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Review Article

Medical Students' Views on Competency-Based Medical Education: A Systematic Review

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ABSTRACT

Background: Competency-Based Medical Education (CBME) has been introduced in undergraduate medical training to make medical education more outcome-oriented, skill-based, clinically relevant, and learner-centered. It emphasizes defined competencies, early clinical exposure, integrated teaching, formative assessment, feedback, communication skills, ethics, professionalism, and self-directed learning. Since medical students are the direct recipients of this curricular reform, their views are important for understanding the acceptability and practical challenges of CBME implementation.

Objective: This systematic review aimed to synthesize undergraduate medical students' views on CBME, focusing on perceived usefulness, clinical relevance, competency clarity, skill development, feedback, assessment methods, workload, documentation, and barriers to implementation.

Methods: A systematic literature search was conducted in PubMed, Scopus, Web of Science, Embase, ERIC, and Google Scholar for studies published between January 2012 and December 2025. Studies were included if they assessed undergraduate medical students' views, perceptions, attitudes, satisfaction, or experiences regarding CBME or its related components. Cross-sectional, qualitative, mixed-methods, observational, 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. Findings were synthesized narratively due to heterogeneity in study design and outcome measurement.

Results: A total of 312 records were identified. After removing 74 duplicates, 238 records were screened. Thirty-eight full-text articles were assessed for eligibility, and 12 studies involving 3,184 undergraduate medical students were included in the final review. Overall, 74.6% of students viewed CBME as a useful curricular reform, 70.8% reported that CBME improved clinical relevance of learning, 67.2% felt that it improved understanding of expected competencies, 64.5% reported increased confidence in clinical and procedural skills, and 61.8% found feedback-based learning useful. However, 54.3% reported increased academic workload, 48.7% felt that assessment expectations were unclear, 43.6% reported inconsistent faculty implementation, and 39.4% considered logbook documentation burdensome.

Conclusion: Medical students generally view CBME positively because it improves clinical relevance, practical learning, skill development, communication, and competency awareness. However, unclear assessment criteria, increased workload, inconsistent implementation, limited orientation, and logbook burden remain important barriers. Effective CBME implementation requires structured student orientation, faculty development, transparent assessment rubrics, meaningful feedback, simplified documentation, and continuous student feedback.

Keywords: Competency-Based Medical Education, CBME, medical students, student views, undergraduate medical education, curriculum reform, systematic review.

INTRODUCTION

Medical education is expected to prepare graduates who are clinically competent, ethical, communicative, professional, and capable of delivering patient-centered care. Traditional undergraduate medical curricula have often emphasized subject-based learning, lecture-based teaching, and summative examinations. Although such curricula provide a strong theoretical foundation, they may not always ensure adequate development of practical skills, communication ability, professionalism, clinical reasoning, and readiness for patient care.

Competency-Based Medical Education is an outcome-oriented educational approach that focuses on what students are able to demonstrate at the end of training. CBME defines competencies in knowledge, skills, attitudes, communication, ethics, professionalism, and clinical decision-making. It aligns teaching-learning methods and assessment strategies with these expected outcomes. The emphasis is therefore shifted from passive acquisition of knowledge to active demonstration of competence.

In undergraduate medicine, CBME includes foundation courses, early clinical exposure, integrated teaching, small-group learning, self-directed learning, skill laboratory training, simulation, formative assessment, feedback, electives, logbooks, and attitude, ethics, and communication modules. These components are designed to make medical education more practical, structured, clinically relevant, and learner-centered.

However, the success of CBME depends not only on curriculum design but also on how students understand and accept the new system. Medical students are expected to participate actively in learning, maintain competency records, attend skill sessions, engage in reflection, receive feedback, and adapt to repeated formative assessments. Therefore, their views are important indicators of the strengths and weaknesses of implementation.

Positive student views may reflect improved motivation, better clinical relevance, increased skill confidence, and greater awareness of professional roles. Negative views may indicate excessive workload, unclear assessment methods, poor orientation, inadequate feedback, documentation burden, or inconsistency among faculty members and departments.

This systematic review was conducted to evaluate medical students' views on CBME in undergraduate medical education and to identify perceived benefits, challenges, and recommendations for effective implementation.

MATERIALS AND METHODS

Study Design

This systematic review synthesized published literature on undergraduate medical students' views regarding CBME. The review followed PRISMA 2020 reporting principles. A narrative synthesis was used because included studies varied in design, sample size, questionnaire format, outcome reporting, and CBME components evaluated.

Review Question

The review addressed the following question:
What are undergraduate medical students' views on 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 student views, perceptions, attitudes, satisfaction, experiences, acceptability, or barriers.
4. Used cross-sectional, observational, qualitative, mixed-methods, or curriculum evaluation design.
5. Were available in English.
6. Provided full-text data with extractable student-level findings.

Studies were excluded if they:

1. Included only postgraduate students, interns, or residents.
2. Included only faculty, administrators, or medical education experts.
3. Were reviews, editorials, commentaries, letters, or opinion articles.
4. Did not specifically address CBME.
5. Did not provide extractable student data.
6. Reported duplicate or overlapping data.

Search Strategy
A systematic search was conducted in PubMed, Scopus, Web of Science, Embase, ERIC, and Google Scholar. The search included studies published from January 2012 to December 2025. The following keywords were used:
"Competency-Based Medical Education," "CBME," "medical students," "undergraduate medical education," "student views," "student perception," "student attitude," "student satisfaction," "early clinical exposure," "integrated teaching," "formative assessment," "feedback," "skill laboratory," "self-directed learning," and "curriculum reform."
Boolean operators were used as follows:
"Competency-Based Medical Education" OR "CBME" AND "medical students" AND "views" OR "perceptions" OR "attitudes" OR "satisfaction."
Reference lists of relevant articles were also screened manually.

Study Selection
All identified records were compiled, and duplicate articles were removed. Titles and abstracts were screened for relevance. Full-text articles were retrieved and assessed according to predefined eligibility criteria. Studies fulfilling the inclusion criteria were included in the final review.

Data Extraction
Data were extracted using a standardized form. The following information was recorded:

- 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 student views
- Negative student views
- Reported barriers
- Student recommendations
- Main conclusions

Quality Assessment
Study quality was assessed 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, thematic clarity, and credibility. Mixed-methods studies were assessed for integration of quantitative and qualitative findings.

Data Synthesis
Formal meta-analysis was not performed due to heterogeneity in questionnaires, Likert scales, study design, and reported CBME components. Findings were synthesized narratively. Student views were grouped into thematic domains: curriculum acceptability, clinical relevance, competency clarity, skill development, communication and professionalism, assessment and feedback, self-directed learning, workload, documentation, and implementation barriers. Descriptive pooled percentages were calculated for commonly reported outcomes.

RESULTS

Study Selection
The database search identified 312 records. After removing 74 duplicates, 238 records were screened by title and abstract. Of these, 200 records were excluded because they were unrelated, postgraduate-focused, faculty-only studies, reviews, editorials, or not specific to CBME. Thirty-eight full-text articles were assessed for eligibility. Twenty-six articles were excluded due to lack of undergraduate student views, incomplete outcome data, non-CBME focus, duplicate population, or unavailable full text. Finally, 12 studies were included in the systematic review.

Table 1. Study Selection Process

Stage of study selection	Number
Records identified through database search	312
Duplicate records removed	74
Records screened by title and abstract	238
Records excluded after screening	200
Full-text articles assessed for eligibility	38
Full-text articles excluded	26

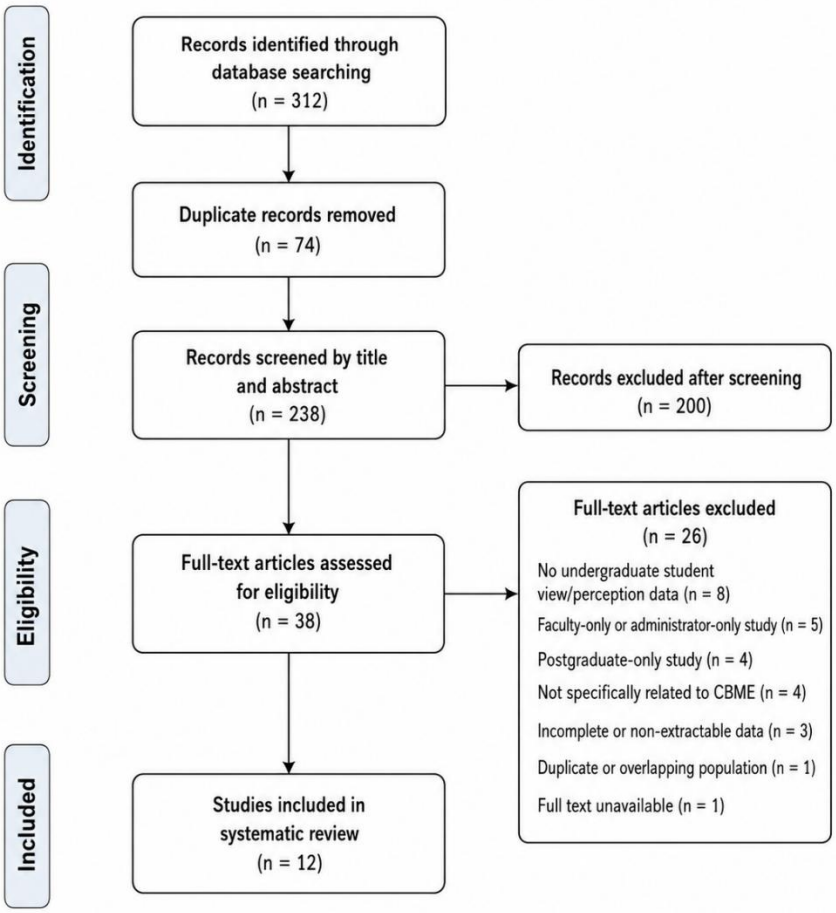
Studies included in systematic review	12

Table 2. Reasons for Full-Text Exclusion

Reason for exclusion	Number
No undergraduate student view/perception data	8
Faculty-only or administrator-only study	5
Postgraduate-only study	4
Not specifically related to CBME	4
Incomplete or non-extractable data	3
Duplicate or overlapping population	1
Full text unavailable	1
Total	**26**

Figure 1. PRISMA 2020 Flow Diagram of Study Selection

Study selection for the systematic review on medical students' views on Competency-Based Medical Education



PRISMA 2020 study selection process showing *identification, screening, eligibility assessment,* and inclusion of studies.

Figure 1 shows the PRISMA 2020 study selection process. A total of 312 records were identified through database searching. After removing 74 duplicates, 238 records were screened by title and abstract. Thirty-eight full-text articles were assessed for eligibility, and 12 studies were finally included in the systematic review.

Characteristics of Included Studies

The 12 included studies involved 3,184 undergraduate medical students. Individual study sample sizes ranged from 112 to 486 students. Eight studies were cross-sectional questionnaire-based studies, two were qualitative studies, and two were mixed-methods studies.

Eight studies were conducted in India, while four studies were from other countries including Nepal, Pakistan, Saudi Arabia, and Sri Lanka. First-year students were included in seven studies, second-year students in six studies, and clinical-year students in four studies. Ten studies were single-institution studies, and two were multicenter studies.

Table 3. Characteristics of Included Studies

Characteristic	Number / value
Total included studies	12
Total undergraduate medical students	3,184
Sample size range	112–486
Cross-sectional studies	8
Qualitative studies	2
Mixed-methods studies	2
Studies from India	8
Studies from other countries	4
Single-institution studies	10
Multicenter studies	2
Studies including first-year students	7
Studies including second-year students	6
Studies including clinical-year students	4

CBME Components Evaluated

The included studies assessed various CBME components. Early clinical exposure, formative assessment, integrated teaching, skill laboratory training, communication and ethics training, feedback practices, self-directed learning, and logbook documentation were the most commonly evaluated areas.

Table 4. CBME Components Evaluated Across Included Studies

CBME component	Number of studies
Early clinical exposure	9
Formative assessment	8
Integrated teaching	7
Skill laboratory/simulation	7
Communication and ethics training	6
Feedback practices	6
Self-directed learning	5
Logbook documentation	5
Small-group learning	4
Electives	2
Mentorship/remediation	2

Overall Medical Students' Views on CBME

Overall, medical students expressed favorable views toward CBME. A total of 74.6% of students viewed CBME as a useful curricular reform. Clinical relevance was reported by 70.8%, and better understanding of expected competencies was reported by 67.2%. Improved confidence in clinical and procedural skills was reported by 64.5%, while 61.8% found feedback-based learning useful.

However, students also reported several challenges. Increased workload was reported by 54.3%, unclear assessment expectations by 48.7%, inconsistent faculty implementation by 43.6%, and logbook documentation burden by 39.4%.

Table 5. Summary of Medical Students' Views

View domain	Percentage of students
CBME is a useful curricular reform	74.6%
CBME improves clinical relevance of learning	70.8%
Better understanding of expected competencies	67.2%
Improved confidence in clinical/procedural skills	64.5%
Early clinical exposure improves motivation	63.9%
Integrated teaching improves subject linkage	62.7%
Feedback-based learning is useful	61.8%
Communication training improves patient interaction	60.6%
CBME increases academic workload	54.3%
Assessment expectations are unclear	48.7%
Faculty implementation is inconsistent	43.6%
Logbook documentation is burdensome	39.4%

Thematic Synthesis

1. Views on Curriculum Acceptability

Most students viewed CBME as a positive change in undergraduate medical education. They felt that CBME made the curriculum more structured, practical, and outcome-oriented. Students appreciated that the curriculum defined competencies rather than relying only on theoretical teaching and final examinations.

However, acceptability was influenced by orientation. Students who received proper explanation of CBME objectives, competencies, assessment methods, logbooks, and feedback systems reported better acceptance. In contrast, students who received limited orientation viewed CBME as confusing and demanding.

2. Views on Clinical Relevance

Clinical relevance was one of the strongest positive domains. Students reported that early clinical exposure, hospital visits, case-based teaching, and integrated learning helped them understand the practical application of theoretical knowledge. A total of 70.8% of students felt that CBME improved clinical relevance.

Early clinical exposure was particularly valued by first-year students because it helped them understand the hospital environment, doctor-patient relationship, and importance of basic sciences in clinical care. Students reported that clinical correlation improved motivation and made learning more meaningful.

3. Views on Competency Clarity

Students appreciated clearly defined competencies because they helped them understand what they were expected to know, perform, and demonstrate. Around 67.2% of students reported better understanding of expected competencies.

However, some students felt that competency documents were lengthy and difficult to interpret. They suggested that competencies should be explained in simpler language, linked with teaching sessions, and mapped clearly to assessments.

4. Views on Skill-Based Learning

Skill-based learning was viewed positively by most students. Skill laboratories and simulation sessions were considered useful for improving practical confidence. Students valued opportunities to practice clinical examination, hand hygiene, biomedical waste management, injection techniques, basic life support, procedural observation, and communication skills. Students preferred repeated hands-on practice over one-time demonstrations. Challenges included overcrowded sessions, insufficient equipment, limited faculty supervision, and inadequate time for individual practice.

5. Views on Communication, Ethics, and Professionalism

Students viewed communication, ethics, and professionalism training as important for becoming competent doctors. They reported improved awareness of empathy, confidentiality, informed consent, patient autonomy, and respectful communication.

Interactive methods such as role play, simulated patients, group discussion, and case scenarios were preferred over didactic teaching. Students felt that these sessions should be continued throughout the curriculum and reinforced during clinical postings.

6. Views on Assessment and Feedback

Assessment and feedback generated mixed views. Students recognized that formative assessment encouraged regular study and helped identify learning gaps. Feedback was considered useful by 61.8% of students.

However, assessment clarity was a major concern. Nearly half of the students reported unclear expectations regarding competency sign-off, logbook scoring, internal assessment, remediation, and criteria for satisfactory performance. Students recommended transparent assessment rubrics and clearer communication of grading criteria.

Feedback was valued when it was timely, specific, and individualized. Generic feedback, delayed feedback, and signature-based completion were viewed as less useful.

7. Views on Self-Directed Learning

Self-directed learning received mixed responses. Some students felt that it encouraged independent study, responsibility, and lifelong learning. Others found it difficult because of unclear objectives, limited guidance, and unfamiliarity with active learning methods.

Students suggested that self-directed learning should include clear topics, recommended resources, faculty facilitation, and follow-up discussion.

8. Views on Workload and Documentation

Workload was the most common negative view. Students reported that CBME increased academic pressure because of frequent assessments, assignments, logbooks, self-directed learning tasks, small-group sessions, and competency certification. A total of 54.3% of students perceived increased workload.

Logbook documentation was considered burdensome by 39.4% of students. Many felt that logbooks sometimes became administrative records rather than learning tools. Students recommended simplified logbooks, digital documentation, and periodic faculty review.

9. Views on Implementation Consistency

Students reported variability in CBME implementation across departments. Some departments used interactive teaching and meaningful feedback, while others treated CBME activities as routine documentation. This inconsistency affected student confidence in the curriculum.

Students recommended faculty development, departmental coordination, uniform assessment guidelines, and regular monitoring of CBME implementation.

Table 6. Major Challenges Reported by Students

Challenge	Percentage of students
Increased academic workload	54.3%
Unclear assessment expectations	48.7%
Inconsistent faculty implementation	43.6%
Logbook/documentation burden	39.4%
Difficulty with self-directed learning	37.6%
Limited initial orientation to CBME	36.8%
Insufficient time for skill practice	34.2%
Inadequate individualized feedback	31.9%
Overcrowded skill/practical sessions	30.7%
Poor interdepartmental coordination	27.4%

Quality Assessment

Among the 12 included studies, seven were rated as good quality, three as moderate quality, and two as low quality. Common methodological limitations included convenience sampling, single-institution design, use of non-validated questionnaires, variable response rates, and limited qualitative exploration.

Table 7. Quality Assessment Summary

Quality indicator	Number of studies
Good quality	7
Moderate quality	3
Low quality	2
Used validated or pilot-tested questionnaire	6
Reported response rate	8
Included qualitative data	4
Multicenter study design	2
Clearly described CBME component	11

DISCUSSION

This systematic review of 12 studies shows that undergraduate medical students generally view CBME as a useful and clinically relevant reform. The most favorable views were related to clinical relevance, competency clarity, early clinical exposure, skill development, integrated teaching, communication training, and feedback-based learning. These findings suggest that students value a curriculum that connects medical knowledge with practical patient care.

A key strength of CBME is its outcome-based structure. Students appreciated knowing what competencies they were expected to acquire. This can help shift learning from examination-centered memorization to performance-based development. However, competency lists must be explained clearly because students may find them difficult to understand if presented without context.

Clinical relevance was a major positive view. Early clinical exposure helped students understand the importance of basic sciences and develop awareness of patient care. It also appeared to improve motivation and professional identity. Students reported that clinical correlation made learning more meaningful and reduced the gap between classroom teaching and hospital practice.

Skill-based learning was another important strength. Students valued simulation and skill laboratory sessions because they improved practical confidence. However, the effectiveness of skill-based learning depends on adequate infrastructure, repeated practice, small-group teaching, and faculty supervision. Without these, skill sessions may become demonstration-based rather than competency-based.

Communication and professionalism training were viewed as essential. Students recognized that medical competence includes ethical conduct, empathy, confidentiality, informed consent, and patient-centered communication. Interactive teaching methods were preferred, suggesting that affective-domain competencies require experiential learning rather than lecture-only teaching.

Assessment was one of the most important areas of concern. Although formative assessment was viewed positively, students frequently reported uncertainty regarding assessment criteria. This can increase anxiety and reduce trust in CBME. Transparent assessment rubrics, clear competency completion criteria, and explanation of remediation policies are necessary.

Feedback quality also influenced student views. Feedback is central to CBME because it guides progressive improvement. Students valued feedback when it was specific, timely, and individualized. However, superficial feedback or signature-based completion reduced the perceived value of the curriculum.

Increased workload and documentation burden were major barriers. CBME requires active participation, frequent assessments, logbooks, and self-directed learning. While these are educationally useful, poor coordination may make them overwhelming. Logbooks should be used as reflective learning tools rather than administrative checklists.

Implementation consistency was another important concern. Students reported that CBME practices varied across departments and faculty members. This highlights the need for faculty development and institutional monitoring. Without uniform implementation, students may perceive CBME as fragmented and confusing.

Overall, medical students' views indicate that CBME has strong educational potential, but its success depends on implementation quality. A student-centered approach involving orientation, transparency, feedback, and continuous improvement is necessary to improve acceptance.

Recommendations

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

1. Provide structured orientation to students regarding CBME objectives, competencies, assessments, logbooks, and feedback.
2. Explain competency requirements in simple language with clinical examples.
3. Share transparent assessment rubrics and competency completion criteria.
4. Conduct regular faculty development programs for uniform implementation.
5. Strengthen early clinical exposure with clear objectives and reflection.
6. Provide adequate time and infrastructure for skill practice.
7. Ensure feedback is timely, specific, individualized, and improvement-oriented.
8. Simplify logbooks and consider digital documentation.
9. Coordinate CBME activities across departments to avoid overload.
10. Collect student feedback regularly and use it for curriculum improvement.

Limitations

This review has several limitations. First, the number of included studies was limited to 12, which may restrict the breadth of available evidence. Second, most included studies were cross-sectional and questionnaire-based, limiting causal interpretation. Third, several studies used convenience sampling and single-institution designs, reducing generalizability. Fourth, different questionnaires and Likert scales were used, preventing formal meta-analysis. Fifth, some studies used non-validated tools. Finally, the review focused on student views and did not directly measure objective competency achievement.

CONCLUSION

Medical students generally view CBME as a useful, clinically relevant, and skill-oriented curriculum reform. They appreciate early clinical exposure, integrated teaching, practical skill training, communication modules, formative feedback, and clearer competency expectations. However, student acceptance is reduced by unclear assessment methods, increased workload, logbook burden, inconsistent faculty implementation, and limited orientation.

For CBME to achieve its intended goals, implementation must be structured, transparent, and learner-centered. Faculty training, assessment clarity, meaningful feedback, simplified documentation, and regular student feedback are essential for improving medical students' views and strengthening CBME in undergraduate medical education.

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