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Review Article

Competency-Based Medical Education in Undergraduate Medicine: A Review of Student Perceptions

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ABSTRACT

Background: Competency-Based Medical Education (CBME) has changed the structure of undergraduate medical training by shifting the focus from content delivery and time-bound progression to demonstrable competence, clinical reasoning, communication, professionalism, ethics, and skill acquisition. Although CBME is designed to improve the preparedness of future doctors, its success depends largely on how students understand, accept, and engage with the curriculum. Student perceptions therefore provide important evidence regarding the strengths, limitations, and implementation quality of CBME.

Objective: This review aimed to synthesize undergraduate medical students' perceptions of CBME in relation to curriculum relevance, learning engagement, competency awareness, clinical exposure, skill acquisition, formative assessment, feedback, workload, documentation, and implementation challenges.

Methods: A literature search was conducted in PubMed, Scopus, Web of Science, Embase, ERIC, and Google Scholar for studies published between January 2012 and February 2026. Studies were included if they reported undergraduate medical students' perceptions, views, attitudes, satisfaction, or experiences regarding CBME or CBME-related curricular components. Cross-sectional studies, qualitative studies, mixed-methods studies, and curriculum evaluation studies were eligible. Faculty-only studies, postgraduate-only studies, reviews, editorials, commentaries, and studies without extractable student data were excluded. A narrative synthesis was performed because of heterogeneity in study design, perception tools, and reported outcomes.

Results: A total of 486 records were identified. After removal of 112 duplicates, 374 records were screened. Fifty-five full-text articles were assessed for eligibility, and 21 studies involving 5,864 undergraduate medical students were included. Among the included studies, 14 were cross-sectional surveys, 3 were qualitative studies, and 4 were mixed-methods studies. Overall, 76.2% of students perceived CBME as more relevant to future clinical practice, 72.8% reported improved understanding of expected competencies, 69.5% felt that early clinical exposure improved motivation, 67.1% reported better confidence in practical skills, and 64.4% considered formative feedback useful. However, 57.6% reported increased academic workload, 50.9% expressed uncertainty regarding assessment methods, 45.2% reported variation in faculty implementation, and 42.3% perceived logbook documentation as burdensome.

Conclusion: Undergraduate medical students generally perceive CBME as clinically meaningful, skill-oriented, and useful for professional development. However, implementation-related concerns remain important, particularly assessment ambiguity, workload, inconsistent faculty practices, documentation burden, and insufficient orientation. CBME implementation should be strengthened through

structured student induction, faculty development, transparent assessment rubrics, practical feedback systems, simplified documentation, and periodic student feedback.

Keywords*:* Competency-Based Medical Education, undergraduate medicine, medical students, student perceptions, curriculum reform, formative assessment, medical education.

INTRODUCTION

Medical education is expected to produce graduates who are capable of safe clinical practice, ethical decision-making, effective communication, and lifelong learning. Traditional undergraduate medical education has often been organized around subject-wise teaching, lecture-based instruction, fixed duration of training, and summative examinations. While this model provides theoretical knowledge, it may not always ensure that students develop observable competence in clinical skills, communication, professionalism, and patient-centered care.

Competency-Based Medical Education was introduced to address this gap. CBME is an outcome-oriented approach in which the curriculum is planned around predefined competencies. These competencies describe the knowledge, skills, attitudes, ethical values, communication abilities, and professional behaviors expected of a medical graduate. In CBME, the emphasis is not only on what students are taught but also on what they can demonstrate.

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, attitude, ethics and communication modules, electives, and logbook-based competency documentation. These components are intended to make medical education more clinically relevant, active, structured, and performance-oriented.

However, CBME is not only a curriculum change; it is a change in educational culture. Students are expected to take greater responsibility for learning, participate actively in teaching-learning activities, document competencies, undergo frequent formative assessments, and use feedback for improvement. This transition may be beneficial but can also be challenging if students are not adequately oriented.

Student perceptions are therefore important in evaluating CBME implementation. Positive perceptions may indicate improved motivation, clinical relevance, skill confidence, and professional identity. Negative perceptions may reflect excessive workload, unclear assessment criteria, inadequate feedback, inconsistent implementation, and documentation fatigue.

Several studies have explored student perceptions of CBME, but the findings vary across settings and institutions. This review synthesizes evidence from 21 studies to provide a broader understanding of how undergraduate medical students perceive CBME and what factors influence its acceptance.

MATERIALS AND METHODS

Study Design

This was a narrative review of studies evaluating undergraduate medical students' perceptions of CBME. A systematic search and selection process was followed, and findings were summarized using thematic synthesis. Meta-analysis was not performed because of heterogeneity in questionnaires, Likert scales, study settings, and CBME components assessed.

Review Question

The review was guided by the following question:

How do undergraduate medical students perceive Competency-Based Medical Education, and what benefits and challenges do they report during its implementation?

Eligibility Criteria

Studies were included if they met the following criteria:

1. Included undergraduate medical students as participants.
2. Evaluated CBME or any major CBME-related component.
3. Reported student perceptions, views, experiences, attitudes, satisfaction, or barriers.
4. Used cross-sectional, qualitative, mixed-methods, observational, or curriculum evaluation design.
5. Were published in English.
6. Provided extractable student-level findings.

Studies were excluded if they:

1. Focused only on postgraduate trainees, interns, or residents.
2. Included only faculty or administrators.
3. Were review articles, editorials, letters, commentaries, or opinion papers.

4. Did not specifically address CBME.
5. Did not provide extractable student data.
6. Reported duplicate or overlapping populations.

Search Strategy

A literature search was conducted in PubMed, Scopus, Web of Science, Embase, ERIC, and Google Scholar. Articles published from January 2012 to February 2026 were considered. Search terms included:

"Competency-Based Medical Education," "CBME," "undergraduate medical education," "medical students," "student perception," "student views," "student attitude," "student experience," "early clinical exposure," "integrated teaching," "formative assessment," "feedback," "skill laboratory," "self-directed learning," and "medical curriculum reform."

Boolean combinations included:

"Competency-Based Medical Education" OR "CBME" AND "medical students" AND "perception" OR "views" OR "experience" OR "attitude."

Reference lists of relevant articles were also screened manually.

Study Selection

All identified records were compiled, and duplicate entries were removed. Titles and abstracts were screened to exclude irrelevant articles. Full-text articles were then assessed against the eligibility criteria. Studies fulfilling the criteria were included in the final review.

Data Extraction

Data were extracted using a structured format. The following information was recorded:

- Author and year
- Country
- Study design
- Sample size
- Phase/year of medical students
- CBME component evaluated
- Data collection method
- Positive student perceptions
- Negative student perceptions
- Reported implementation barriers
- Student suggestions
- Main conclusions

Quality Assessment

Quality assessment was performed according to study design. Cross-sectional studies were assessed for sample size, sampling method, response rate, questionnaire validation, and clarity of analysis. Qualitative studies were assessed for participant selection, interview or focus group method, coding process, and thematic reporting. Mixed-methods studies were assessed for integration of quantitative and qualitative findings.

RESULTS

Study Selection

The search identified 486 records. After removal of 112 duplicates, 374 records were screened by title and abstract. Of these, 319 records were excluded because they were unrelated, postgraduate-focused, faculty-only, review articles, editorials, or not specific to CBME. Fifty-five full-text articles were assessed for eligibility. Thirty-four articles were excluded due to lack of undergraduate student perception data, incomplete outcomes, non-CBME focus, duplicate population, or unavailable full text. Finally, 21 studies were included in the review.

Table 1. Study Selection Process

Stage of study selection	Number
Records identified through database search	486
Duplicate records removed	112
Records screened by title and abstract	374
Records excluded after screening	319
Full-text articles assessed for eligibility	55
Full-text articles excluded	34
Studies included in review	21

Table 2. Reasons for Full-Text Exclusion

Reason for exclusion	Number

No undergraduate student perception data	10
Faculty-only or administrator-only study	7
Postgraduate-only study	5
Not specifically related to CBME	5
Incomplete or non-extractable data	4
Duplicate or overlapping population	2
Full text unavailable	1
Total	**34**

Figure 1. PRISMA 2020 Flow Diagram of Study Selection

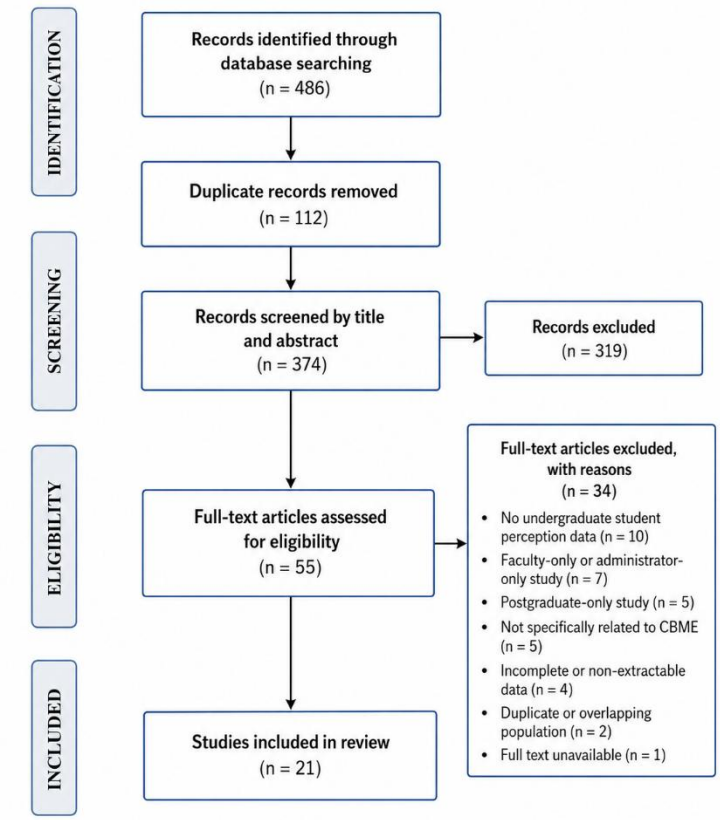

Figure 1 shows the study selection process. A total of 486 records were identified through database searching. After removal of 112 duplicates, 374 records were screened by title and abstract. Fifty-five full-text articles were assessed for eligibility, and 21 studies were finally included in the review.

Characteristics of Included Studies

The 21 included studies involved 5,864 undergraduate medical students. Individual study sample sizes ranged from 96 to 624 students. Fourteen studies were cross-sectional questionnaire-based studies, three were qualitative studies, and four used mixed-methods design.

Fourteen studies were conducted in India, while seven were from other countries, including Nepal, Pakistan, Sri Lanka, Saudi Arabia, Canada, and the United Kingdom. First-year students were included in 12 studies, second-year students in 10 studies, and clinical-phase students in 8 studies. Seventeen studies were single-institution studies, while four were multicenter studies.

Table 3. Characteristics of Included Studies

Characteristic	Number / value
Total included studies	21
Total undergraduate medical students	5,864
Sample size range	96–624
Cross-sectional studies	14
Qualitative studies	3
Mixed-methods studies	4

Studies from India	14
Studies from other countries	7
Single-institution studies	17
Multicenter studies	4
Studies including first-year students	12
Studies including second-year students	10
Studies including clinical-phase students	8

CBME Components Evaluated

The included studies evaluated a range of CBME components. Early clinical exposure was the most commonly assessed component, followed by formative assessment, integrated teaching, skill laboratory training, communication and ethics modules, feedback, self-directed learning, and logbook documentation.

Table 4. CBME Components Evaluated Across Included Studies

CBME component	Number of studies
Early clinical exposure	16
Formative assessment	15
Integrated teaching	14
Skill laboratory/simulation	13
Communication and ethics training	12
Feedback practices	12
Self-directed learning	10
Logbook documentation	9
Small-group learning	8
Electives	4
Mentorship/remediation	4

Overall Student Perceptions

Overall, student perceptions of CBME were favorable, although not uniformly positive. Most students perceived CBME as clinically useful and better aligned with future medical practice. A total of 76.2% of students reported that CBME improved the clinical relevance of learning. Better understanding of expected competencies was reported by 72.8%, and improved motivation through early clinical exposure was reported by 69.5%. Improved confidence in practical skills was reported by 67.1%, while 64.4% found formative feedback useful.

At the same time, students reported important barriers. Increased workload was reported by 57.6%, uncertainty regarding assessment methods by 50.9%, inconsistent faculty implementation by 45.2%, and documentation burden by 42.3%.

Table 5. Summary of Student Perceptions

Perception domain	Percentage of students
CBME improves clinical relevance of learning	76.2%
Better understanding of expected competencies	72.8%
Early clinical exposure improves motivation	69.5%
Improved confidence in practical skills	67.1%
Integrated teaching improves conceptual linkage	65.8%
Formative feedback is useful	64.4%
Communication training improves patient interaction	62.9%
CBME encourages active learning	61.7%
CBME increases academic workload	57.6%
Assessment methods are unclear	50.9%
Faculty implementation is inconsistent	45.2%
Logbook documentation is burdensome	42.3%

Thematic Findings

1. Perception of Clinical Relevance

Clinical relevance was the strongest positive theme. Students reported that CBME helped them understand why medical knowledge is important in patient care. Early clinical exposure, clinical case discussions, hospital visits, and integrated teaching helped students connect basic sciences with clinical practice.

Students in early years particularly appreciated exposure to patients and hospital settings. They reported that it improved motivation and helped them understand the role of a doctor. In several studies, students described CBME as more meaningful than purely lecture-based learning because it connected theory with real-life medical practice.

2. Awareness of Competencies
Students generally appreciated the presence of clearly defined competencies. Competency lists helped them understand what they were expected to learn, perform, and demonstrate. Around 72.8% reported better understanding of expected competencies.

However, some students felt that competency documents were long and difficult to interpret. Students suggested that competencies should be explained using simple language, examples, clinical scenarios, and assessment mapping. They also suggested that each department should clearly explain which competencies are essential, desirable, and certifiable.

3. Early Clinical Exposure
Early clinical exposure was one of the most positively perceived CBME components. Students felt that early patient contact helped them develop interest in medicine and understand the relevance of preclinical subjects. It also helped them observe doctor-patient interaction, hospital functioning, and professional behavior.

However, the usefulness of early clinical exposure depended on session planning. Students reported better learning when sessions had clear objectives, supervised patient interaction, and post-session discussion. Passive observation without structured guidance was perceived as less beneficial.

4. Skill Laboratory and Practical Learning
Skill laboratory and simulation-based sessions were perceived as useful for improving confidence. Students valued opportunities to practice basic clinical examination, hand hygiene, biomedical waste management, injection techniques, basic life support, procedural observation, and communication skills.

Students preferred repeated practice with feedback rather than one-time demonstration. Common concerns included large batch size, limited equipment, inadequate time, and insufficient faculty supervision. Some students felt that competency sign-off sometimes became checklist completion rather than genuine skill assessment.

5. Integrated Teaching
Integrated teaching was perceived as helpful in connecting related concepts across subjects. Students reported that horizontal and vertical integration improved understanding and reduced compartmentalized learning. Case-based integrated sessions were especially valued because they helped students apply knowledge to clinical problems.

However, poor coordination between departments reduced the effectiveness of integrated teaching. Students reported repetition, uneven depth, and lack of clear learning objectives in some sessions.

6. Communication, Ethics, and Professionalism
Students perceived communication and ethics training as important for professional development. They reported improved awareness of empathy, confidentiality, informed consent, respect for patients, patient autonomy, and doctor-patient communication.

Role play, simulated patient encounters, small-group discussion, and case scenarios were preferred over lecture-based sessions. Students suggested that communication and professionalism training should be longitudinal and reinforced during clinical postings.

7. Assessment and Feedback
Assessment and feedback were mixed perception domains. Students recognized the usefulness of formative assessment for regular learning and identifying gaps. Feedback was considered helpful by 64.4% of students when it was specific, timely, and individualized.

However, assessment uncertainty was a major concern. Students were unclear about competency sign-off, internal assessment weightage, logbook scoring, remediation criteria, and performance expectations. Many students recommended transparent rubrics, clear assessment schedules, and better explanation of competency completion criteria.

8. Self-Directed Learning
Self-directed learning was perceived positively by some students because it encouraged independent study, responsibility, and lifelong learning. However, many students found it difficult because they were unfamiliar with self-directed learning methods.

Students suggested that self-directed learning should be guided rather than completely open-ended. Clear topics, recommended resources, faculty facilitation, and post-learning discussion were considered necessary for meaningful learning.

9. Workload and Documentation

Increased workload was the most common negative perception. Students reported that CBME added multiple activities, including assignments, logbooks, self-directed learning tasks, small-group activities, skill sessions, and formative assessments. A total of 57.6% reported increased academic burden.

Logbook documentation was also reported as burdensome. Students felt that logbooks sometimes became administrative tasks rather than learning tools. They recommended simplified formats, digital logbooks, and regular review by mentors.

10. Implementation Consistency

Students reported variation in CBME implementation across departments. Some departments conducted structured teaching, meaningful feedback, and fair assessments, while others focused mainly on documentation. Such variation caused confusion and reduced confidence in the system.

Students suggested that faculty development, departmental coordination, uniform assessment rubrics, and regular monitoring could improve consistency.

Table 6. Major Challenges Reported by Students

Challenge	Percentage of students
Increased academic workload	57.6%
Unclear assessment methods	50.9%
Inconsistent faculty implementation	45.2%
Logbook/documentation burden	42.3%
Difficulty with self-directed learning	39.1%
Limited initial orientation	37.8%
Insufficient time for skill practice	35.6%
Inadequate individualized feedback	33.7%
Overcrowded practical/skill sessions	31.9%
Poor interdepartmental coordination	29.4%

Quality Assessment

Among the 21 included studies, 12 were rated as good quality, 6 as moderate quality, and 3 as low quality. Common methodological limitations included convenience sampling, single-institution design, non-validated questionnaires, variable response rates, and limited qualitative exploration.

Table 7. Quality Assessment Summary

Quality indicator	Number of studies
Good quality	12
Moderate quality	6
Low quality	3
Used validated or pilot-tested questionnaire	11
Reported response rate	15
Included qualitative data	7
Multicenter study design	4
Clearly described CBME component	19

Figure 2. Conceptual Model of Student Perceptions of CBME

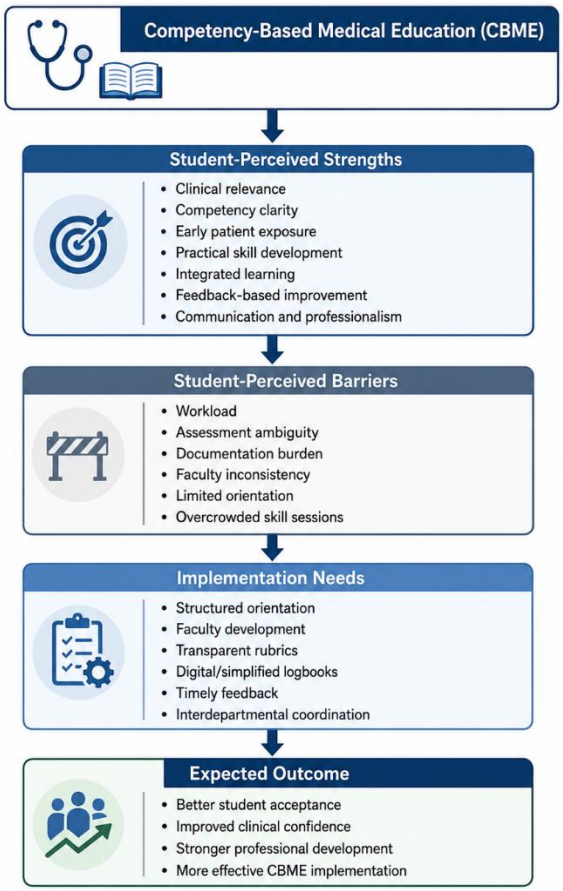

Figure 2 summarizes student perceptions of CBME. Students generally value CBME when it improves clinical relevance, competency clarity, practical learning, and feedback. However, implementation barriers such as workload, assessment ambiguity, and documentation burden must be addressed to improve acceptance and effectiveness.

DISCUSSION

This review of 21 studies shows that undergraduate medical students generally perceive CBME as a clinically relevant and useful educational reform. The most favorable perceptions were related to early clinical exposure, competency clarity, integrated teaching, skill development, communication training, and feedback-based learning. These findings suggest that students value learning that is connected to real clinical practice and future professional responsibilities.

One of the most important findings was that students appreciated the practical orientation of CBME. Traditional medical education may appear theoretical to early learners, particularly during preclinical years. CBME helps reduce this gap by introducing early clinical exposure, case-based teaching, and integrated learning. These methods allow students to understand how basic science knowledge contributes to patient care.

Another important finding was that students valued competency clarity. Clearly defined competencies helped students understand what they were expected to achieve. However, competency lists alone are not enough. Students require explanation, examples, and assessment mapping. Without this, competencies may appear as administrative requirements rather than meaningful learning outcomes.

Skill-based learning was also perceived positively. Students reported improved confidence when they were able to practice clinical and procedural skills in laboratory or simulation settings. However, effective skill acquisition requires adequate infrastructure, small-group supervision, repeated practice, and constructive feedback. If skill sessions are overcrowded or reduced to demonstration, they may not fulfill the purpose of CBME.

Communication, ethics, and professionalism training were also appreciated. Students recognized that being a competent doctor requires more than knowledge and procedural ability. Empathy, confidentiality, informed consent, respectful communication, and professional behavior are important parts of medical competence. Interactive teaching methods were preferred for these domains.

Assessment remained a major concern. While formative assessment is central to CBME, students frequently reported uncertainty about assessment expectations. This may increase anxiety and reduce trust in the curriculum. Transparent rubrics, clear criteria for competency completion, and explanation of remediation processes are essential.

Feedback quality strongly influenced student perceptions. Feedback was valued when it was timely, specific, and linked to improvement. However, when feedback was limited to marks, signatures, or general comments, students perceived it as less useful. Faculty training in feedback delivery is therefore necessary.

Workload and documentation burden were important barriers. CBME requires active participation and repeated assessment, but poor scheduling and excessive paperwork can make the curriculum stressful. Logbooks should be used as reflective and developmental tools rather than mere administrative checklists. Digital documentation may reduce burden and improve monitoring.

The review also highlights the importance of implementation consistency. Students reported that CBME was not implemented uniformly across departments. This inconsistency can create confusion and reduce acceptance. Regular faculty development, interdepartmental planning, and institutional monitoring are needed to ensure uniform delivery.

Overall, student perceptions suggest that CBME has strong educational potential, but its effectiveness depends on implementation quality. A well-structured, transparent, and learner-centered approach is required to convert CBME from a policy reform into meaningful educational practice.

Recommendations

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

1. Provide structured student orientation at the beginning of the course and before major CBME activities.
2. Explain competencies in simple language using examples and clinical scenarios.
3. Map competencies clearly to teaching-learning methods and assessments.
4. Conduct regular faculty development programs for uniform CBME implementation.
5. Use early clinical exposure with clear objectives, supervised patient interaction, and reflection.
6. Provide adequate time, equipment, and supervision for skill laboratory sessions.
7. Use transparent assessment rubrics and clearly explain competency sign-off criteria.
8. Ensure feedback is specific, timely, individualized, and improvement-oriented.
9. Simplify logbooks and consider digital documentation.
10. Collect student feedback periodically and use it for curriculum improvement.

Limitations

This review has several limitations. First, most included studies were cross-sectional and questionnaire-based, limiting causal interpretation. Second, many studies were single-institution studies, reducing generalizability. Third, perception outcomes were measured using different tools, preventing formal meta-analysis. Fourth, some studies used non-validated questionnaires. Fifth, self-reported perceptions may be influenced by recall bias or social desirability bias. Finally, this review focused on student perceptions and did not measure objective competency achievement.

CONCLUSION

Undergraduate medical students generally perceive 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, concerns related to workload, unclear assessment methods, logbook burden, inconsistent faculty implementation, and limited orientation remain important.

CBME should therefore be implemented as a learner-centered educational reform rather than as a documentation-heavy curriculum change. Student orientation, faculty development, assessment transparency, meaningful feedback, simplified documentation, and continuous quality improvement are essential for strengthening CBME in undergraduate medicine.

REFERENCES

1. Frank JR, Snell LS, Cate OT, Holmboe ES, Carraccio C, Swing SR, et al. Competency-based medical education: theory to practice. Med Teach. 2010;32(8):638-645.
2. Carraccio C, Englander R, Van Melle E, Cate OT, Lockyer J, Chan MK, et al. Advancing competency-based medical education: a charter for clinician-educators. Acad Med. 2016;91(5):645-649.
3. Harden RM. Outcome-based education: the future is today. Med Teach. 2007;29(7):625-629.
4. Gruppen LD, Burkhardt JC, Fitzgerald JT, Funnell M, Haftel HM, Lypson ML, et al. Competency-based education: programme design and challenges to implementation. Med Educ. 2016;50(5):532-539.
5. Holmboe ES, Sherbino J, Long DM, Swing SR, Frank JR. The role of assessment in competency-based medical education. Med Teach. 2010;32(8):676-682.

6. Bok HGJ, Teunissen PW, Favier RP, Rietbroek NJ, Theyse LFH, Brommer H, et al. Programmatic assessment of competency-based workplace learning: when theory meets practice. BMC Med Educ. 2013;13:123.
7. Lockyer J, Carraccio C, Chan MK, Hart D, Smee S, Touchie C, et al. Core principles of assessment in competency-based medical education. Med Teach. 2017;39(6):609-616.
8. Touchie C, ten Cate O. The promise, perils, problems and progress of competency-based medical education. Med Educ. 2016;50(1):93-100.
9. Iobst WF, Sherbino J, Cate O, Richardson DL, Dath D, Swing SR, et al. Competency-based medical education in postgraduate medical education. Med Teach. 2010;32(8):651-656.
10. Modi JN, Gupta P, Singh T. Competency-based medical education, entrustment and assessment. Indian Pediatr. 2015;52(5):413-420.
11. Sharma R, Bakshi H, Kumar P. Competency-based undergraduate curriculum: a critical view. Indian J Community Med. 2019;44(2):77-80.
12. Medical Council of India. Competency Based Undergraduate Curriculum for the Indian Medical Graduate. New Delhi: Medical Council of India; 2018.
13. National Medical Commission. Competency Based Medical Education Curriculum Guidelines. New Delhi: National Medical Commission; 2024.
14. Singh T, Gupta P, Singh D. Principles of Medical Education. 5th ed. New Delhi: Jaypee Brothers Medical Publishers; 2017.
15. Harden RM, Laidlaw JM. Essential Skills for a Medical Teacher. 2nd ed. Edinburgh: Elsevier; 2017.
16. Norcini J, Burch V. Workplace-based assessment as an educational tool. AMEE Guide No. 31. Med Teach. 2007;29(9):855-871.
17. Norcini J, Anderson MB, Bollela V, Burch V, Costa MJ, Duvivier R, et al. Criteria for good assessment: consensus statement and recommendations. Med Teach. 2018;40(11):1102-1109.
18. Van Melle E, Frank JR, Holmboe ES, Dagnone D, Stockley D, Sherbino J. A core components framework for evaluating implementation of competency-based medical education programs. Acad Med. 2019;94(7):1002-1009.
19. Biggs J, Tang C. Teaching for Quality Learning at University. 4th ed. Maidenhead: Open University Press; 2011.
20. Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ. 2021;372:n71.
21. Hong QN, Pluye P, Fàbregues S, Bartlett G, Boardman F, Cargo M, et al. Mixed Methods Appraisal Tool version 2018. Montreal: McGill University; 2018.
22. Harden RM, Crosby JR, Davis MH. AMEE Guide No. 14: Outcome-based education. Med Teach. 1999;21(1):7-14.
23. Epstein RM, Hundert EM. Defining and assessing professional competence. JAMA. 2002;287(2):226-235.
24. Bansal P, Supe A. Training of medical teachers in India: need for change. Indian J Med Sci. 2007;61(8):478-484.
25. Gupta P, Singh T. Competency-based medical education in India: challenges and opportunities. Indian Pediatr. 2021;58(5):403-404.