

Online Teaching during Pre and Para Clinical Phase in Response to COVID-19 Pandemic and its Impact on Clinical Training-Perception of Indian Medical Students

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ABSTRACT

Background

COVID-19 pandemic has thrown a lot of challenges at medical education system and has necessitated a swift change from conventional classroom/laboratory-oriented/bed-side teaching to technology based online teaching. Academicians have worked hard to overcome robust challenges to facilitate students' continued learning.

Objective

In the wake of this drastic shift in teaching methodology, the present study aimed to investigate and understand the perceptions of medical students about online teaching and its impact on clinical training.

Method

Fifty students of 1st Year MBBS professional course of 2019 admission batch voluntarily and anonymously filled-in a questionnaire on online teaching and its effects on learning compared with regular classroom teaching in 2020 within 3 months of introduction of first ever online teaching methodology. Same students were followed up with same questionnaire during their final year of MBBS course in April 2023. Additionally, they were given a questionnaire to assess the impact of this shift on their learning.

Result

In Indian scenario most of the students opined regular classroom teaching as the better method over online teaching reasoning that concentration and learning are better in classroom teaching. Additionally, internet connectivity and accessibility issues further affected the reach and effect of online teaching. This perception did not change from 1st year to their final year. Also, the students believe that shift in teaching methodology has hampered negatively on their learning, understanding and developing clinical skills.

Conclusion

Overall Indian medical students preferred regular classroom teaching over online teaching.

KEY WORDS

Classroom Teaching, Clinical skills, Covid-19, Online teaching

INTRODUCTION

Global scenario due to COVID-19 is fast changing and adapting to novel situations arising from social distancing and lock-down are challenging. Absence of face-to-face teaching had led to a change-over to online teaching. Medical institutions in India were the first few to adapt online teaching. As a part of COVID-19 guidelines, Government of India issued directives to suspend classroom teaching.¹ But to keep the continuity without loss of academic year, universities in India were directed to continue teaching by online method. But these policy decisions were made without considering the opinions of the students, the primary recipients.

In first year, students study Anatomy, Physiology and Biochemistry, of which Anatomy and Physiology have extensive "hands-on" hours with a strong emphasis on future clinical application of learnt concepts and skill-sets. Consequently, challenges are more in teaching anatomy and physiology online. Post COVID-19, teaching and learning method has changed to online mode. Teachers responded to this enthusiastically and creatively, ensuring students comforts for learning as students are forced to study remotely, exercise social distancing and where necessary, self-isolation. This shift provides the opportunity to assess future approach to curriculum design for online teaching. But it is important to know the perception of the students, the end beneficiaries who must understand and learn to become competent care givers. The present study is designed to assess and understand the perceptions of the students about online teaching and the impact of the same on their learning during the later part of their MBBS course.

METHODS

Questionnaire based cross sectional descriptive survey study design was used and cluster sampling method was employed. All fifty students of 1st professional MBBS course enrolled in the year 2019 at the All India Institute of Medical Sciences, Bibinagar, Telangana, India, a premier federal government medical institute were included and none was excluded from the study. After obtaining informed written consent, students were asked to fill in voluntarily and anonymously a prevalidated semiquantitative questionnaire containing 15 statements with response options from 1 to 4, 1 being strongly disagree and 4 being strongly agree. The same questionnaire was given to the students twice - once during their 1st year in June 2020 and again when they were in final year in April 2023. Additionally, students were given a 5-statement questionnaire in April 2023 to know the impact of shift in teaching methodology due to COVID-19 on their learning, understanding and developing clinical skills and patient care. Students were also encouraged to comment freely about the pros and cons of online teaching in addition to the statements given in the questionnaire.

Student response data was tabulated and distribution across all 15 questions were calculated and expressed as percentages using Microsoft Excel. All the procedures were carried out in accordance with the ethical standards as per the guidelines of the Helsinki Declaration.

RESULTS

All 50 students returned duly filled and completed questionnaire both the times. At the first time assessment of student perception in June 2020 just after the first lockdown, majority of the students believed online teaching classes are not as enjoyable as classroom teaching. Students opined that motivation is higher in classroom teaching with less distraction and consequently easier to maintain concentration in classroom teaching. Student responses indicated that student participation and interaction is better, with higher sense of community and co-operative learning in classroom teaching. Students strongly disagreed with the statement that time taken to understand and learn in online teaching is similar to classroom teaching implying that it is better in classroom teaching. Teacher communication was also perceived to be poorer in online teaching classes compared to classroom teaching. The results indicate that ease of learning in online teaching classes is variable with respect to subdivisions of the subject (Table 1). The response of the students to almost all these statements remained the same even during their Final year of study when the same questionnaire was administered in April 2023, though with a slight drifting. But with respect to the role of online classes in facilitating student participation and interaction and developing a sense of community and co-operative learning, even higher percentage of students disagreed in 2023 than in 2020 (Table 2).

One interesting observation of the study is that almost half of students disagreed that it is more difficult to ask questions and get answers in online teaching than in regular classroom teaching suggesting heterogeneity of perceptions, with many students being at ease with asking questions and interacting with teachers in online teaching. Almost the same ratio was seen in 2023. Majority of the students agreed that absence of face-to-face interaction with teachers has negative effect on learning, technology involved and lack of experience made online teaching more confusing and the availability and accessibility of infrastructure are major issues with online teaching compared to classroom teaching.

Almost 75% of the students in their first year in 2020 were of the opinion that theory teaching and learning with online teaching was not as effective as classroom teaching and learning in classroom teaching (Table 1). But this perception seems to have changed considerably over time. By final year, only about half of the students were of that same opinion, indicating a more favourable outlook

Table 1. Perception of students about online teaching during 1st MBBS Course - June 2020.

Statement	Strongly Agree 4	Agree 3	Disagree 2	Strongly disagree 1
1. Online teaching classes are more enjoyable than regular classroom teaching.	6	22	52	20
2. There is higher motivation to attend online teaching than classroom teaching.	6	12	48	34
3. There are less distractions in online teaching than in classroom teaching	4	2	56	38
4. It is easier to maintain concentration in online teaching than in classroom teaching	4	16	56	24
5. Time taken to understand and learn is same in online teaching as in classroom teaching.	2	38	38	22
6. Student participation and interaction is better in online teaching than in classroom teaching. *	8	24	44	22
7. There is higher sense of community and co-operative learning in online teaching than in regular classroom teaching.	2	32	42	24
8. Teacher communication is better in online teaching than in classroom teaching.	2	12	62	24
9. All subdivisions of the subject are equally easy to learn in online teaching compared to classroom teaching.**	2	16	42	36
10. It is more difficulty to ask questions and get answers in online teaching than in regular classroom teaching	16	26	46	12
11. Absence of face-to-face interaction with Teacher in online teaching has negative effect on learning.*	48	30		
12. Technology involved, and lack of experience make online teaching more confusing than classroom teaching.	22	28		
13. Availability and accessibility of infrastructure are major issues with online teaching compared to classroom teaching.	30	48		
14. Overall, learning with online teaching is as effective as in regular classroom teaching.	4	14		
15. Overall, online theory teaching is as effective as regular classroom teaching. *	10	18		

Values are expressed as % (n = 50), *One, **Two unattempted statement responses.

Table 2. Perception of students about online teaching during Final MBBS Course - April 2023.

Statement	Strongly Agree 4	Agree 3	Disagree 2	Strongly disagree 1
1. Online teaching classes are more enjoyable than regular classroom teaching.	6	28	52	14
2. There is higher motivation to attend online teaching than classroom teaching.	4	20	54	22
3. There are less distractions in online teaching than in classroom teaching	2	10	56	32
4. It is easier to maintain concentration in online teaching than in classroom teaching	0	20	52	28
5. Time taken to understand and learn is same in online teaching as in classroom teaching.	6	40	42	12
6. Student participation and interaction is better in online teaching than in classroom teaching.	6	18	52	24
7. There is higher sense of community and co-operative learning in online teaching than in regular classroom teaching. *	2	14	66	16
8. Teacher communication is better in online teaching than in classroom teaching.	4	12	72	12
9. All subdivisions of the subject are equally easy to learn in online teaching compared to classroom teaching.	2	24	56	18
10. It is more difficulty to ask questions and get answers in online teaching than in regular classroom teaching	2	48	42	8
11. Absence of face-to-face interaction with Teacher in online teaching has negative effect on learning.	30	44	22	4
12. Technology involved, and lack of experience make online teaching more confusing than classroom teaching.	18	52	22	8
13. Availability and accessibility of infrastructure are major issues with online teaching compared to classroom teaching.	28	54	14	4
14. Overall, learning with online teaching is as effective as in regular classroom teaching.	4	40	44	12
15. Overall, online theory teaching is as effective as regular classroom teaching.	6	36	40	18

Values are expressed as % (n=50), *Oneunattempted statement responses

towards online learning teaching - at least for theory classes (Table 2).

Additionally, students indicated that continuous online teaching sessions are stressful for eyes. Students liked to have online classes as teaching and learning tool for revisions and felt that this will be highly useful for retaining the concepts. Students also indicated that recording of online teaching classes adds advantage and is useful for learning at their leisure time. Interestingly some of the students have identified and suggested that it is difficult to concentrate in online teaching because of the home environment.

Further, the students' perception for questionnaire on the effect of online teaching methodology during COVID-19 pandemic on learning clinical subjects revealed that students strongly believe that learning efficiency and knowledge acquisition in clinical subjects has become difficult and online teaching during COVID-19 has negatively affected application of concepts of basic sciences to clinical sciences, resulted negatively on development of clinical skills relevant to patient care. Students believed that clinical sciences topics contingent on the topics in basic sciences that were taught in regular offline mode before the pandemic were easier to understand. Finally, it was opined that complete regular practical sessions in offline mode rather than online mode would have been more beneficial in dealing with patients (Table 3).

DISCUSSION

The results of the present study clearly indicate that students prefer regular classroom teaching over online teaching. Furthermore motivation, concentration, understanding, participation, interaction, community learning and cooperative learning are much better in classroom teaching than online teaching. It is also clear that the shift in teaching mode due to COVID-19 was not only NOT appreciated by the student community but it also has negative impact on their understanding, developing clinical skills pertinent to patient care. Susanna Loeb reported that online classes are less effective than classroom teaching, as were a couple of other studies which suggested that online courses were less effective, and students faced more difficulty in learning in online classes compared to face to face classes.² Online classes are not only less effective for learning and understanding but also have negative impact on the academic performance as indicated by lowering of students' grades. This downgrade had a great impact not only on that course but also on those courses which needed the knowledge of the previous semester.³ The results of the present study are in line with the previous reports in that in-person courses have a much better effect than online courses.⁴

Majority of the students disagreed that time taken to understand and learn is same in online teaching as in

Table 3. Perception of students on the impact of online teaching during Covid on clinical training.

Statement	Strongly Agree 4	Agree 3	Disagree 2	Strongly disagree 1
1. Due to online teaching methodology during Covid - 19, learning efficiency and knowledge acquisition in clinical subjects has become difficult.	42	56	2	0
2. Switching from face-to-face teaching to online mode due to pandemic has negatively affected application of concepts of basic sciences to clinical sciences.	22	60	18	0
3. It has been easier to understand clinical sciences topics contingent on the topics in basic sciences that were taught in regular offline mode before the pandemic.	20	60	20	0
4. Online teaching during Covid – 19 pandemic has resulted negatively on development of clinical skills relevant to patient care.	44	42	12	2
5. Complete regular practical sessions in offline mode rather than online mode would have been more beneficial in dealing with patients.	58	34	4	4

Values are expressed as % (n = 50).

classroom teaching. This was also found by an earlier study wherein students did not perceive any difference in rate of learning with use of digital teaching tools compared to a traditional dissection and lecture format. But the same study also found that long-term retention of material is influenced by the addition of digital learning tools and proposed to consider the same as a beneficial supplementary tool.⁵ This is in-line with the perception of students' in this study who suggested that online teaching classes are less effective without in-class practical teaching and online teaching classes are a good tool for revising the topics which have been taught earlier in classroom teaching. This observation drives us to plan curricula and teaching in such a way that it could be a blended way of teaching as perceived by the students, the primary beneficiaries. Chen et al. mentioned that blended courses are successful and are welcomed by both teachers and students.⁶ Sadhegi et al. demonstrated that the students' learning rate is increased by the blended method, with the suggestion that e-learning could be used as a supplement to traditional teaching methods.⁷ Brockman et al. also reported that students desire having a blend of online and in-person teaching and learning activities.⁸ Blended education was preferred by most medical students due to

the dual advantages of traditional and distance learning strategies.⁹ This has also been the perception of students in our study. These observations emphasise the need for further research directed towards student perception of online teaching Vs classroom teaching and blending of both the methodologies.

Students believe that face to face teaching has a more favourable environment for learning since it involved instructors engaging with students more often, resulting with students being less distracted by the surroundings in the presence of instructors.¹⁰ Students in this study also disagree that there are less distractions in online teaching than in classroom teaching with majority agreeing that absence of face-to-face interaction with teacher in online teaching has negative impact on learning. Anticipating this issue, all teachers were trained to make as much eye contact with students as possible during the teaching session. In addition, small group interactive discussions, impromptu quizzes, question-answer sessions and spotter identification exercises etc which have been found to be beneficial had been used as much as possible.^{12,13} In spite of these efforts, the students' response do suggest the need to further increase the quality of student-teacher communication and interaction to improve effectiveness of online teaching. Though the students' opinion in the present study was divided regarding the role of technology as a limiting factor in online education, educators would still need to address the issue of technology involved being a hurdle combined with lack of experience among students which could possibly make online teaching more confusing than classroom teaching. An earlier report shows that poor technical skills, inadequate infrastructure, time constraints etc., are few barriers to the implementation of e-learning in medical schools.¹¹ Interestingly majority of the students disagreed that it is more difficulty to ask questions and get answers in online teaching than in regular classroom teaching. This should provide a good boost for designing and improving the online teaching classes.

In the present study the opinion of the students indicated that shift in teaching had negatively impacted on understanding and learning clinical subjects, this is in line with the report stated that many participants agreed in acquiring knowledge E-learning was satisfactory, but it was not effective in acquiring clinical and technical skills.¹⁴ Because of visual as well as verbal discussion many students feel that no technology can replace face-to-face teaching in real.¹⁵ In the present study also students believe that switching from face-to-face teaching to online mode due to

pandemic has negatively affected application of concepts of basic sciences to clinical sciences. Students also opined that it has been easier to understand clinical sciences topics contingent on the topics in basic sciences that were taught in regular offline mode before the pandemic. Thus, it is of cardinal importance that in medicine which is a skilled field we assess the efficacy of online classes and accordingly take measures to ensure proper delivery of content to students. Majority of the students agreed that online teaching during COVID-19 pandemic has resulted negatively on development of clinical skills relevant to patient care. This is supported by the study of Meyer et al. which states that the COVID-19 pandemic has reduced the amount of practice opportunities, thus negatively affecting practical skills.¹⁶ Further, in our study students agreed that complete regular practical sessions in offline mode rather than online mode would have been more beneficial in dealing with patients. Same was suggested in Meyer et al. study that additional practice should be provided to students.¹⁶

One limitation of this study is that correlation between students' perceptions and their actual performance in subsequent assessments was not ascertained, because of inherent limitations of the anonymity of the participants. Additionally differing competencies and variable effectiveness of different teachers involved in the online teaching could be a confounding variable affecting student's perceptions of online teaching.

CONCLUSION

In conclusion it is opined that classroom teaching with face-to-face interaction is a more effective way for learning, concentrating, understanding in comparison to online teaching. These results also provide scope to think and improve online teaching where better interaction with students needs to be planned. A blend of online and in-person teaching and learning activities, as suggested by multiple studies and has been the perception of students in the present study, could be a way forward. The perception of students did not change about the online teaching even in their final year of course study. Further, the shift that was adopted in teaching methodology due to COVID-19 has substantial negative impact on the learning, understanding and developing clinical skills pertaining to the patient care. Future research should help and aid in the design, evolution and adaptation of medical curriculum to accommodate the needs of the students, the institution and the felt needs of the community and target population.

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