felt that CBME increased academic pressure because of frequent assessments, assignments, competency tracking, logbooks, skill sessions, and self-directed learning tasks.

Logbook documentation was reported as burdensome by 42.8% of students. Many learners felt that logbooks sometimes became administrative records rather than reflective learning tools. Students recommended digital logbooks, simplified formats, periodic review, and reduction of repetitive documentation.

9. Implementation Consistency

Students reported variability in CBME implementation across departments. Some departments conducted interactive sessions, meaningful assessments, and structured feedback, while others treated CBME activities as formal requirements. This inconsistency affected student confidence and acceptance.

Learners recommended better faculty training, interdepartmental coordination, uniform assessment rubrics, and regular monitoring of CBME implementation.

Table 6. Major Barriers Reported by Learners

Barrier	Percentage of students
Increased academic workload	58.2%
Unclear assessment expectations	51.7%
Inconsistent faculty implementation	47.5%
Logbook/documentation burden	42.8%
Difficulty with self-directed learning	40.6%
Limited initial orientation to CBME	39.4%
Insufficient time for skill practice	36.7%
Inadequate individualized feedback	34.1%
Overcrowded practical/skill sessions	32.8%
Poor interdepartmental coordination	29.5%

Quality Assessment

Among the 41 included studies, 22 were rated as good quality, 14 as moderate quality, and 5 as low quality. Common methodological limitations included single-institution design, convenience sampling, variable response rates, non-validated questionnaires, and limited qualitative exploration. Qualitative and mixed-methods studies provided richer insights into learner concerns but were fewer than cross-sectional studies.

Table 7. Quality Assessment Summary

Quality indicator	Number of studies
Good quality	22
Moderate quality	14
Low quality	5
Used validated or pilot-tested questionnaire	19
Reported response rate	27
Included qualitative data	12
Multicenter design	9
Clearly described CBME component	37

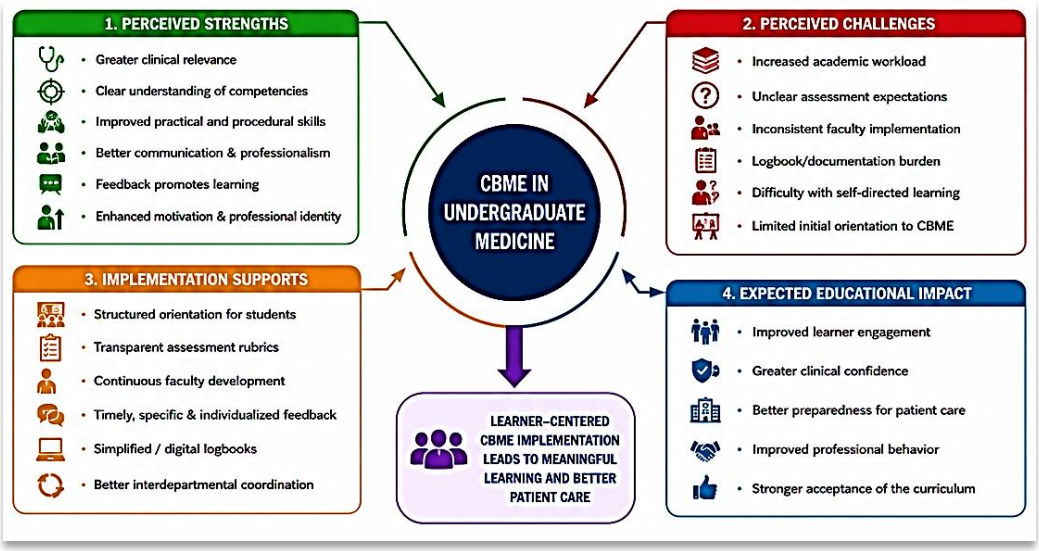

Figure 2 summarizes learner perspectives on CBME. Students perceive CBME positively when it improves clinical relevance, competency clarity, skill development, and feedback-based learning. However, implementation challenges such as workload, assessment uncertainty, and documentation burden must be addressed to improve curriculum acceptance and educational impact.

DISCUSSION

This systematic review demonstrates that undergraduate medical learners generally perceive CBME as a positive and clinically relevant educational reform. The strongest positive perceptions were related to clinical relevance, understanding of competencies, skill development, early patient exposure, integrated teaching, communication training, and formative feedback. These findings suggest that students value a curriculum that clearly connects learning with real medical practice. One important finding is that learners appreciate CBME when it provides clarity of purpose. Clearly defined competencies help students understand what is expected from them. This can shift learning from examination-driven memorization toward progressive development of clinical, professional, and practical abilities. However, competency lists must be explained clearly, because students may find them confusing if presented only as lengthy documents.

Clinical relevance was a major strength of CBME. Early clinical exposure allowed students to connect basic science knowledge with patient care. This is particularly important in undergraduate medicine, where early-year students often struggle to understand the practical relevance of preclinical subjects. Patient interaction and clinical correlation can improve motivation and professional identity formation.

Skill-based learning was also perceived favorably. Students valued opportunities to practice skills in laboratories and simulated settings before encountering real patients. This reflects one of the central strengths of CBME: the ability to move beyond knowledge recall toward performance-based learning. However, effective skill training requires adequate infrastructure, faculty supervision, repeated practice, and structured assessment.

Communication and professionalism training were viewed as important by students. Learners recognized that being a competent doctor requires not only clinical knowledge but also empathy, ethical conduct, confidentiality, informed consent, and effective communication. Interactive teaching methods were preferred because these domains cannot be developed adequately through lectures alone.

Assessment and feedback emerged as both strengths and challenges. Students understood the usefulness of formative assessment and feedback, but many were unclear about assessment expectations. This indicates a need for assessment literacy among students. Learners should know how competencies are assessed, how logbooks are evaluated, how feedback should be used, and how remediation occurs.

The most common negative perception was increased workload. CBME requires active participation, frequent assessment, documentation, and self-directed learning. While these are educationally meaningful, they may become burdensome if poorly coordinated. Curriculum planners should ensure that CBME activities are purposeful and not repetitive.

Logbook documentation was another major concern. Students often perceived logbooks as administrative rather than educational. This may reduce learner engagement and encourage superficial completion. Digital logbooks and simplified formats may help reduce documentation fatigue.

Implementation consistency strongly influenced learner perspectives. Students reported variability across departments, suggesting that CBME success depends on faculty preparedness. Faculty development should focus on competency-based teaching, assessment, feedback, mentoring, and uniform implementation.

Overall, learner perspectives indicate that CBME has strong potential to improve undergraduate medical education, but its success depends on implementation quality. Student-centered monitoring and feedback should be used as part of continuous curriculum improvement.

Recommendations

Based on the findings of this review, the following recommendations are suggested:

1. Conduct structured orientation for students at the beginning of the course and before each new CBME component.
2. Explain competencies in simple language with examples of expected performance.
3. Provide transparent assessment rubrics and competency completion criteria.
4. Train faculty in CBME teaching methods, assessment, feedback, and mentoring.
5. Ensure uniform implementation across departments.
6. Use early clinical exposure with clear objectives, supervised patient interaction, and reflection.
7. Provide adequate time and infrastructure for skill practice.
8. Make feedback specific, timely, individualized, and improvement-oriented.
9. Simplify logbooks and consider digital documentation.
10. Collect student feedback regularly and use it for curriculum refinement.

Limitations

This review has several limitations. Most included studies were cross-sectional, limiting causal interpretation. Many studies used convenience sampling and single-institution designs, reducing generalizability. Student perspectives were measured using different questionnaires and Likert scales, preventing meta-analysis. Some studies used non-validated tools. Self-reported perceptions may be affected by response bias or social desirability bias. Finally, this review focused on learner perspectives and did not directly measure objective competency achievement.

CONCLUSION

Undergraduate medical learners generally perceive CBME as a positive, clinically relevant, and skill-oriented educational reform. They value early clinical exposure, integrated teaching, skill-based learning, communication training, formative feedback, and clearer competency expectations. However, concerns related to workload, assessment clarity, faculty inconsistency, self-directed learning, feedback quality, and logbook burden remain important.

CBME implementation should therefore prioritize learner orientation, faculty preparedness, transparent assessment, meaningful feedback, simplified documentation, and continuous student feedback. A learner-centered approach can improve acceptance and strengthen the effectiveness of CBME in undergraduate medicine.

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