Original Article

Challenges and opportunities in the implementation of competency-based medical education – A cross-sectional survey among medical faculty in India

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Abstract:

BACKGROUND: In India, competency-based medical education (CBME) is gaining foothold to transform the medical student into a doctor fulfilling community and societal needs. With that end in view the teaching faculty are getting sensitized and trained by the National Faculty Development Program (FDP). We aimed to assess the awareness about FDP among teaching faculty in medical colleges and study the attitude and perceived barriers to implementation of CBME.

METHODOLOGY: A cross-sectional, electronically distributed, questionnaire-based study was conducted among medical faculty in India. The questionnaire identified participants' awareness, attitude, and perceived barriers to CBME. Descriptive analysis was employed for continuous variables and internal comparison employing Chi-square test with α <0.05 for statistical significance.

RESULTS: Among 251 participants 90.2% faculties from private institutes had undergone FDP as against 71% from Government sector (P = 0.008). We observed that 92.4% were aware, 80.2% had undergone Curriculum Implementation Support Program and 95.2% did agree that CBME will improve the medical education system. Major challenges perceived were high student to faculty ratio (67.7%), ill developed infrastructure (41.4%) and difficulties in assessment (41.1%). The popular solutions suggested were to increase faculty strength (73.7%), improve infrastructure (69.3%), extra remuneration (35.9%) and increase administrative support (30.7%). There was significant difference of opinions between teaching faculty of government and private sector (P = 0.017).

CONCLUSION: Most of the medical faculty are aware of the need and have acquired a positive attitude towards enforcement of CBME. However, significant barriers do exist in the form of manpower and resources which need to be addressed.

Keywords:

Competency-based Medical Education, Faculty Development Program, Graduate Medical Education Regulations, Indian Medical Graduate, Medical Education

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Introduction

Medical curriculum worldwide is experiencing a paradigm shift towards Competency Based Medical Education (CBME), an outcome-based structure that needs the integration of information, skills, values, and attitudes into observable and measurable competencies. In our country there have been decisive steps in that direction as well.[1,2] The need for betterment in medical education is based on landmark recommendations of the Accreditation Council of Graduate Medical Education of America which mandates the acquisition of six domains of competencies namely, patient care, knowledge, practice-based

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learning, communication skills, professionalism, and systems-based practice.[3-6]

CBME emphasizes a shift from teacher-centered to learner-centered educative methods and a systematic interdisciplinary integrated learning rather than piecemeal information in each department. Another noteworthy alteration is problem-based learning which triggers the scholar to arm himself with knowledge crucial to encounter and solve real-life problems within the hospital or community. Entrustable Professional Activities are observable and measurable outcomes in CBME which bridges the gap between idea and practice of technical skills thereby integrating multiple competencies in a holistic nature.[7-9] CBME is conducive to the Dreyfus model which emphasizes the medical graduate to travel past five milestones-a novice, advanced beginner, competent, proficient, and expert as a graded transition[10] [Figure 1].

The goal of CBME is to produce an Indian medical graduate who is envisaged as a doctor fulfilling the roles

of clinician, leader, communicator, professional and lifelong learner[13,20] [Table 1]. The new regulations on Graduate Medical Education (Amendment), 2019 is more learner-centric, patient-oriented, gender-sensitive, and environment-appropriate leading to an outcome-driven curriculum, in conformity with global trends. To initiate the process of transformation from traditional curriculum into CBME, the teaching faculty of medical institutions need to be sensitized and moulded into the modern-day medical education facilitators. The National Faculty Development Program (FDP) initiative of the Medical Council of India (MCI) is a step forward in the direction, which aimed to enable and empower faculty of every medical institution across the country by a structured and perpetuating process[11] [Figure 2].

There has been a steep rise in the number of medical colleges in India from 297 in 2009 (146 within the Government sector and 151 within the private sector) to a total of 554 medical colleges in 2019 (285 within
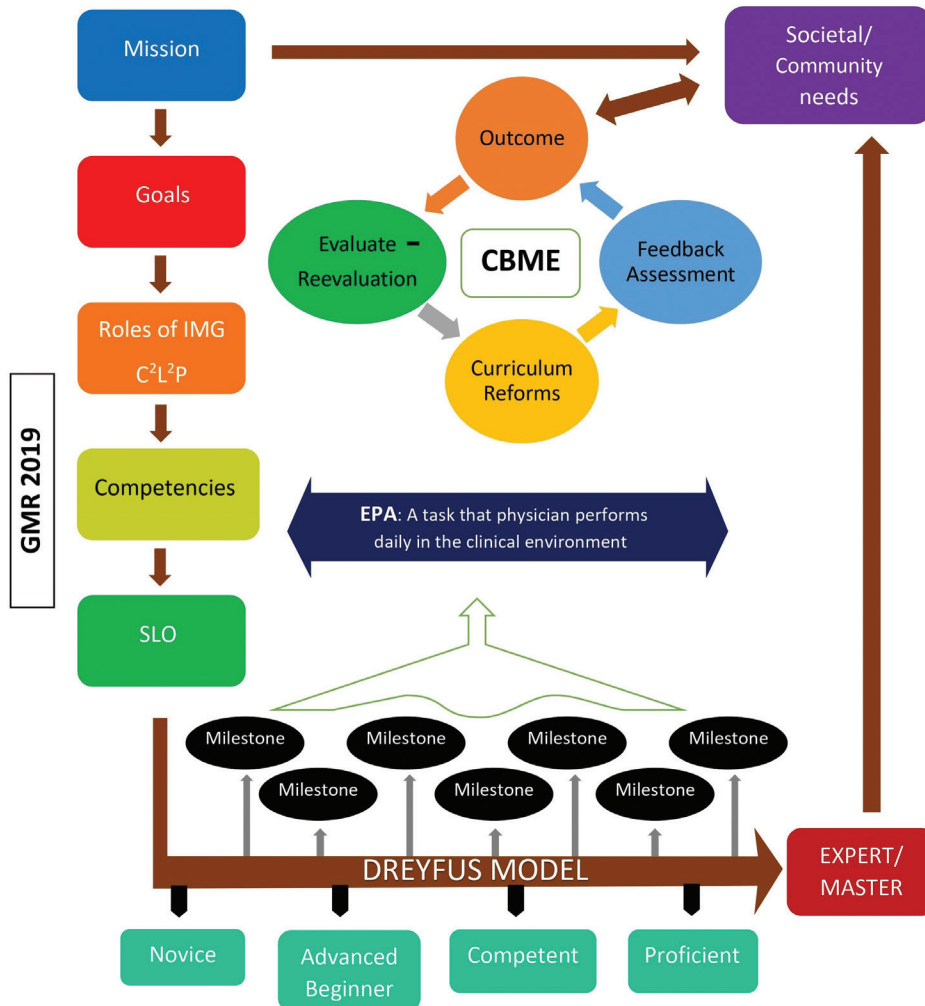

Figure 1: Shows link between Graduate Medical Regulations 2019 and societal need. C²L²P: Clinician, Communicator, Lifelong learner, Leader, Professional
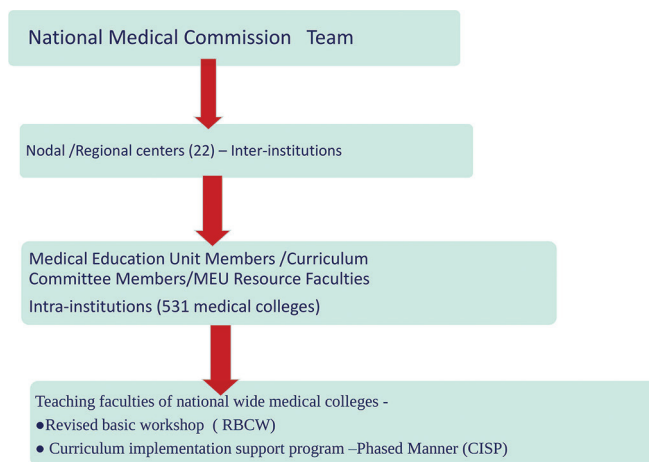
Figure 2: Shows rollout plan for the implementation of CBME in India

Table 1: Represents the roles of Indian Medical Graduate and new components of Graduate Medical Education Regulations 2019

Roles of IMG with description	New components of GMER 2019
Clinician - Preventive, promotive, curative, palliative and holistic care with compassion	Foundation course
Communicator - Patients, families, colleagues and community	Early clinical exposure AETCOM
Leader - Leader and member of the health care team - Collect analyze, synthesize and communicate health data	Self-directed learning Elective posting Basic research
Lifelong learner - Continuous improvement	Problem-based learning Integrated and aligned learning
Professional - Ethical, responsive and accountable	Reflection and meta-cognition

GMER=Graduate Medical Education Regulations, AETCOM=Attitude ethics and communication, IMG=Indian Medical Graduate

the Government sector and 269 within the private sector).[10-14] In the last 10 years FDP of MCI had trained 44,932 faculties in Basic Course in Medical Education Technology through 1697 workshops conducted by regional centers and nodal centers. The Curriculum Implementation Support Program (CISP-Phase 1) had been implemented through 557 programs which trained 15,509 faculty in a record time of 7 months.[15]

Though FDP's have been in vogue since 2009, till date very little research has gone into assessing the faculty's knowledge and mental preparedness to embrace CBME. Neither has it been evaluated whether the training process had percolated to the grass roots. In this research we aimed to study the existent level of awareness, attitude, and perceived barriers towards implementation of CBME among teaching faculty of medical institutes countrywide.

Materials and Methods

Study design and setting
This multicentric cross sectional study was conducted among teaching faculty from medical colleges of India. The study was conducted by the Medical Education Unit members of Government Sivagangai Medical College and Government Villupuram Medical College. Study period was August 2020–February 2021.

Study participants and sampling
The participants were teaching faculty of medical colleges. Assuming that 50% of participants were aware of CBME, minimum sample size needed at 95% confidence interval and 5% precision was calculated using formula $n = z^2pq/E^2$. Based on this formula sample size required was 178. Probability sampling method using Stratified Sampling Technique was employed to ensure equitable representation from all segments of medical education like pre, para and clinical departments. All teaching faculty presently serving in Indian Medical Schools were eligible to participate. However only those with a minimum of 2 years of teaching experience were included. Faculty presently on leave for >6 months or on psychotropic support or medications were excluded.

Data collection tool and technique
A validated questionnaire was propagated using an online platform (Google forms). The validity was done by external expertise. The external validity was done by non-participating expert faculty in the field from institutes other than parent study center. The questionnaire was piloted among the first 50 participants and further refined based on feedback. There were 3 sections in the questionnaire-Section A dealt with informed consent of the participants and their sociodemographic data. Those who consented to the study could access the Section B which addressed the awareness of the faculty and Section C investigated attitude and perceived barriers to implementation of CBME in our health system. Only fully completed forms could be successfully submitted. The study team regularly scrutinized data collection process and met periodically to review the study conduct and computing of data. At the end of study period, the coded and consolidated data were analyzed using IBM SPSS version 22. IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp.

Analytical method
The Section A containing sociodemographic data was analyzed using descriptive methods of frequency such as percentage. Internal comparison between faculty of government sector and private sector in awareness about FDP (Section B) and attitude and perceived barriers on CBME (Section C) was done by cross tabulation and comparison of percentages. Chi-square test was used to test statistical significance ($P < 0.05$). Descriptive analysis was carried out for assessing the closed response questions about perceived barriers to CBME. The questionnaires are as per Tables 2 and 3.

Table 2: Comparison between teaching faculty of government and private sector in faculty development program awareness

FDP awareness	Government sector		Private sector		*P*
	F	**P (%)**	**F**	**P (%)**	
Have you undergone any FDP?					
Yes	142	71.00	46	90.20	0.008*
No	58	29.00	5	9.80	
If no, reason for not attending any FDP					
Did not get an opportunity	52	89.66	3	60.00	0.159
Not aware	5	8.62	2	40.00	
No time	1	1.72	0	0.00	
If yes, which of the following FDPs have you undergone?					
CISP	113	79.58	39	84.78	0.314
Revised basic course workshop	93	65.49	36	78.26	
AETCOM	69	48.59	32	69.57	
Basic course workshop	69	48.59	31	67.39	
ACME	25	17.61	18	39.13	
FAIMER	3	2.11	4	8.70	
Are you holding any other degree in medical education	4	2.82	3	6.52	
Are you aware that a few of the above mentioned FDPs are mandatory for promotion?					
Yes	186	93.00	49	96.08	0.536
No	14	7.00	2	3.92	
Do you agree that FDPs are important to improve teaching skills of medical faculties?					
Agree	190	95.00	49	96.08	0.722
Disagree	6	3.00	2	3.92	
Do not know	4	2.00	0	0.00	
Are you aware of the existence and functioning of MEU in your institution?					
Yes, aware of its existence, functions and activities	164	82.00	47	92.16	0.170
Yes, aware of its existence, but not aware of its functions and activities	32	16.00	3	5.88	
No, not aware of its existence	4	2.00	1	1.96	
Do you agree that FDPs will be helpful for implementation of CBME?					
Agree	193	96.50	47	92.16	0.107
Disagree	2	1.00	0	0.00	
Do not know	5	2.50	4	7.84	
Are you interested in attending all the FDPs?					
Yes	183	91.50	44	86.27	0.295
No	17	8.50	7	13.73	

FDP=Faculty development program, CISP=Curriculum implementation support program, AETCOM=Attitude ethics and communication, ACME=Advanced course in medical education, FAIMER=Foundation for Advancement of International Medical Education and Research, MEU=Medical education unit, CBME=Competency-based medical education, F=Frequency, P=Percentage. * P value<0.05 was considered statistically significant

Ethical consideration

The study was approved by Institutional Ethics Committee of Government Sivagangai Medical College and Hospital.

Results

A total of 251 Teaching faculties (200 from Government Institutes and 51 from Private Institutes) completed the questionnaire. The sociodemographic features of participants included age group 25–30 (4.4%), 31–40 years (40.6%), 41–50 years (37.1%), 51–60 years (17.9%). Pre, para, and clinical discipline participants were 34.3%, 29.1% and 37.5% respectively. Among the study sample 188 (80.9%) had undergone at least one FDP, the most common being CISP [Table 2] and their perception of major challenges included high student to faculty ratio (67.7%), infrastructural deficiencies (41.4%), and nonfeasible assessment methods (41.1%). The solutions suggested were boosting faculty strength (73.7%), revamping infrastructure (69.3%) performance-based remuneration (35.9%), and additional administrative support (30.7%) [Table 3].

Internal comparison between government and private medical college faculty revealed a significant increase in FDP attendance by the latter (*P* = 0.008). Furthermore, the groups differed in their ways to overcome barriers of CBME (*P* = 0.017). However, there was no difference in terms of teaching skills, MEU functions, and awareness [Table 2]. 95.2% agreed that FDP was conducive towards implementing CBME.

Table 3: Comparison between teaching faculty of government and private sector in attitude and perceived barriers on competency-based medical education

Attitude and perceived barriers on CBME	Government		Private		P
	F	P (%)	F	P (%)	
Are you aware of CBME being implemented by NMC in a phased manner?					
Yes	183	91.50	49	96.08	0.360
No	17	8.50	2	3.92	
If yes, do you think it can be effectively implemented in your institution?					
Yes	140	76.50	34	69.39	0.461
Partly	42	22.95	15	30.61	
No	1	0.55	0	0.00	
In your opinion, CBME is					
Is a positive step forward in improving the present system of medical education	190	95.00	49	96.08	1.000
Is a wasteful exercise without much productivity	10	5.00	2	3.92	
Which according to you are the main changes in GMER 2019?					
Early clinical exposure	162	81.00	47	92.16	0.511
Integrated teaching	164	82.00	45	88.24	
Foundation course	164	82.00	43	84.31	
Self-directed learning	153	76.50	45	88.24	
AETCOM module	148	74.00	41	80.39	
Elective posting	132	66.00	39	76.47	
Basic research	127	63.50	31	60.78	
Reflection and meta-cognition	92	46.00	28	54.90	
Problem-based learning	33	16.50	19	37.25	
In your experience/perception in what aspects have you faced/expect to face challenges in implementation of CBME?					
Issues involving faculty	132	66.00	38	74.51	0.969
Issues involving infrastructure	83	41.50	22	43.14	
Issues involving assessment	78	39.00	26	50.98	
Issues involving curriculum	61	3	17	33.33	
Issues involving students	54	27.00	16	31.37	
In your opinion the most important step to facilitate CBME implementation is					
Increase the faculty numbers in medical colleges	148	74.00	37	72.55	0.017*
Improve the infrastructure for teaching learning methods	136	68.00	38	74.51	
Provide extra remuneration to existent faculty	66	33.00	24	47.06	
Ensure political and administrative will to achieve results	48	24.00	29	56.86	

*p value < 0.05 was considered statistically significant. CBME = Competency-based medical education, GMER = Graduate Medical Education Regulations, AETCOM = Attitude ethics and communication, NMC = National Medical Commission, F=Frequency, P=Percentage

Discussion

Indian medical education system, one of the largest in the world is under the process of transforming itself into a structured and globally relevant principle.[16] Some of the hallmark alterations in the present curriculum include incorporation of androgogical teaching methods like Self Directed Learning (SDL), cooperative learning, small group teaching, community practices, special emphasis on formative assessment and wholesome acquisition of skills to function as part of the health care team. Such landmark reforms in education system are possible only if the medical educator understands and embraces the concept of CBME. This sets into motion the chain of events finally culminating in an education system on par with international standards. FDPs are crucial first steps fueling the evolution of modern day medical education facilitators.

In our study pre, para, and clinical faculties participated in adequate numbers to be representative of their respective fields. The majority were of the cadre of Assistant Professor, Associate Professor and Professor. In our study the government faculty outnumbered those from private institutes probably because the authors were from government sector and better identified among the same population.

Previous research by Rustagi *et al.* identified that 44.8% faculties had undergone RBCW and 39.7% attended CISP.[15] Appreciably we documented 64.5% RBCW trained and 74.9% trained in CISP which is encouraging and a significant improvement over the former record Figure 3. The remaining faculty quote lack of opportunity as reason behind the lapse presumably due to heavy work burden. Nevertheless 93.6% are still aware that RBCW has been made mandatory for consideration for

promotion in ranks. This leaves a large lacuna to be filled and is at the behest of the administrative heads to create opportunities for all.

The Medical Education Units of medical schools play a pivotal role in organizing FDP for all faculties. In this regard, it was reassuring to find that 84.1% of participants were well aware of the structure and functions of MEU [Table 2] and 95.2% strongly agreed to the crucial role of FDP in implementing CBME. An appreciable fraction (>70%) of the study responders remained updated about the newer components of Graduate Medical Education Regulations most notably, the foundation course, early clinical exposure, integrated teaching, attitude, and communication module and SDL. In comparison with the report by Rustagi *et al*., our observations were far more encouraging.[17] The former had recorded only 12.9% faculty awareness about curriculum and 56.9% negative attitude towards CBME.

Reforms in the educational field are fraught with challenges and impediments. Truthfully so, research findings by Kulkarni *et al*. in 2020 found that student to faculty ratio, poor infrastructure, time constraints, lack of commitment and human inertia to be the main hurdles in the way of CBME.[16,18] Our findings mirrored similar reflections among the faculty as depicted in Table 4. To highlight a few, demotivation, fatigue among faculties, lack of administrative support and nonuniformity in assessment methods were perceived as significant barriers to implement the new curriculum.[19] The mindset and attitude of teachers accustomed to the traditional curriculum has to change if CBME aims to spread roots into the system.[20] The noteworthy opportunities which the faculties were aware of

included free and easy availability of resourse material and guidelines for CBME implementation in the NMC website and rollout plan. The main strength of the study was its multicentric nature and unearthing of the core issues in CBME. Hearteningly we found that majority of our participants (95.2%) housed a positive attitude and were willing to walk the tight rope to enforce reforms.

The authors stand to understand that though there are quite a few impediments en route to full operationalization of CBME, the stakeholders are conducive and the transformation has long begun. However, we recommend that politically committed administrative support and feedback evaluation from faculty and students be given due weightage to ease out the wrinkles of the system. The authors also strongly recommend the need to take feedback evaluation from student population. Furthermore, regional and institutional surveys are recommended which may reveal many other specific implementation issues to be addressed for success of CBME.

Limitation and recommendation

The major limitation of this study was its sample size. We conducted the study during the peak phase of COVID 19 pandemic which probably evoked a less optimal response from the participants. Though the minimum appropriate sample size as per statistical formula was achieved a larger sample would definitely have been more informative. Another drawback was a thin

Figure 3: Pictogram showing number of participants undergone faculty development program (*n* = 251)

Table 4: Perceived problems and suggested solutions for implementation of competency-based medical education by faculties

Perceived problems	Perceived solutions
Challenges for faculty	
Lack of awareness	Motivation and sensitization programs with feedback evaluation
Disinterest	
Lack of guidance	Promotion/incentives
Frequent transfers	MEU and inter department cooperation
Increased student: faculty ratio	increased faculty strength
	Optimization of student to faculty ratio, and training the junior residents and interns
Challenges with infrastructure and administration	
Poorly developed MEU	MEU strengthened as per NMC norms and sensitization of administrative staff
Lack of administrative support	
	Dedicated faculty, paramedical staff should be posted for medical education department
Challenges with students and assessment	
Lack of students awareness of CBME	Students need to be trained and sensitized about new curriculum with feedback evaluation and re-evaluation
Lack of uniformity in assessment	
	Mentorship program needs to implemented
	National wide universities coordination for assessments

CBME=Competency-based medical education, MEU=Medical education unit, NMC=National Medical Commission
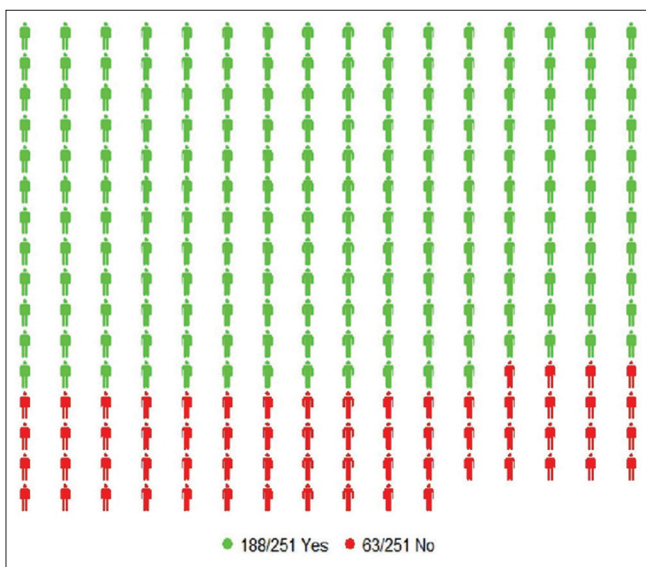
representation from the private sector institutes. The authors being from government run institutions couldn't evoke a more energetic response from their counterparts in the other sector.

The authors recommend further larger scale research studies investigating the preparedness of faculty across the nation with appreciable participation from rural colleges as well.

Conclusion

There is an existing favorable environment for change from traditional curriculum to CBME. Most of the faculty of medical institutes across the country are aware of the need and have acquired a positive attitude to enforce the educational reform. Significant barriers do exist however in the form of manpower and resources which need to be addressed by political commitment and administrative spearheading.

Conflicts of interest
There are no conflicts of interest.

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;32:638-45.PMID: 20662574 https://doi.org/10.3109/0142159X.2010.501190.

2. Bansal P, Supe A. Faculty development for competency based medical education. NJIRM 2017;8:(5) 89-95.

3. Al-Temimi M, Kidon M, Johna S. Accreditation council for graduate medical education core competencies at a community teaching hospital: Is there a gap in awareness? Perm J 2016;20:16-67.PMID: 27768565 PMCID: PMC5101093https://doi.org/10.7812/tpp/16-067.

4. General Medical Council. Tomorrow's Doctors: Education Outcomes and Standards for Undergraduate Medical Education. Available from: http://www.gmc-uk.org/Tomorrow_s_Doctors_1214.pdf_48905759.pdf. [Last accessed on 2016 May 16].

5. Frank JR, Danoff D. The CanMEDS initiative: Implementing an outcomes-based framework of physician competencies. Med Teach 2007;29:642-7.PMID: 18236250 doi.org/10.1080/01421590701746983.

6. Modi JN, Gupta P, Singh T. Competency-based medical education, entrustment and assessment. Indian Pediatr 2015;52:413-20.PMID: 26061928 doi.org/10.1007/s13312-015-0647-5.

7. Somdatta Patra Amir Maroof Khan Development and implementation of a competency-based module for teaching research methodology to medical undergraduates. J Educ Health Promot 2019;8:164.PMID: 31544128 doi.org/10.4103/jehp.jehp_133_19.

8. Ten Cate O Nuts and bolts of entrustable professional activities. J Grad Med Educ 2013;5:157-158. doi.org/10.430/JGME-D-12-00380.1.

9. Ten Cate O, Scheele F. Competency-based postgraduate training: can we bridge the gap between theory and clinical practice? Acad Med. 2007 Jun; 82(6):542-7. doi: 10.1097/ACM.0b013e31805559c7. PMID: 17525536.

10. Batalden P, Leach D, Swing S, Dreyfus H, Dreyfus S. General competencies and accreditation in graduate medical education. Health Aff (Millwood). 2002 Sep-Oct;21(5):103-11. doi: 10.1377/hlthaff. 21.5.103. PMID: 12224871.

11. Ghosh A, Bir A. Role of written examination in the assessment of attitude ethics and communication in medical students: Perceptions of medical faculties. J Educ Health Promot. 2021 Jan 28;10:23. doi: 10.4103/jehp.jehp_424_20. PMID: 33688532; PMCID: PMC7933678.

12. Medical Council of India. College and Course search. Available from: https://www.mciindia.org/CMS/information-desk/college-and-course-search. [Last accessed on 2020 Apr 15].

13. National Medical Commission, Information Desk/National Faculty Development Programme New/https://www.nmc.org.in/[Last accessed on 2021 Nov 18].

14. Mahajan R, Badyal DK, Singh T. Online faculty-development programme for medical teachers in resource poor settings: Behind the scene.J Res Med Educ Ethics 2017;7:163-8.

15. Medical Council of India. Curriculum Implementation Support Program (CISP I): First Year Report; 2019. p. 1-49.

16. Deswal BS, Singhal VK. Problems of medical education in India. Int J Community Med Public Health 2016;3:1905-9.

17. Rustagi SM, Mohan C, Verma N, BinduT Nair. Competency-based medical education: The perceptions of faculty. J Med Acad 2019;2:1-5.

18. Kulkarni P, Pushpalatha K, Bhat D. Medicaleducation in India: Past, present, and future. APIK J Int Med 2019;7:69-73.

19. Caverzagie KJ, Nousiainen MT, Ferguson PC, Ten Cate O, Ross S, Harris KA *et al.*, Overarching challenges to the implementation of competency-based medical education. Med Teach. 2017 Jun; 39(6):588-593. doi: 10.1080/0142159X.2017.1315075. PMID: 28598747.

20. Herur A, Kolagi S. Competency-based medical education: Need of the hour: Let's do our bit…!!. BLDE Univ J Health Sci 2016;1:59-60.