ORIGINAL ARTICLE

Perceptions of Competency-Based Medical Education (CBME) Curriculum Among Indian Medical Students: A Cross-Sectional Analysis from ANIIMS, Port Blair

Mudit Sharma,[1] Amit Kumar Kamboj,[2] Rashmi Ramanathan,[3] Vivin Vincent[4] and Jeevithan Shanmugam[5,]*

[1]*Assistant Professor, Department of Community Medicine, JNUIMSRC, Jaipur - 17*
[2]*Associate Professor, Department of Community Medicine, JNUIMSRC, Jaipur -17*
[3]*Professor, Department of Physiology, KMCHIHSR, Coimbatore – 14*
[4]*Professor, Department of Community Medicine, JNUIMSRC, Jaipur – 17*
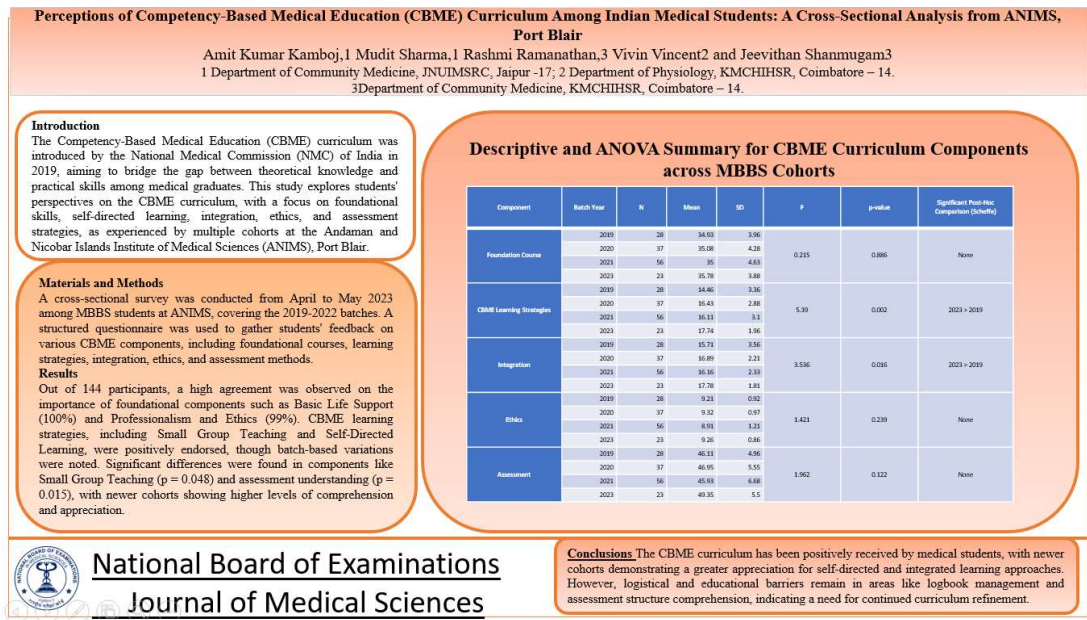[5]*Professor, Department of Community Medicine, KMCHIHSR, Coimbatore – 14.*

Abstract
Introduction: The Competency-Based Medical Education (CBME) curriculum was introduced by the National Medical Commission (NMC) of India in 2019, aiming to bridge the gap between theoretical knowledge and practical skills among medical graduates. This study explores students' perspectives on the CBME curriculum, with a focus on foundational skills, self-directed learning, integration, ethics, and assessment strategies, as experienced by multiple cohorts at the Andaman and Nicobar Islands Institute of Medical Sciences (ANIIMS), Port Blair. **Materials and Methods:** A cross-sectional survey was conducted from April to May 2023 among MBBS students at ANIIMS, covering the 2019-2022 batches. A structured questionnaire was used to gather students' feedback on various CBME components, including foundational courses, learning strategies, integration, ethics, and assessment methods. Descriptive and inferential statistical analyses were performed, with Chi-square tests and ANOVA to examine the association between student responses and their year of joining. **Results:** Out of 144 participants, a high agreement was observed on the importance of foundational components such as Basic Life Support (100%) and Professionalism and Ethics (99%). CBME learning strategies, including Small Group Teaching and Self-Directed Learning, were positively endorsed, though batch-based variations were noted. Significant differences were found in components like Small Group Teaching (p = 0.048) and assessment understanding (p = 0.015), with newer cohorts showing higher levels of comprehension and appreciation. Integration and ethics were consistently well-regarded across all batches, while challenges were highlighted in areas such as logbook management. **Conclusion:** The CBME curriculum has been positively received by medical students, with newer cohorts demonstrating a greater appreciation for self-directed and integrated learning approaches. However, logistical and educational barriers remain in areas like logbook management and assessment structure comprehension, indicating a need for continued curriculum refinement. This study provides valuable insights into how CBME is perceived by medical students and highlights areas for further enhancement to ensure competency-based training meets the needs of future healthcare professionals.

Keywords: CBME, medical education, competency-based curriculum, medical students, curriculum perception

*Corresponding Author: S. Jeevithan
Email: dr.jeevithan@gmail.com

Graphical Abstract

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Amit Kumar Kamboj,1 Mudit Sharma,1 Rashmi Ramanathan,3 Vivin Vincent2 and Jeevithan Shanmugam3

1 Department of Community Medicine, JNUIMSRC, Jaipur -17; 2 Department of Physiology, KMCHIHSR, Coimbatore – 14.
3Department of Community Medicine, KMCHIHSR, Coimbatore – 14.

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Out of 144 participants, a high agreement was observed on the importance of foundational components such as Basic Life Support (100%) and Professionalism and Ethics (99%). CBME learning strategies, including Small Group Teaching and Self-Directed Learning, were positively endorsed, though batch-based variations were noted. Significant differences were found in components like Small Group Teaching (p = 0.048) and assessment understanding (p = 0.015), with newer cohorts showing higher levels of comprehension and appreciation.

Descriptive and ANOVA Summary for CBME Curriculum Components across MBBS Cohorts

Component	Batch Year	N	Mean	SD	F	p-value	Significant Post-Hoc Comparison (Scheffe)
Foundation Course	2019	28	34.93	3.96	0.215	0.886	None
	2020	37	35.08	4.28			
	2021	56	35	4.63			
	2023	23	35.78	3.88			
CBME Learning Strategies	2019	28	14.46	3.36	5.39	0.002	2023 > 2019
	2020	37	16.43	2.88			
	2021	56	16.11	3.1			
	2023	23	17.74	1.96			
Integration	2019	28	15.71	3.56	3.536	0.016	2023 > 2019
	2020	37	16.89	2.21			
	2021	56	16.16	2.33			
	2023	23	17.78	1.81			
Ethics	2019	28	9.21	0.92	1.421	0.239	None
	2020	37	9.32	0.97			
	2021	56	8.91	1.21			
	2023	23	9.26	0.86			
Assessment	2019	28	46.11	4.96	1.962	0.122	None
	2020	37	46.95	5.55			
	2021	56	45.93	6.68			
	2023	23	49.35	5.5			

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Conclusions The CBME curriculum has been positively received by medical students, with newer cohorts demonstrating a greater appreciation for self-directed and integrated learning approaches. However, logistical and educational barriers remain in areas like logbook management and assessment structure comprehension, indicating a need for continued curriculum refinement.

Introduction

The Competency-Based Medical Education (CBME) curriculum, implemented by the National Medical Commission (NMC) in India in 2019, had marked a significant departure from the traditional medical education model. This shift was motivated by the need to produce medical graduates who are not only knowledgeable but also competent in a range of essential skills, including clinical, communication, and ethical decision-making. The traditional curriculum, which focused heavily on theoretical knowledge and standardized testing, often left students with limited practical skills and unprepared for real-world challenges. In contrast, the CBME curriculum emphasizes the development of specific competencies, aiming to bridge the gap between academic training and clinical practice. Recent studies, including our own research, have begun to examine the impact of these changes on students' learning experiences and preparedness for future roles in healthcare [1-5].

The foundation course, integrated teaching, and the use of formative assessments were among the key innovations introduced under CBME, designed to engage students in a more holistic learning process. Early exposure to clinical settings, interdisciplinary teaching, and stress management training, and all hallmarks of the CBME curriculum, were highlighted as beneficial elements by the students. Previous research has shown that such components foster critical thinking, adaptability, and resilience, which are essential traits in the rapidly evolving medical field [1,2,4,5].

One of the key objectives of the CBME curriculum is to produce "globally competent" doctors who can provide high-quality care in diverse healthcare settings. The CBME approach includes structured clinical exposure, early engagement with patients, and emphasis on self-directed learning [1,3]. Students are encouraged to develop reflective practices, which help them evaluate their performance and identify areas for improvement. Formative

assessments, logbooks, and multiple-choice questions are used to monitor students' progress and provide constructive feedback [1-4]. These methods have proven effective in enhancing students' clinical skills and communication abilities, as highlighted in our previous publications [1]. The CBME framework also incorporates a robust ethics and professionalism component, ensuring that students are not only clinically competent but also empathetic and culturally sensitive practitioners [5].

Given these extensive changes, it is essential to gather feedback from students on how the CBME curriculum has impacted their educational journey and professional development. Understanding students' perceptions of the CBME curriculum can offer valuable insights for policymakers, educators, and administrators to further refine and improve the curriculum. Our study, therefore, seeks to add to the growing body of evidence on CBME's effectiveness by capturing student voices from various batches, documenting both the strengths and areas for improvement in the curriculum. By focusing on the experiences and feedback from students, we aim to provide a comprehensive evaluation of how the CBME curriculum aligns with its objectives and how it has been received by those directly involved in the learning process. This feedback is critical to ensure that the curriculum continues to evolve and meet the demands of modern healthcare.

Materials and Methods

This cross-sectional study was conducted over a period of two months, from April to May 2023, among MBBS students at the Andaman and Nicobar Islands Institute of Medical Sciences (ANIIMS), Port Blair. The study aimed to assess the perspectives of medical students on the implementation of the Competency-Based Medical Education (CBME) curriculum introduced by the National Medical Commission (NMC) of India. Ethical approval for the study was obtained from the institutional ethics committee at ANIIMS, ensuring compliance with ethical research standards and safeguarding participant rights.

Students from 2019, 2020, 2021 and 2022 batches were included, and responses were gathered through a structured questionnaire administered during classroom sessions. Students who completed the first MBBS were included in this study. Though the 2023 batch were in the college during the conduct of the study, since they have not completed the first MBBS, they would not be in a position to answer all the components. Hence, they were excluded from the study. The students were explained about the objectives of the study, the need for the study, rights of the students and the other ethical concerns. The Participant information sheet was also given to them. Once they accepted to participate, a written informed consent was obtained, ensuring voluntary participation and confidentiality. The questionnaire addressed various components of the CBME curriculum, focusing on foundational courses, learning strategies, integration, ethics, and assessment methods, capturing the students' views on their benefits and challenges.

The collected data was entered in Microsoft excel and was analysed with SPSS 27 to identify the perceived impact of the CBME curriculum on students' learning and competency development, with a focus on their satisfaction and challenges faced with the curriculum transition. The responses were quantified and analysed to determine the distribution of opinions

across different curriculum components. Basic descriptive data were expressed as frequency/ percentage and Mean ± SD. Chi square test and ANOVA with post hoc scheffe was used to measure the association between various factors and level of agreement.

Results

A total of 144 students participated in the study. The distribution of students by year of joining MBBS reflects a varied representation across four batches: 2019, 2020, 2021, and 2022. The largest group consists of students from the 2021 batch, accounting for 38.9% of the sample, indicating a significant input from this cohort. The 2020 batch follows with 25.7%, while the 2019 and 2022 batches contribute 19.4% and 16.0%, respectively. This distribution demonstrates a steady intake of students over recent years, with a cumulative representation of 84% from the three most recent batches (2019-2021) and a smaller input from the most recent batch of 2022. This balanced representation allows for a comprehensive analysis of student perceptions across different stages of the MBBS curriculum, highlighting any evolving trends or challenges in adapting to the CBME curriculum over these years.

The survey findings indicate a highly positive reception of foundational components and CBME learning strategies among students, with a near-universal endorsement of essential skills and strategies. Specifically, foundational components such as Basic Life Support, Language and Communication Skills, and Professionalism and Ethics garnered agreement rates exceeding 99%, highlighting students' recognition of these elements as essential for their medical education. Components like IT/Computer Skills and Stress Management, while still largely valued, displayed slightly lower agreement levels, particularly IT skills, which had an agreement rate of 91.7%. This variation may reflect differences in individual exposure and the perceived importance of technology in the medical curriculum. Ethics was unanimously recognized as an essential component, with 100% agreement on the necessity of learning ethics, professionalism, and communication in the initial phase of training.

Regarding CBME learning strategies, components such as Early Clinical Exposure and Reflective Learning received strong support, with over 90% agreement. However, Self-Directed Learning showed slightly lower agreement (88.9%), suggesting a possible need for additional guidance or adaptation to this independent learning approach among students. Assessment methods and additional learning supports also received positive feedback. Students acknowledged the role of MCQs, problem-based learning, and elective postings, each receiving over 95% agreement, affirming these as beneficial to their competency development. Notably, the preference for case-based assessments over traditional essay formats suggests a shift toward practical, scenario-based learning. However, only 68.1% agreed on the feasibility of maintaining separate logbooks for each department, indicating logistical challenges or concerns with this approach. Overall, these insights underscore the value students place on foundational skills, interactive learning methods, and scenario-based assessments, with minor areas noted for further enhancement or support. (Table 1)

Table 1. Perception of Students about CBME curriculum

S.No	Parameter	Agree		Disagree	
		F	%	F	%
Useful Components of Foundation Course					
1	Basic Life Support	143	99.3	1	0.7
2	Field / Health Centre Visits	142	98.6	2	1.4
3	Time Management	142	98.6	2	1.4
4	Stress Management	141	97.9	3	2.1
5	Language & Communication Skills	143	99.3	1	0.7
6	Professionalism and Ethics	143	99.3	1	0.7
7	Biomedical Waste Management	142	98.6	2	1.4
8	IT/Computer Skills	132	91.7	12	8.3
CBME Learning Strategies					
9	Self-Directed Learning	128	88.9	16	11.1
10	Early Clinical Exposure	141	97.9	3	2.1
11	Reflective Learning	135	93.8	9	6.3
12	Small Group Teaching / Learning	133	92.4	11	7.6
Assessment and Integration					
13	Multiple Choice Questions have their own role in assessment	137	95.1	7	4.9
14	Assessment using Problem-Based Learning and Case Scenarios improves competency	142	98.6	2	1.4
15	Elective posting is needed after Phase III	137	95.1	7	4.9
16	It is possible to maintain separate log books for each department	98	68.1	46	31.9
17	Phase I in medical college is academically very stressful	141	97.9	3	2.1
18	There should be some time for sports activities during weekdays	142	98.6	2	1.4
19	After three years of CBME implementation, I am well-versed in all its components	122	84.7	22	15.3

20	Assessment in the form of case scenarios instead of essays and short essays is preferable	137	95.1	7	4.9

Chi-square test was done to provide insights into MBBS students' perspectives on the foundation course and CBME curriculum components across various batches. The cross-tabulated analysis of various foundational components and learning strategies, categorized by MBBS batch years, reveals high consistency in positive responses across all batches regarding the perceived benefits of foundational course elements. Notably, 100% of students across batches agreed on the necessity of Basic Life Support training, with slight variations observed in components such as Field/Health Centre visits and Time Management. A small percentage of students from the 2019 and 2021 batches (3.6% and 1.8%, respectively) disagreed with the utility of Field/Health Centre visits. However, overall, above 98% across batches positively endorsed these components. Similarly, IT/Computer Skills saw a broader range in agreement, with the 2019 batch showing a slightly lower endorsement (85.7%) compared to other batches.

In CBME learning strategies, batch-based differences were observed in the endorsement of Self-Directed Learning, with the 2019 batch showing a lower agreement rate (78.6%) compared to the 2021 batch (91.1%) and the 2023 batch (100%). A chi-square test revealed significant batch-based differences for some strategies, such as Small Group Teaching/Learning, where the 2019 batch had a lower agreement rate (82.1%) compared to others (p = 0.048). Additionally, significant batch differences were observed in understanding of assessment systems (p = 0.015), with earlier batches (notably the 2019 cohort) reporting lower levels of comprehension in comparison to more recent cohorts, potentially reflecting challenges in initial curriculum adaptation. Integration elements, including horizontal and vertical integration, were generally well-received across batches, with over 98% agreement, indicating a shared positive perception of integrated learning across subjects among students from all cohorts. These findings highlight that while positive reception to CBME components and strategies is strong across batches, minor batch-specific preferences and challenges exist, potentially linked to varying levels of curriculum adaptation over time. (Table 2)

Table 2. Perception of Medical Students on the Importance of CBME Components Across Batches

S.No	Parameter	2019		2020		2021		2022		p-value
		N	%	N	%	N	%	N	%	
		Frequency and Percentage of those who agree the importance								
1	Basic Life Support	28	100	37	100	56	100	23	100	0.663
2	Field / Health Centre Visits	27	96.4	37	100	55	98.2	0	0	0.597
3	Time Management	28	100	36	97.3	55	98.2	0	0	0.741
4	Stress Management	26	92.9	36	97.3	56	100	0	0	0.153
5	Language & Communication Skills	28	100	36	97.3	56	100	0	0	0.405
6	Professionalism and Ethics	28	100	37	100	55	98.2	0	0	0.663
7	Biomedical Waste Management	26	92.9	37	100	56	100	0	0	0.038
8	IT/Computer Skills	24	85.7	35	94.6	52	92.9	2	8.7	0.61
9	Self-Directed Learning	22	78.6	32	86.5	51	91.1	23	100	0.095
10	Early Clinical Exposure	27	96.4	37	100	54	96.4	23	100	0.534
11	Reflective Learning	25	89.3	34	91.9	53	94.6	23	100	0.427
12	Small Group Teaching / Learning	23	82.1	33	89.2	54	96.4	23	100	0.048
13	Multiple Choice Questions have their own role in assessment	25	89.3	35	94.6	54	96.4	23	100	0.324
14	Assessment using Problem-Based Learning and Case	28	100	36	97.3	55	98.2	23	100	0.741

	Scenarios improves competency								
15	Elective posting is needed after Phase III	27	96.4	35	94.6	55	98.2	20	87	0.204
16	It is possible to maintain separate log books for each department	17	60.7	24	64.9	38	67.9	19	82.6	0.375
17	Phase I in medical college is academically very stressful	28	100	37	100	53	94.6	23	100	0.186
18	There should be some time for sports activities during weekdays	28	100	37	100	54	96.4	23	100	0.364
19	After three years of CBME implementation, I am well-versed in all its components	22	78.6	29	78.4	50	89.3	21	91.3	0.303
20	Assessment in the form of case scenarios instead of essays and short essays is preferable	26	92.9	36	97.3	53	94.6	22	95.7	0.866

The responses were converted into scores and the mean score between the groups were analysed to find out the association if any, the analysis of different MBBS cohorts reveal consistent and insightful patterns regarding perceptions of the CBME curriculum components. Across all batches, the foundation course received similar mean scores with no significant differences, indicating a consensus among students on the foundational aspects of CBME, valued consistently across years of joining. This uniformity points to a shared positive perception of the course's essential elements among students, regardless of batch differences.

However, some variations emerged in other areas. For instance, CBME learning strategies were viewed significantly more favourably by the 2023 batch compared to earlier cohorts, particularly the 2019 batch. This could signal a growing appreciation of self-directed and interactive learning approaches, possibly as students become more accustomed to CBME over time. Similarly, integration components such as

horizontal and vertical integration showed higher endorsement in the newer 2023 batch compared to earlier ones, with the 2023 batch reporting the highest mean score (17.78) and the 2019 batch the lowest (15.71). This trend suggests an evolving perspective in favor of integrated learning as curriculum adjustments enhance its effectiveness.

In other curriculum areas, such as ethics, no significant differences were observed across batches, which suggests stable attitudes toward ethical training as a core component of early medical education. Although not statistically significant, assessment mean scores have shown a slight upward trend, with the 2023 cohort rating this component higher, possibly reflecting increased familiarity with the CBME assessment structure. (Table 3)

Table 3. Descriptive and ANOVA Summary for CBME Curriculum Components across MBBS Cohorts

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Foundation Course	2019	28	34.93	3.96	0.215	0.886	None
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	2021	56	45.93	6.68			
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Discussion

The implementation of Competency-Based Medical Education (CBME) by the National Medical Commission (NMC) in India marks a transformative shift from traditional time-based training to an outcome-based framework that focuses on equipping medical graduates with essential competencies required for effective medical practice [1-4]. This shift resonates with global trends in medical education, where the emphasis on competency and practical skill integration has demonstrated benefits in improving medical outcomes [6-10]. However, the integration and acceptance of CBME have varied, as observed in this study's cohort-based analysis of students' perspectives on foundational, integrative, and evaluative components of the CBME curriculum [11].

Students across batches showed strong endorsement for foundational skills, especially in areas such as Basic Life Support (BLS) and Professionalism, which aligns with previous findings that stress the need for medical graduates to be well-versed in essential clinical skills early in their training [12]. This result echoes the findings of Epstein and Hundert, who emphasized the importance of competence in communication, ethics, and patient care as fundamental to medical education [13]. The consistently high agreement rates on foundational skills highlight the effectiveness of CBME's initial phases, which prioritize these critical competencies [14].

Despite high acceptance of foundational components, disparities emerged in students' reception of CBME's learning strategies, particularly Self-Directed Learning (SDL) and Small Group Learning. Earlier cohorts, like the 2019 batch, expressed lower favorability towards SDL, which may indicate challenges in adapting to a more autonomous learning model [15]. This outcome is supported by previous research, where transition to self-directed formats has been shown to necessitate additional guidance and support structures, especially for students accustomed to structured learning environments [16]. Small Group Teaching, while highly valued, also revealed cohort differences, with lower endorsements from the earlier 2019 cohort, suggesting an initial adaptation phase that could benefit from better preparatory or support systems [1].

The need for integration in CBME, covering both horizontal and vertical integration across subjects, was recognized positively across cohorts, though more recent batches (2022 and 2023) rated this aspect higher. Harden et al. suggested that integrating topics across disciplines facilitates holistic learning, which helps students contextualize knowledge [17]. These findings align with the research by ten Cate, which showed that integration enhances knowledge retention and applicability in clinical settings [18]. However, student feedback on the time-consuming nature of integration sessions indicates that careful attention is needed to balance depth with manageability in the curriculum [19].

In terms of assessments, while traditional assessments received positive feedback, there was strong student preference for problem-based and case-based assessment formats over essays. The literature supports this shift, as case-based assessments promote critical thinking and are aligned with CBME's goals of producing competent, practice-ready graduates [20-21]. The observed challenges with maintaining separate logbooks across

departments reflect logistical issues and suggest a need for more streamlined documentation processes to ensure these tools enhance rather than hinder the learning experience.

Conclusion

The CBME curriculum, as perceived by medical students across multiple cohorts, reflects a positive response towards foundational skills, interactive learning strategies, and integrated assessment methods. The study highlights that newer cohorts have a greater appreciation for self-directed and integrated learning approaches, suggesting that curriculum adaptations over time have made these methods more effective and accessible. However, challenges remain in areas such as logbook management and comprehension of assessment structures, emphasizing the need for continuous curriculum refinement to address logistical and educational barriers. This research contributes to the understanding how CBME is perceived and utilized in Indian medical education and suggests that further refinement of student-centered strategies may enhance the effectiveness of competency-based training.

Statements and Declarations
Ethical Approval

Ethical approval for the study was obtained from the institutional ethics committee at ANIIMS, ensuring compliance with ethical research standards and safeguarding participant rights.

Conflicts of interest

The authors declare that they do not have conflict of interest.

References

1. Ramanathan R, Shanmugam J, Gopalakrishnan SM, Palanisamy KT, Narayanan S. Challenges in the Implementation of Competency-Based Medical Curriculum: Perspectives of Prospective Academicians. Cureus. 2022 Dec 22;14(12):e32838. doi: 10.7759/cureus.32838.

2. Ramanathan R, Shanmugam J, Sridhar MG, Palanisamy K, Narayanan S. Exploring faculty perspectives on competency-based medical education: A report from India. J Educ Health Promot. 2021 Oct 29;10:402. doi: 10.4103/jehp.jehp_1264_20.

3. National Medical Commission. Competency-Based Undergraduate Curriculum for the Indian Medical Graduate [Internet]. New Delhi: National Medical Commission; 2019. Available from: https://www.nmc.org.in/information-desk/for-colleges/ug-curriculum/

4. Sharma R, Bakshi H, Kumar P. Competency-Based Undergraduate Curriculum: A Critical View. Indian J Community Med. 2019 Apr-Jun;44(2):77-80. doi: 10.4103/ijcm.IJCM_206_19.

5. Sharma S, Chhatwal J. Perspectives of undergraduate medical students regarding competency-based curriculum. Natl Med J India 2023;36:379–83. DOI: 10.25259/NMJI_461_2022

6. Neeli D, Prasad U, Atla B, Kukkala SSS, Konuku VBSK, Mohammad A.

Integrated teaching in medical education: undergraduate student's perception. Int J Res Med Sci 2019;7:2813-7.

7. Harden RM, Crosby JR, Davis MH. AMEE Guide No. 14: Outcome-based education: Part 1 – An introduction to outcome-based education. Med Teach. 1999;21(1):7-14.

8. Frank JR, Snell LS, Ten Cate O, Holmboe ES, Carraccio C, Swing SR, et al. Competency-based medical education: Theory to practice. Med Teach. 2010;32(8):638-45.

9. Ten Cate O. Nuts and bolts of entrustable professional activities. J Grad Med Educ. 2013;5(1):157-8.

10. Carraccio C, Wolfsthal SD, Englander R, Ferentz K, Martin C. Shifting paradigms: From Flexner to competencies. Acad Med. 2002;77(5):361-7.

11. Holmboe ES, Sherbino J, Long DM, Swing SR, Frank JR. The role of assessment in competency-based medical education. Med Teach. 2010;32(8):676-82.

12. Epstein RM, Hundert EM. Defining and assessing professional competence. JAMA. 2002;287(2):226-35.

13. Dath D, Iobst W, and the International CBME Collaborators. The importance of faculty development in the transition to competency-based

medical education. Med Teach. 2010;32(8):683-6.

14. Gruppen LD, ten Cate O, Lingard LA, Teunissen PW. Enhanced requirements for assessment in a competency-based, time-variable medical education system. Acad Med. 2018;93(3S)

15. Norman G, van der Vleuten CP, Newble DI, Dent JA. International handbook of research in medical education. Dordrecht: Springer; 2002.

16. Swing SR. The ACGME outcome project: Retrospective and prospective. Med Teach. 2007;29(7):648-54.

17. Harden RM. Curriculum integration in medical education: AMEE Guide No. 21. Med Teach. 2000;22(2):110-20.

18. ten Cate O. Entrustable professional activities in CBME. Med Teach. 2014;36(8):697-702.

19. Thakuria B, Bordoloi P, Pathak P. Perception of MBBS students to the new competency-based medical education curriculum in a tertiary care hospital in North East India. Curr Med Issues. 2024;22(3):146-150.

20. Epstein RM. Assessment in medical education. N Engl J Med. 2007;356(4):387-96.

21. Carraccio C, et al. Shifting paradigms: Flexner to competencies. Acad Med. 2002;77(5):361-7.