Medical Education

Competency-based medical curriculum: Exploring the preclinical medical teachers' pedagogical and technical readiness levels

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ABSTRACT

Background. The medical curriculum for undergraduates was revised by the Medical Council of India in 2019, after 21 years. We did this study to determine teachers' pedagogical and technical readiness to implement the competency-based curriculum in medical colleges and determine factors that affect readiness, from their perspective.

Methods. We conducted a cross-sectional survey in the form of an online questionnaire. The qualitative data were coded numerically and were analysed using frequencies and proportions. Pearson Chi-square test was used to study the association among variables.

Results. The majority (85%) of respondents had attended a curriculum implementation training programme; 62.2% with experience < 5 years, 56.1% with experience 5–10 years and a minority of 13.3% with > 10 years' experience were ready to a 'great extent' to implement the new curriculum; 54.1% agreed to re-frame lectures and 64.9% possessed technological skills to suit the needs of a competency-based curriculum. About 77% agreed that it will provide a rich learning environment, inspire self-directed learning while 52% believed it will promote scientific thinking and provide better learning outcomes in the long run.

Conclusion. Medical teachers had a positive attitude towards implementation of the new curriculum. However, numerous factors such as low teacher–student ratio, textbooks designed according to the traditional curriculum, limited teachers' training and cumbersome paperwork may hinder its successful implementation. Updation of teachers' knowledge and skills through seminars/workshops is recommended to facilitate delivery of the new curriculum. Like any other ongoing reforms in medical education, competency-based curriculum is a work in process.

Natl Med J India 2023;36:36–9

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[**To cite:** Aprajita, Gupta RK, Mohan M. Competency-based medical curriculum: Exploring the preclinical medical teachers' pedagogical and technical readiness levels. *Natl Med J India* 2023;**36:**36–9. DOI: 10.25259/NMJI_694_20]

INTRODUCTION

Our medical curriculum is an impeccable benchmark to equip Indian medical graduates with knowledge, skills, attitudes, values and responsiveness to deal with preventive, promotive, curative and rehabilitative attributes of medicine.[1] Competency-based medical curriculum was rolled out by the Medical Council of India (MCI) from 1 August 2019 for implementation in all medical colleges of India for undergraduates to incorporate psychomotor, affective and cognitive domains of learning in medical education.[2] A competent physician as the first contact is now supposed to play the dynamic role of a clinician, communicator, leader, lifelong learner and professional.[3]

The key features of the competency-based curriculum include a foundation course in the beginning of the session, elective postings, topics such as attitude, ethics and communication, decrease in didactic learning in the classroom to less than one-third, horizontal and vertical integration among different disciplines,[4] small-group interactive learning and case-based learning to foster active learning.[5]

However, to implement the competency-based curriculum in India is a challenge.[6] Medical teachers being the key implementers of the curriculum must be geared towards re-modulation of the medical education framework[7] and equipped with essential technical and pedagogical skills to implement the curriculum empirically.

Therefore, we explored the readiness of preclinical medical teachers and their perceptions towards competency-based curriculum to help curriculum decision-makers/reformers in formulating the best ways to support teachers in effective implementation of the curriculum in the long run.

METHODS

The study was undertaken at the Government Institute of Medical Sciences, Greater Noida, Uttar Pradesh after obtaining approval from the institutional ethics committee and informed consent of the participants. We used a cross-sectional study design and the survey was online between 18 September and 19 October 2019.

Sample size

A sample size of 30% was considered adequate for a descriptive survey.[8] Simple random sampling was used to select a sample size of 30% of the target population—medical teachers of the preclinical departments of Anatomy, Physiology and Biochemistry. On average, there are 9 medical teachers in these subjects and there are 46 medical colleges (government and private) in Delhi and Uttar Pradesh. Considering a 20% drop out, 46×7=325 was our target population.

Study tool

The questionnaire had five sections. *Section A* had demographic characteristics of the participants—gender, age, academic qualification and years of teaching. *Section B* assessed teachers' readiness for implementation of the curriculum and training received if any, including number, place and duration of training, areas covered during training, and areas they further wish to be trained in. *Section C* explored preparedness of the teachers. *Section D* collected information on technological skills of the teachers. *Section E* assessed teachers' perceptions regarding merits/demerits of the new curriculum over the conventional curriculum.

Validity and reliability of the study tool

Twenty-nine questions were given to a panel of 10 professors at the Government Institute of Medical Sciences, Greater Noida, and Gautam Buddha University, who provided feedback on the readability and appropriateness of the survey items. Four of the 29 questions were modified after the feedback. Cronbach's alpha score was 0.81 (high internal consistency). The panel members were excluded from the final sample to reduce any extraneous influence on the results.

Data collection

The submission of the response was made through online SurveyMonkey Inc., software (California, USA), and was in English. The link to the survey was sent to the heads of all pre-clinical departments through email, web-link, social media and they were requested to forward the survey link to the faculty members. While the link was online, reminders were sent to the teachers twice a week. The medical teachers from preclinical departments in the medical colleges of both Delhi and Uttar Pradesh who volunteered to participate in the study were included in the study. Those who did not give consent were excluded.

Statistical analysis

The data were exported to Statistical Package of Social Sciences version 20.0 and analysed for descriptive statistics using frequencies and proportions. Qualitative data were processed by categorizing responses for an item according to intended objectives and data were coded numerically. Pearson Chi-square test was used to study the association, if any, among variables.

RESULTS

The response rate was 83% and deemed adequate for data analysis. Six responses were discarded as three were filled as a trial run by the researchers and three responses were not complete. Of the 98 responders, 55 were women. Seventy-nine respondents were postgraduates while 10 had a PhD degree. Most teachers (45, 45.4%) were in the 30–39 years age group followed by 26 in the 40–49 years (27%) age group; 19 were above 50 years of age and 8 were between 25 and 29 years of age. Thirty-seven participants had more than 10 years of teaching experience, 28 had 5–10 years of experience and 33 had <5 years of experience. Eighteen participants were members of the curriculum committee and 20 were members of the medical education unit.

A majority (62.2%) with teaching experience of <5 years were ready to a great extent to implement the new curriculum while 11.2% were moderately ready and 26.5% were not ready at all. Among teachers who were teaching for the past 5–10 years, 56.1% were found ready to a great extent. However, among teachers with >10 years of experience, only a minority of 13.3% were ready to a great extent and 44.9% were moderately ready to implement the curriculum change (Table I).

When asked if they would re-frame their lectures, if needed, to suit the needs of the competency-based curriculum, a majority (53, 54.1%) said yes. Forty-four said maybe and only 1 declined. The majority (64.9%) had been adequately exposed to computer facilities. Nearly 58.2% of teachers always used a projector to teach and 97.5% were able to prepare their PowerPoint presentations without difficulty (Table II). More than 25% strongly agreed and 52% agreed that the new curriculum will provide a rich learning environment for students, 56% thought it will inspire them for self-directed learning while 52% believe it will promote scientific thinking (Table III). The training given to teachers and their preparedness level did not have a significant

TABLE I. Participants' self-assessed readiness to teach the competency-based curriculum

Teaching experience (years)	Ready to a great extent (%)	Moderately ready (%)	Not ready (%)
<5	20 (62.2)	4 (11.2)	9 (26.5)
5–10	16 (56.1)	8 (27.6)	4 (16.3)
>10	5 (13.3)	17 (44.9)	15 (41.8)

p=0.03

TABLE II. Participants' exposure to technology for teaching

Item	Frequency, *n* (%)	p value
Have you been exposed to information technology and computer facilities for the implementation of the competency-based curriculum?		
Yes	50 (64.9)	0.12
No	27 (35.1)	0.94
How often do you use a projector to teach?		
Never	03 (3.8)	0.12
Sometimes	30 (38.0)	0.94
Always	46 (58.2)	0.65
Competence in basic computer operations		
Can search for files on the computer system easily	69 (87.3)	0.32
Can prepare a PowerPoint presentation easily	77 (97.5)	0.14
Can download and save files from the internet	68 (86.1)	0.74
Can insert videos in PowerPoint presentations	57 (72.2)	0.023

TABLE III. Participants' opinion on the new competency-based curriculum

Item	Frequency (%)	p value
Will the new curriculum provide a rich learning environment for students?		
Strongly agree	19 (25.3)	0.04
Agree	39 (52.0)	0.05
Neither agree nor disagree	11 (14.7)	0.84
Disagree	4 (5.3)	0.02
Strongly disagree	2 (2.7)	0.56
Will the new curriculum inspire the students for self-directed learning?		
Yes	42 (56.0)	0.02
No	9 (12.0)	0.32
Maybe	24 (32.0)	0.23
Will it promote scientific thinking in medical students?		
Yes	39 (52.0)	0.02
No	8 (10.7)	0.83
Maybe	28 (37.3)	0.96

relationship (r=3.24, p=0.3). There was no association between gender and the perception that competency-based medical curriculum will have a better learning outcome (r=3.2, p=0.03).

We found that 17.7% of the teachers did not understand the concept of competency-based medical curriculum. The majority (64.9%) of teachers were digital literates, which is essential for the successful implementation of the competency-based curriculum.

DISCUSSION

We investigated medical teachers' pedagogical and technical readiness for implementation of the competency-based undergraduate curriculum in government and private medical colleges of Uttar Pradesh and Delhi. A preliminary assessment showed that medical teachers believe that the new curriculum is an innovative, interactive module based on predetermined objectives and categorically involves cognitive, affective and psychomotor domains. However, it will require a vigorous, heterogeneous ongoing assessment system. These findings are in agreement with the study conducted by Holmboe *et al*.[9]

We found that the majority (62.2%) with teaching experience of <5 years were ready to a great extent to implement the new curriculum while 11.2% were moderately ready and 26.5% were not ready at all. Among teachers who were teaching for the past 5–10 years, 56.1% were ready to a great extent. However, among the teachers with >10 years of experience, only 13.3% were ready to a great extent. Thus, younger teachers were more flexible and adaptable, possibly because they were more familiar with technology.

We concluded that the majority (90%) of teachers believed that competency-based curriculum is a positive change as a teacher and they are prepared to implement it with great zeal. It has provided them a unique platform to be creative, enhance critical thinking, compelled them to review their methods of teaching, and opened new avenues to hone their skills. Only a small (10%) proportion of respondents disagreed that competency-based curriculum will have a positive impact. Our findings are similar to a study done[10] in dental colleges.

A few respondents believed that they found the new curriculum confusing and its implementation meant cumbersome paperwork and exhaustive workload for medical teachers. A participant said that: 'Competency-based curriculum is a waste of valuable time. It is meaningless to introduce clinical skills to first-year MBBS students without basic knowledge.' In a study conducted[11] in Mexico, some teachers regarded the curriculum change as being irrelevant, impractical and too complex to be followed.

Teachers are the implementers of the curriculum and should be adequately trained in all topics. Nearly 85% of the participants said that they had attended the curriculum implementation support programme-1 and -2 in the medical college/institute and of these, a large proportion (81.5%) agreed that they were taught principles, alignment, integration, competency-based assessment and early clinical exposure during the training session.

Our study reported that 17.7% of the teachers did not comprehend the concept of the competency-based curriculum and could not apply these principles in classroom teaching. This is a grey area as the teachers' knowledge, skills and comprehension are vital elements for effective implementation of any curriculum.[12]

We found that the majority of teachers were digital literates, which is essential for successful implementation of the competency-based curriculum. Nearly 58.2% of the teachers always used a projector to teach and 97.5% were able to prepare their PowerPoint presentations without difficulty. This is in agreement with the study by Nousiainen *et al*.[13] who stated that teachers should be equipped with information and computer technology for successful implementation of the competency-based curriculum.

When asked to enumerate the challenges they were facing for the curriculum implementation, most of them stated that limited human resource, lack of adequate resources, and a decrease in salaries demotivate them. They suggested remedial measures such as the recruitment of more teachers in medical colleges, revised salary scales, more training sessions for curriculum implementation and revision of standard books as per the revised curriculum.

In our study, a professor pointed out that, as an administrator, it is difficult to motivate their staff to believe in and support the abrupt transformation in the curriculum and issued a call to the higher authorities to ensure that the programme is meeting the demands of the community. As the curriculum was rolled out abruptly, the implementation should be given more time.

Conclusion

Though all medical teachers are positively inclined towards the implementation of the competency-based curriculum, factors

such as limited human resource, inadequate resources, cumbersome paperwork and exhaustive workload may hinder the successful implementation of the competency-based curriculum.

Knowledge and skills of medical teachers should be regularly updated through training, seminars and workshops and they should be actively involved in the curriculum change process to create a favourable environment among teachers for the effective implementation of the competency-based curriculum. The curriculum reformers should not rush to completely replace the curriculum as total transformation of any curriculum requires time.

The findings of the present study can be extended to the entire nation to evaluate medical teachers' readiness to implement the competency-based curriculum and the results may be compared to other states. Like other reforms in medical education, competency-based medical curriculum is a work in progress and its successful implementation may take several years as it requires judicious utilization of resources and a positive mindset of stakeholders.

ACKNOWLEDGEMENTS

We extend our gratitude towards Dr Anmol Mathur, Associate Professor, Department of Public Health Dentistry, D.Y. Patil Vidhapeeth, Pune, for his expertise and assistance through all aspects of our study and Dr Manish Jain, Professor and Head, Department of Public Health Dentistry, SNBT Dental College and Hospital, Nasik, for doing the statistical analysis. We also thank the participants of the study who spared their valuable time to fill the survey questionnaire.

Conflicts of interest. None declared

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