

## THE UNPRECEDENTED TIMES OF COVID-19 PANDEMIC AND THE ONLINE MEDICAL EDUCATION: -A SURVEY REPORT-

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### ABSTRACT

**Background:** In the year 2019 the National medical commission was ready to roll open its newly framed competency-based curriculum (CBME) and the colleges and medical universities were all geared up and trained to do the same. The tale began at a new pace with the academic session 2020 but was jolted soon by the spreading tentacles of COVID-19 pandemic. This disease made a drastic impact on education delivery system and the medical graduates were soon facing the challenge of not only revised curriculum but also the revised methodology of teaching. The present study compares the outcome of online education for students with CBME and with traditional variant of medical education. **Material & Methods:** A retrospective survey analysis questionnaire was created on google forms, on the basis of DREEM questionnaire [appendix 1]. The student's perspective was scored on Likert scale. The students were divided into study groups following traditional and CBME curriculum. The SPSS system was utilized to find the mean score of responses and student t-test and chi square tests were used. **Results:** The comparison of results for student's perception towards online education suggested statistically non-significant outputs between the genders but significant difference for study groups i.e. traditional vs. CBME curriculum. **Conclusion:** This survey highlighted that curating the new format of curriculum for delivery in an online format would produce better outputs and making availability of resources for use during online classes can increase the performance of students to be better aligned with graduate medical regulations.

**Key Words:** COVID-19, online education, curriculum, CBME.

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### INTRODUCTION:

The National Medical commission modified the traditionally running medical curriculum into Competency Based curriculum after almost two decades, in the year 2019.[1] The stakeholders were kept in the center during formulation of the new competency-based curriculum (CBME) where skill based, small group interactive sessions, clinical exposure at the very beginning of first phase of the curriculum and self-directed learning were introduced.[2] This was done to facilitate students to acquire more practical, skill based and patient centric approach. The didactic lectures were reduced and an

addition of foundation course and AETCOM (attitudes, ethics and communication) module by the Medical Council of India (MCI), now National Medical Commission (NMC), was introduced for students to acquire better communication skill, apt professional attitudes and to further enhance their ethical standards.[3,1] While the students and teachers were still trying hard to adjust and understand this reform in the curriculum, came the most unprecedented times of covid pandemic.[4] The lockdown imposed by the pandemic was not a clear solution while looking way forward in the medical arena where this pandemic desired better and proficient healthcare providers.[5] To keep pace with

education during the COVID -19 pandemic, the medical colleges and universities reframed the CBME curriculum to online format to keep up with the time frames of the curriculum.[6] The difficulties faced by teachers, especially, those who were less familiar with technology was a challenge but was well accepted by many. In spite of all odds, the colleges were able to complete the gloomy year of covid education and students took their sessional examinations in the month of February-March 2021. The examinations were preceded by thorough practical training which was mandated by the governing authorities as per order published on 25<sup>th</sup> of November 2020.[7]

After facing the challenge of online education and providing their output during the assessment phase, students' perspective towards online education was better defined and framed. Taking this into consideration, a survey was planned for MBBS students to analyze the pros and cons of online education, the difficulties and challenges faced by them, the expertise of teachers to modulate and the good, bad and ugly of online teaching.

#### **MATERIALS AND METHODS:**

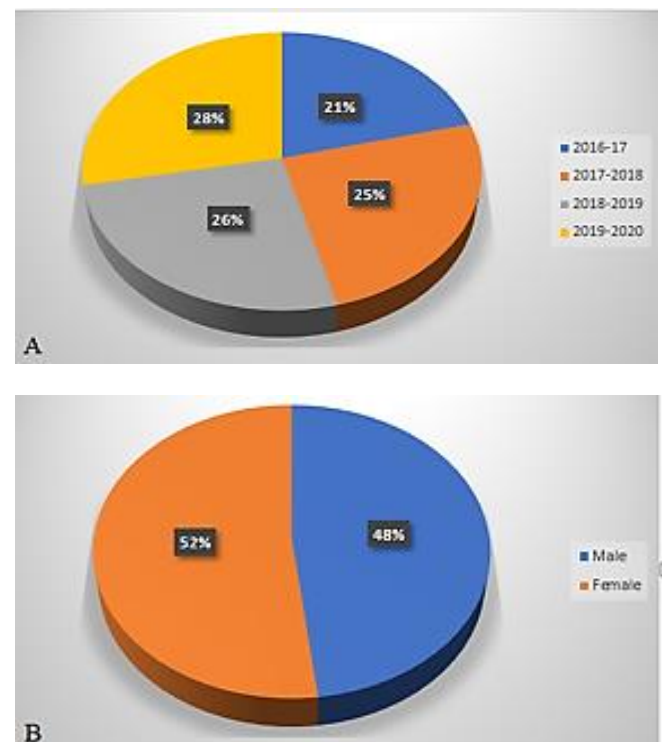
A google form based on The Dundee Ready Education Environment Measure (DREEM) was created in January 2021[8]. It included students' demographic details, students' perception towards online teaching, students' perception towards teacher/facilitator (providing online training) and students' perception towards nuances of technology. The questions were dichotomous or scored on a Likert scale [9]. Towards the end an open-ended question was kept to get the free opinion of students towards this modality of teaching. Before circulating the questionnaire to all students, a pilot study was conducted taking 20 students from each batch, for validation of the questionnaire. The students were pre-informed about the study and the form was circulated to only consenting students. The whole process was guided by the medical education unit (MEU) of Heritage Institute of Medical sciences (HIMS), Varanasi and took complete three months. A total of 516 responses were achieved after 72 hours of uploading the google form. The learning management system (LMS) used by the institute was same for all batch students and training was provided to both the students as well as the teachers before actual execution of the classes on the LMS. The time table for all batches was created under strict supervision of the MEU of HIMS and was framed keeping in mind the hazardous effects of long use of laptops, desktops

etc. The total duration of classes was kept 2-4hrs per batch on all working days and an interval of 15 minutes was scheduled between the sessions. The results, hence obtained, from the survey were also analyzed under the same subheadings as the questionnaire. The results were tabulated for total number of students as well as the Likert score was generated for students following CBME curriculum (Group A) and those with traditional curriculum (Group B).

The SPSS 18.0 system was utilized to find the mean score of responses and student t-test was used to compare results between the genders and for students following traditional and CBME based curricula [10,11] Chi square test was used to analyze the statistical significance for response obtained for effect of online teaching on assessment score of the students. For all the tests, the confidence interval was set at 95% with  $p < 0.05$  considered as significant.

#### **RESULTS:**

A total of 560 undergraduate students were available for survey but responses could be achieved only from 516 students. The categorization of responses as per batches and their gender demography is shown in **figure 1**.



**Figure 1: A distribution of students as per year of admission, B Gender distribution of subjects**

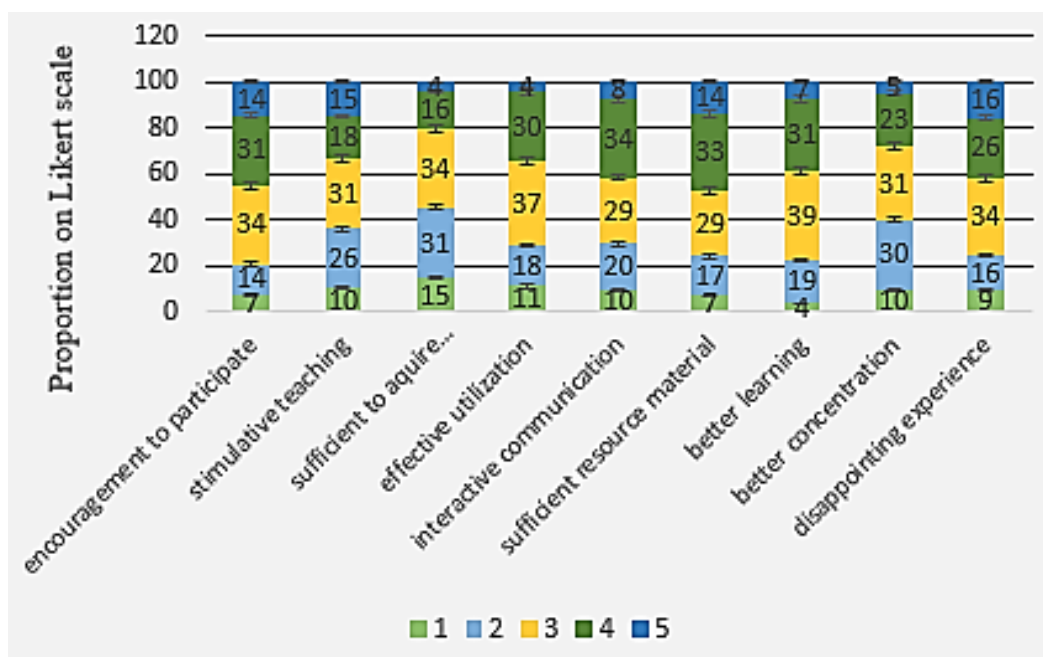
The distribution of subjects between each batch was found to be non-significant (confidence interval 95% and  $p < 0.05$ ). The gender distribution within each batch was also found to be statistically non-significant ( $p < 0.05$ ) as shown in **Table I**.

**Table I: Gender wise distribution of students between the two curricula**

Students with	Male N (%)	Female N (%)	Total N (%)	Chi-square /p value
CBME curriculum (2019-20 batch/Group A)	69(47.6%)	76(52.4%)	145(28.1%)	0.018/0.89 NS
Traditional curriculum (2016,2017,2018 batches/Group B)	179(48.2%)	192(51.8%)	371(71.9%)	
Total	248(48.1%)	268(51.9%)	516	

*n*=number, *NS*=non-significant

The proportion of responses on the Likert scale under the domain students' perception about online learning is shown in figure 2. The 58.7% of students experienced less stress while taking online classes, as compared to in-person sessions.



**Figure 2: Students' perception of online learning; 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree**

The analysis of students' perception of teachers towards technical acumen and innovation in teaching methodologies is shown in **figure 3**.

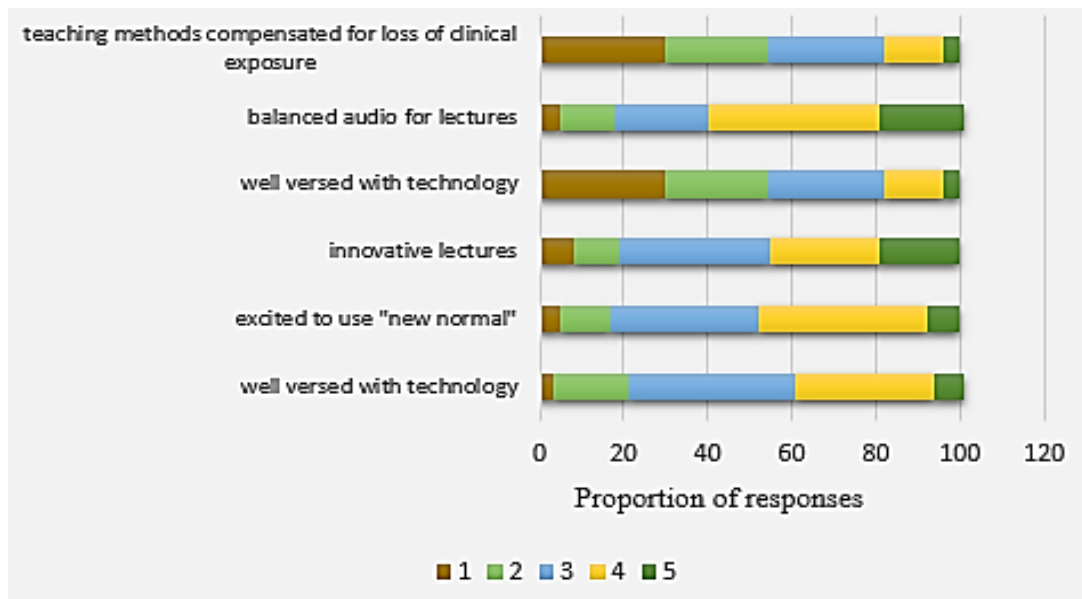


Figure 3: Students' perception of teacher; 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree

The analysis of students' perception towards technology reports that for 66%-48% of students faced technical error or network issues during the active sessions and hence were not comfortable in attending the sessions. The major limitation reported by more than 40% of students was audio and visual fatigue and for more than 70% of students the classes were more of a mono-dialogue type. The

comparison of results for the students following CBME curriculum and for students with traditional curriculum was also done. The domain used for this comparison was the students' perception towards online teaching. The gender difference for students' perception towards online education is depicted in **table II**, where scores were non-significant for gender.

Table II: Mean Likert's score for Students' perception on online teaching methodology as per gender

Students' perception towards online teaching	Mean score ± SD (MBBS batch with CBME curriculum/ Group A)			Mean score ± SD (MBBS batches with traditional curriculum/ Group B)		
	Male	Female	P value	Male	Female	P value
	I was encouraged to participate in online classes	3.55±1.44	3.66±1.46	0.31 NS	3.01±1.08	3.23±.72
The online course content, teaching was stimulating	3.55±1.66	3.36±1.76	0.23 NS	2.69±1.26	2.78±.72	0.29 NS
The online modality was sufficient to develop my competence skills	3.09±1.23	2.96±1.16	0.27 NS	2.29±.82	2.39±.78	0.25 NS
The online teaching time was put to good use	3.42±1.03	3.27±1.04	0.22 NS	2.62±1.15	2.81±.81	0.13NS
The communication was interactive during the classes	3.49±1.37	3.46±0.94	0.45 NS	2.65±1.12	2.97±.82	<b>0.04* S</b>
The resource materials used were sufficient& effective	3.69±1.29	3.24±1.47	0.11 NS	3.04±1.1	3.16±1.05	0.25 NS
I was able to concentrate well	3.3±1.37	3.04±0.94	0.08 NS	2.49±.99	2.58±.99	0.28 NS
I could learn better at leisure	3.1±1.02	3.27±0.96	0.26 NS	3.22±.94	3.16±.69	0.33 NS

SD=standard deviation, NS=non-significant, S=significant

The students' perception for online teaching was found to be statistically significant between the two study groups as shown in **Table III**.

**Table III: Mean Likert score for students' perception on online teaching methodology as per study groups**

<i>Students' perception towards online teaching</i>	<i>Mean score ± SD (MBBS batch with CBME curriculum/ Group A)</i>	<i>Mean score ± SD (MBBS batches with traditional curriculum/ Group B)</i>	<i>P value</i>
I was encouraged to participate in online classes	3.6±1.47	3.09±0.97	.000125. S
The online course content, teaching was stimulating	3.45±1.7	2.7±1.03	< .00001 S
The online modality was sufficient to develop my competence skills	3.03±1.19	2.32±0.9	< .00001 S
The online teaching time was put to good use	3.34±1.03	2.7±1.01	< .00001 S
The communication was interactive during the classes	3.48±1.18	2.78±1.14	< .00001 S
The resource materials used were sufficient & effective	3.55±1.39	3.07±1.06	.000293. S
I was able to concentrate well	3.18±1.17	2.53±0.88	< .00001 S
I could learn better at leisure	3.21±0.98	3.19±0.86	.440407* NS

*SD=standard deviation, S= significant, NS= non-significant*

The impact of online teaching on the student performance was also analyzed and is shown in **Table IV**.

**Table IV: Effect of online teaching on performance during assessment**

<i>Student with / Response</i>	<i>Did the online teaching affected your performance during examinations</i>				<i>Chi-square/P value</i>
	<i>Yes</i>	<i>No</i>	<i>Maybe</i>	<i>Total</i>	
CBME curriculum	61 (42%)	18 (12.5%)	66 (45.5%)	145	13.15/
Traditional curriculum	111 (29.9%)	27 (7.3%)	233 (62.8%)	371	0.0014
Total	172	45	299	516	Significant

## DISCUSSION

The medical curriculum in India had always been face-to-face teaching supplemented with development of skill component in ways of cadaveric dissection, practical sessions, laboratory readings, bed-side examinations etc. However, the education environment took a sudden transition from in-person classes to remote learning due to the spreading pandemic of COVID 19. This affected students in the middle of their sessions and both students and the faculties were caught off-guard. The medical education environment, globally, took a turtle turn where active learning and assessments were replaced by online sessions and non-proctored assessments.[12] The present survey is an effort to analyze the opportunities and challenges of online teaching and modulate the curriculum further for forth-coming students.

For the survey, students of both genders and from both types of curricula (traditional vs CBME) were analyzed. The number and gender frequency within the two groups was observed to be statistically non-significant (vide supra, figure 1A&B). Similar non-significant difference between genders was observed in earlier study on foundation course of CBME curriculum by the author.[3]

### 1. *Students' perception to online teaching:*

Responses pertaining to this domain show that the largest proportion for majority of the responses was given a Likert score of 3(neutral) except for the sufficient utilization of academic resources. The total disagreement to online education environment occupied very little proportion of the whole for each question asked, ranging from 4%-15%. There has been an earlier addition of technology in form of problem-based learning, case scenarios and small group teaching in form of tutorials and self-directed learning which probably explains the neutral response on the scoring scale by majority of the students.[13,14] Similar results were obtained in studies conducted globally where online education was well accepted both nationally and internationally[15,16].A study conducted on students of Taiwan by Bali et al although could not appreciate statistically significant difference between students' perspective towards in-person vs online teaching[17].The new CBME curriculum further highlights the significance of self-directed learning and integration of systems, which probably worked with students in the lesser time span made available to them during this pandemic. The addition of various other modalities of resource materials in form of 3D models, videos or from virtual teaching learning management systems could have further increased the proportion of higher acceptance (a score of 4 or more) of students towards online



learning. It is rightly said assessment drives learning [18] and in the online set-up, the assessments were mainly un-proctored which created a non-conducive environment for the students. The roll-over from campus education to home set-up resulted in lack of concentration, lack of peer group learning and distraction caused by family and of course we cannot omit the psychological stress of covid pandemic [19,12]

### **2. *Students' perception of teachers with technology:***

The results show that though the teachers were comfortable to use the technology but were not very complacent to innovate with technology. Earlier studies have also shown that teachers take addition of technology into classroom teaching as an extra burden [20]. The sudden transition provided little scope for the teachers to understand the online pedagogy. This probably explains the results for students' perception of teachers on technology. The excitement in teachers to use the new normal was there but the lack of expertise, experience and lack of available resources limited their skill to use technology in the best possible way. The loss of practical sessions, dissection and clinical exposure created by pandemic needed to be compensated but teachers were still struggling to find the best suited teaching material and the methodology.[21,22]

### **3. *Comparison for students following traditional vs CBME curriculum:***

The comparison of mean score between the genders for each group students was found to be non-significant for all responses except for interaction in between sessions. Gender affects everyday interactions and thus it may produce an impact in the virtual classes also. Though men are considered better in technology and interactions but there is also a study which states that females are better listeners in online sessions.[23] The gender precisely may not be the reason for involvement in an e-classroom, the sense of self efficacy, social belongingness and individuals emotional state of well-being also contributes effectively in participation in interactions.[24]

The comparison of score between the two-study group show that the scores are higher for Group A i.e for students following CBME curriculum and the results were significant between the two groups. The probable reason could be that the new curriculum is more integrated, technology based with problem-based learning, case-scenarios and was already more

e-centric and hence students could cope well with the transition from in-person classes to online teaching. However, lack of clinical exposure in real time hospital-based settings acted as an effective barrier to their degree of acceptance to online teaching methodology. The traditional curriculum was more teacher centric, with more of didactic lectures and even the assessments were text based with long or short answer-based questions and this traditional mode of learning acted as a challenge for majority of the students to accept the online teaching methodology, thus presenting with a lower score on the lower side of the scoring scale.

Comparison of performance in assessments for both the groups also provide significant results, where majority of the students opined about a negative impact of online teaching on their performance score. This can be explained by the fact that teachers were not well versed with the online mode of teaching but if the content of the course is curated suitably probably this mode can enhance learning standards in a limited time span.

Students also positively responded to a blended approach for the curriculum. Similar results of better knowledge outcomes have been observed in a study conducted earlier by Vallee A et al [25] where blended learning was well promoted by students.

## **CONCLUSION**

The healthcare and medical teaching environment had to undergo rapid transition in all modes of delivery and performance. To keep themselves abreast with the changing needs, the providers as well as stakeholders had to become "digitally literate". The lack of resources, time and non-uniform policy of the online education for the academic sessions in the year 2020 could not cope up well but if the curriculum is suitably designed and well curated probably it would enhance the expected outcomes of new CBME based curriculum. A well structured and accurately designed curriculum, with stringent time lines, provided for execution to all medical colleges and universities at the same time could probably enhance the learning outcomes expected through this curriculum.

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**CONFLICT OF INTEREST:** Nil

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