Impact of New Competency-Based Medical Curriculum on the Educational Environment of Medical Students in a Medical College in Central Kerala

Health Action *by* People

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Abstract

Background: Competency-based medical education (CBME) for graduate medical students was introduced by National Medical Commission from the 2019 batch. This paper seeks to estimate the impact of CBME on the educational environment of medical students and to compare the university examination outcomes after the introduction of CBME with the antecedent non-CBME batch.

Methods: A cross-sectional study was carried out among all the students (197) of the CBME and preceding non-CBME batch of a medical college in central Kerala. The educational environment was collected in the online platform with a standard questionnaire, Dundee Ready Education Environmental Measure (DREEM questionnaire) in 5 domains: perception of learning, perception of teachers, student's academic self-perception (ASP), perceptions of atmosphere, and social self-perception (SSP).

Results: The overall DREEM score was found to be significantly higher at 122.7 in the CBME batch compared to 112.8 in the non-CBME batch ($P < .002$). The individual mean domain scores of "perceptions of learning" was the highest at 30.39 ± 5.17 followed by "student's perception of atmosphere" with a mean score of 29.53. Perception of learning, ASP, perception of atmosphere, and SSP were statistically significantly higher in CBME (2019) batch.
The proportion of failures was significantly higher in the non-CBME batch, and among those with distinction, 3 out of 4 students were from CBME batch. The DREEM score was also significantly correlated with the university marks score.

Conclusion: It appears that the CBME batch is performing better than the previous non-CBME batch and also has a better educational environment, though larger studies are necessary to further examine this phenomenon.

Keywords

CBME, medical curriculum, DREEM questionnaire, medical students

Introduction

National Medical Commission (NMC) of India has introduced competency-based medical education (CBME) for graduate medical students from the 2019 MBBS batch.[1] It is different from the traditional medical curriculum followed in India till 2018 batch, which was last modified in 1997.[2]

The disadvantages of the traditional approach to medical education included memorizing and recollecting a large quantity of information.[3] Also, it was suffering from poor assessment, misdistribution, lacked innovative approaches, and sufficient faculty development initiatives. There was a need for innovative policies and strategies for reforming the entire system.[4] The current outcome-based approach signals a

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paradigm shift from the traditional knowledge-based training to skill-based training embedded in attitude, ethics, and communication (AETCOM) competencies.

CBME thus aims to create medical professionals who can provide holistic care with compassion and excellence in line with global trends.[5]

CBME is an outcome-based teaching method initiated from 2019 batch onward, where students learn competencies for early clinical exposure to improve their skills.[6] It also requires integration of knowledge, attitude, skills, values, and responsiveness.[7] Since the previous modification a quarter of a century back, various changes have occurred in terms of demography, socioeconomic context, values, perception of stakeholders, advances in medicine, and innovations in teaching worldwide. The new guidelines prepared by NMC is the need of the hour and tries to prepare an appropriate educational environment. It seeks to reorient the medical graduates to the national goal of "Health for All" and helps them to fulfil their social obligations to the society.[2]

According to National Medical Commission of India, "Medical graduates should have the required knowledge, skills, attitudes, values and responsiveness, so that he/she can perform as a physician in the community effectively and also be globally relevant." The Indian medical graduates should be able to perform the role of a clinician, leader, and member of the health-care team and the medical system. Medical graduates are also communicators, lifelong learners, and professionals with ethical responsibility.[2] In this context, it is important to assess the educational environment in professional health programs.

The educational environment of medical students can be assessed by several instruments and the most commonly used is the Dundee Ready Education Environmental Measure. In this study, we are comparing the educational environment before and after the implementation of new curriculum with the help of DREEM questionnaire. DREEM inventory helps to assess the educational environment vis-a-vis perceptions of learning (POL), perceptions of teachers, ASP, perceptions of atmosphere, and social self-perceptions (SSPs). DREEM is validated across at least 20 countries and translated into 8 languages. Several studies show that DREEM was suitable for evaluating educational environments of medical schools and other health training settings[8] and has been used in India too.[9,10] An effective curriculum requires a plan, systematic feedback, and assessment.[11]

A cross-sectional study conducted in Bangalore to assess the impact of new curriculum on students' performance and faculty found that new curriculum is much better but had a bad effect on teaching faculty.[1]

The new provisions in the present curriculum will have an impact on the future doctors in India. It would be interesting to determine the perspectives of the students about the new curriculum, POL, perceptions of teachers, ASP, POA, and SSPs. Thus, the objective of the study is to assess and compare the perceptions of students with regard to teaching, learning, academic, and social environment and to compare the student's first year university marks in the CBME and the antecedent non-CBME batch.

Methods

A cross-sectional study was carried out among MBBS students of 2018 and 2019 batches of a medical college, Amrita Institute in central Kerala from October to November 2021. Universal sampling was adopted among all the students of 2018 and 2019 batches. All the students of 2018 and 2019 MBBS batches who provided informed consent were included, numbering 197.

Data was collected using structured questionnaire, in online platform, (WhatsApp, Instagram, Facebook) using Google Forms. The questionnaire included sociodemographic details and a 50-item DREEM, which was developed at the University of Dundee[8] to assess the educational environment in terms of perceptions of students with regard to teaching, learning, academic, and social environment. It consists of 50 questions which are categorized into 5 domains: POL has 12 items and a maximum score of 48. Ten of the questions are positive and 2 are negative. The perception of teachers (POT) has 11 items and a maximum score of 44, 7 items are positive and 4 are negative. The student's academic self-perception (ASP) has 8 items with a maximum score of 32 and all the questions are positive. POA has 12 items with a maximum score of 48. SSP has 7 items and a maximum score of 28 with 6 positive and 1 negative questions. The total score for the questionnaire is 200. Each question is valued based on Likert Scale and scored from 0 to 4. A maximum score of 4 is assigned for "strongly agree," 3 for "agree," 2 for "unsure," 1 for "disagree," and 0 for "strongly disagree." Negative items are scored in a reverse order.

Some minor modifications were required in the questionnaire as some questions were not applicable to the first-year students. In domain II and IV, as the first-year students are not exposed to clinics, the question under the domain POT (DII, Q2) has been changed from "The teachers are patient with patients" to "Teachers are patient with students" and domain IV, POA (DIV, Q1) it was changed from "The atmosphere is relaxed during the ward teaching" to "The atmosphere is relaxed during the practical teaching." In domain III, ASP (DIII, Q2) was changed from "I am confident about passing this year" to "I was confident about passing first year" as the study is retrospective and in the same domain (DIII, Q4) the question was modified from "Last year's work has been a good preparation for this year's work" to "The orientation classes provided in the beginning of first year was beneficial" as this study considered only first year students and is more relevant.

To assess the impact of the new CBME curriculum on student's academic performance, the first year university marks of both the batches were collected from

the academic office with consent of the administration. Ethical clearance was obtained from institutional ethical committee- ECASM-AIMS-2022-030.

Statistical Analysis

The data was entered in Microsoft Excel and was analyzed using SPSS software version 24. The qualitative variables are expressed as frequencies and percentages, whereas quantitative variables are expressed as mean and standard deviation. Independent sample t test was used to find the mean difference between the successive batches in the various domains. Pearson correlation was applied to find the linear relationship between DREEM score and university marks and P value less than .05 was considered statistically significant

Results

The mean age of 197 study participants in 2018 (non-CBME) and 2019 (CBME) batches was 20.97 ± 2.35 years of which 99 were from the non-CBME batch and 98 from CBME batch.

The proportion of female students 129 (65.5%) was higher. On comparison of first year university marks in the various categories among the 2 batches, there was a significant difference in the overall performance (*P = .001) (Figure 1). The CBME batch had higher proportion of distinctions (73.4%) and first class (53.9%) and lower proportion of failures (37.5%) as compared to the non-CBME batch.

The overall DREEM score was higher in the CBME batch (122.73 ± 19.66) compared to non-CBME (112.81 ± 24.28) and was found to be statistically significant (p value = .02). Out of the 5 domains, the highest mean score was observed in the "perception of learning" domain for both the batches; 30.39 ± 5.17 and 27.49 ± 7.17, respectively. In 4 out of 5 domains, namely perception of learning (P = .001), ASP (P = .008), perception of atmosphere (P = .009), and social self-perception (P = .045), the scores were significantly higher in the CBME batch (Table 1). Of the 5 domains, a positive perception was expressed in 4 domains and in the fifth domain, the students social perception was not so good.

A gender perspective of the DREEM scores showed that the total score was higher among females at 120.05 ± 20.66 compared to 113.38 ± 25.48 among males. Though

Table 1. Differences in Mean DREEM Score Domains Among 2018 and 2019 Batch (t Test).

Domains	Batch	Mean	P Value
Student's perception of learning	2018	27.49 ± 7.17	0.001
	2019	30.39 ± 5.17	
Student's perception of teachers	2018	27.15 ± 5.38	0.203
	2019	28.05 ± 4.44	
Student's academic self-perception	2018	17.82 ± 5.21	0.008*
	2019	19.81 ± 5.21	
Student's perception of atmosphere	2018	26.78 ± 7.51	0.009*
	2019	29.53 ± 7.17	
Student's social self-perception	2018	13.55 ± 4.90	0.045*
	2019	14.93 ± 4.72	
Overall DREEM Score	2018	112.81 ± 24.28	0.002*
	2019	122.73 ± 19.66	
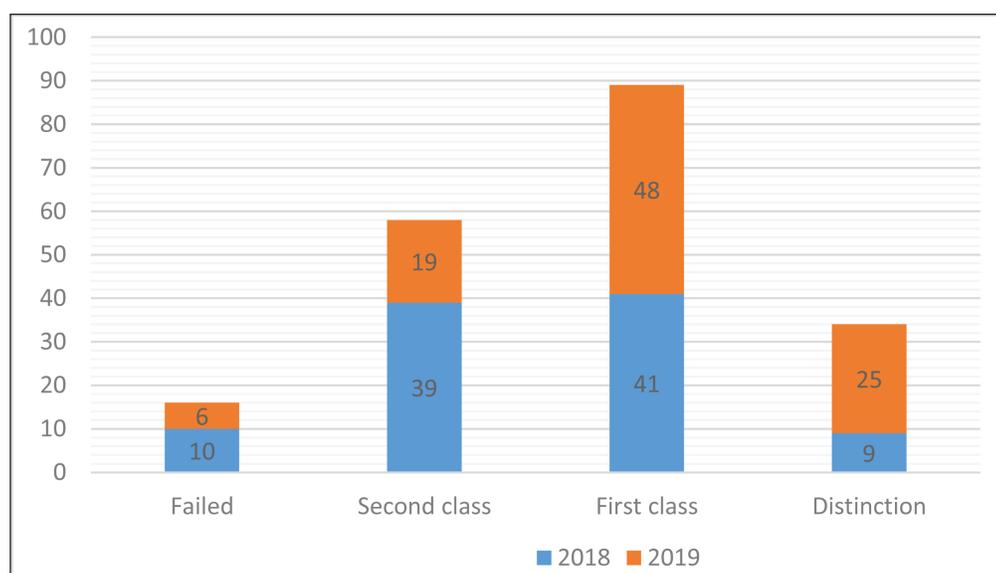
Figure 1. Distribution of Participants Based on University Marks. (For colour, please refer to the web version of this article.)

Table 2. Differences in Mean DREEM Score Domains and Gender (*t* Test).

Domains	Gender	Mean	*P* Value
Student's perception of learning	Female	29.86 ± 6.02	0.05*
	Male	27.16 ± 6.78	
Student's perception of teachers	Female	27.62 ± 4.40	0.918
	Male	27.54 ± 5.88	
Student's academic self-perception	Female	19.45 ± 4.71	0.031*
	Male	17.60 ± 6.11	
Student's perception of atmosphere	Female	28.84 ± 6.84	0.092
	Male	26.83 ± 8.39	
Student's social self-perception	Female	14.25 ± 4.64	0.962
	Male	14.22 ± 5.26	
Overall DREEM Score	Female	120.05 ± 20.66	0.06
	Male	113.38 ± 25.48	

Table 3. Correlation Between DREEM Score and University Marks.

		University Marks
DREEM Score	Pearson correlation	0.232
	Significance	0.001*
	N	197

female students had marginally higher scores in all the 5 domains, only the ASP score had a significantly higher score ($P = .031$) (Table 2).

A positive significant correlation ($r = 0.232$, *P* value .001) was obtained between DREEM score and university marks using Pearson correlation (Table 3). However, though the course of the 2019 batch students started on time and continued uninterrupted till March 2020, the examinations were delayed due to the Covid pandemic.

Discussion

This study used DREEM questionnaire to assess the impact of CBME curriculum on the educational environment and outcomes of medical students in a medical college in central Kerala.

The university marks of the CBME batch were found to be higher among the CBME batch with three-fourths of the distinctions coming from that batch. However, a similar study conducted in Bangalore found a marginal increase in mean marks obtained by the CBME batch.[1] The quality of a curriculum is not only dependent on the marks of the students but the perceptions of the students regarding the educational environment are also important.

In a study in Belagavi, Karnataka, the mean overall DREEM score was 116.22 ± 18.86 and higher for second year students at 119.9 ± 16.08[9] compared to 123 in Mangalore.[12] There does not seem to be a pattern as another study in India a

decade ago found lower global scores for the eighth semester compared to second and fourth semesters.[10] In Mangalore, the first year students appeared to be more happy[12] with the learning environment similar to our study. Though, unlike the students from Mangalore, our students had a new curriculum introduced to them. However, in a neighboring country Sri Lanka, the global DREEM score was lower at 108.[13]

In our study, highest score was obtained in the domain of "students perception of learning" among the CBME batch students with a mean score of 30.39 ± 5.17 ($P = .001$) indicating students' satisfaction with the learning methods. This perhaps points to the fact that students were stimulated to participate in class, teaching is focused, student-centered, and helps students to improve their courage and confidence.[7]

Among all the domains, POL, ASP, perception of atmosphere, and SSP, the scores were significantly higher in the CBME batch except for the "students perception of teachers." The social perception had lower scores in this study. Similarly, in a study in Pakistan, the perception in all domains was average though the social domain had the lowest score.[14] Overall, the students of both the batches rated the program as more positive than negative.[15]

In health professional education, measurement of the environment has received attention in correlation with its impact on educational outcomes.[16] This study found a significant positive correlation between the DREEM scores and university marks indicating the importance of improving the educational environment.

The limitation of this study is that it has been done in a single institution and by the members of the institution which could elicit more desirable answers. However, this social desirability could be taken care of to a great extent by the fact that it was administered by the students/peers and not by the teaching faculty. The fact that the university examinations were delayed may not affect the educational environment but may have given the CBME students a longer period of time to study leading to better marks in the university examination.

Conclusion

Students with new CBME-based curriculum had higher overall mean DREEM scores as compared to the antecedent non-CBME batch which also resulted in better first year performance evidenced by university marks. However, larger studies across government and private medical colleges are necessary.

Declaration of Conflicting Interests

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