

Students' Perspective on Online Medical Education During the COVID-19 Pandemic: A Cross-Sectional Study

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ABSTRACT

Background: The COVID-19 pandemic and subsequent lockdowns have contributed to the rise of new digital platforms for online education worldwide. This mode of teaching has its own merits and drawbacks. Yet, it is increasingly recognized as the only viable method of instruction during the pandemic. This study sought to evaluate students' perceptions of different aspects of online teaching in pandemic times.

Methods: This cross-sectional study was conducted among 257 undergraduate medical students during October 2020. Their informed consent was obtained, and a validated researcher-made questionnaire with 51 closed-ended items was distributed among them using Google Forms. Data were analyzed using SPSS version 22, and all the statistical tests were conducted at a significance level of 5%.

Results: Findings revealed that 241 students (93.8%) attended online classes using smartphones, whereas only 4 students (1.6%) used laptops. Most students (n=164, 63.8%) were conversant with the use of internet/online apps (P<0.0001). Also, a majority (n=156, 60.7%) disagreed with the time-saving benefit of online classes, and 29 students (11.3%) argued that live lectures offered greater scope for connection with teachers as compared to online classes. Finally, 209 students (81.3%) believed that they were less attentive in online lectures than in live lectures, and 180 (70.1%) were not willing to attend these lectures after the pandemic.

Conclusion: Although online teaching is a very powerful and effective means of teaching in this pandemic, it was observed that students were less favorable toward online classes due to non-availability of books, technical problems and network connectivity issues. It is worth noting that working with live patients in real clinical settings is vital to medical education and cannot be fully replaced by e-learning.

Keywords: Medical students, Questionnaire, Perception, Medical Education, COVID-19

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Introduction

The COVID-19 pandemic has forced an abrupt shutdown of medical schools around the world, bringing conventional medical education to a standstill. Many institutions have switched to other forms of teaching, which involve the deployment of digital platforms (1). This state of affairs is bound to leave medical students in a state of dilemma. The new e-learning methods have had an invariable psychological effect on learners (2). These methods had not previously been put to widespread use, especially in areas struggling with internet connectivity problems. Medical educators across the world are weighing the advantages and disadvantages of e-learning, and may need to rethink their policies accordingly (3). Online classes provide flexibility, ample resources, timely feedback, and positive interactions with students (4). However, adequate access to computers and the Internet is an essential prerequisite for this approach in education. Although most teachers and students are digitally literate and tech savvy, full-time online education is still a new experience.

Despite the growing global trend toward e-learning, this method had never been adopted in Indian medical education up until the pandemic struck. In the Indian scenario, a number of limitations have been observed including network issues, lack of bedside clinical skills, absence of an integrated approach and limited student-teacher interaction (5, 6).

In order to address such issues, it is critical to know about medical students' views and experiences regarding different aspects of online teaching. This study aimed to investigate students' perceptions of this new methodology and their suggestions for its further refinement.

Methods

Study Design and Setting

This cross-sectional study was conducted in the first week of October 2020 at Shaheed Hasan Khan Mewati Government Medical College, Nalhar (SHKM GMC), located in

Nuh district, Haryana, India. The College launched its programs in 2013 with its first batch of MBBS (Bachelor of Medicine and Bachelor of Surgery) students, and since then it has admitted an average of 100 MBBS students each year. There were a total of 527 MBBS students (regular batch and additional batch) at the time of this study.

An online teaching program was launched in our tertiary care-teaching institution from April 22, 2020. As per the roster of scheduled didactic lectures, these classes were conducted daily in classroom settings. Google Meet software was used by teachers to deliver three classes in different subjects which were attended by around 100 students. Each class was held for a time period of 60 minutes. A follow-up online survey was then planned. Following the issuance of ethical clearance by the institutional ethics committee of SHKM, this online survey was administered among the participants.

Participants

The study population consisted of 527 undergraduate medical students enrolled in different programs offered by SHKM GMC. Based on the Cochran formula, our sample size was estimated to be 222 students. To compensate for the expected dropouts, a sample of 270 participants were selected by simple random sampling, using random number table. The individuals who were studying at SHKM at the time of the study and were willing to participate, were included in the sample. Those who failed to return the questionnaires or returned incomplete questionnaires were excluded from the study. Finally, a total of 257 respondents from all undergraduate years returned the completed questionnaires. Participation in the study was voluntary and informed personal consent was obtained from all participants. The respondents ranged in age from 20 to 24 years, and expressed their willingness to participate in the study.

Data Collection Tool

A web-based questionnaire consisting

of 3 sections with closed-ended items was developed for an assessment of online teaching in COVID-19 period (see the [Appendix](#)). The first section was comprised of 8 questions aimed at evaluating the clarity and ease of online classes. The second section consisted of 19 items scored on a five-point Likert scale (ranging from 1=strongly agree to 5=strongly disagree). The third section displayed the questions regarding content delivery and mode of instruction respectively. Some suggestions were also made for the improvement of online classes. The face and content validity of the questionnaire were assessed by an expert committee including 15 members of medical faculty at the SKVM. The committee was made up of experts from different departments, including an associate professor, a professor, an expert in educational psychology and a curriculum study expert. These members were selected through purposive sampling technique.

Content validity index (CVI) was 0.776 and the validity of the questionnaire was confirmed based on Lawshe table for CVR (7). To examine the reliability of implementation at the University, the questionnaire was distributed to 30 medical students. The results were then used as a guide for modifying the sentence structure of some questions and preparing the final version of the questionnaire. Reliability was obtained using Cronbach's alpha coefficient ($\alpha=0.91$), indicating adequate reliability of the employed instrument.

The respondents were assigned a three-day window to complete the questionnaire. All instructions along with a brief paragraph on the aims and objectives of the study were mailed to the participants. All questions were mandatory and sufficient time was given to each respondent to read, comprehend and answer all the questions. The average time taken to complete the survey was ten minutes.

Statistical Methods

The data collected was analyzed using IBM SPSS Statistics for windows version 22.0.

Ethical Considerations

The purpose of the study was explained. Informed written consent was obtained from all the study participants. Anonymity and confidentiality of the participants was maintained.

Results

A total of 257 undergraduate students participated in the study and returned the completed questionnaires. After gathering data, 10 participants were excluded from the study process due to the submission of incomplete questionnaires. A nearly equal representation of participants from each undergraduate academic year was observed in the study sample. The average age of the respondents was 20.95 ± 1.57 years, and male-to-female ratio was 3:1.

In total, 164 students (63.8%) were conversant with the use of internet/online apps, while 126 (49%) did not have adequate internet facilities at home and also struggled with technical problems. We did not observe great enthusiasm towards online classes ($P=0.09298$). Also, 161 students (62.6%) did not have access to reference books at home, and 159 (61.9%) were hesitant in interacting during online classes ($P<0.001$) (Table 1). Majority of the students ($n=238$, 92.6%) wanted the teachers to share PPTs/electronic materials. In this study, we determined the face validity of the questionnaire by asking the students the questions on a five-point scale ranging from "Strongly Disagree" to "Strongly Agree". Some students experienced difficulty with the clarity of content and diagrams. Most students ($n=156$, 60.7%) disagreed with the time-saving benefit of online classes, and 29 (11.3%) claimed that live lectures provided a greater scope for connection with teachers as compared to online classes (provided in the [Appendix](#)). Most of the students were not comfortable with online teaching, suggesting that it should be used as a supplementary method to in-person teaching, and they did not look forward to continuing with these online

Table 1. Descriptive analysis

Characteristic	No(%) / Mean±SD	P value
Age	20.95±1.57	
Gender		
Male	193 (75.10)	<0.0001
Female	64 (24.90)	
Anatomy/Physiology/Biochemistry	91 (35.40)	
Microbiology/Pathology/Forensic Medicine/Pharmacology	83 (32.30)	
Medicine & allied/ Pediatrics/Surgery & allied/Obstetrics & Gynecology/CM	83 (32.30)	
Screen Use for online class		
Laptop	4 (1.6)	<0.0001
Smartphone	241 (93.8)	
Tablet	12 (4.7)	
Did you feel excited with the starting of online classes		
Yes	129 (50.2)	0.9298
No	128 (49.8)	
Are you conversant with the use of internet/online apps		
Yes	164 (63.8)	<0.0001
No	93 (36.2)	
Do you have adequate internet facility at home for online classes		
Yes	131 (51)	0.6595
No	126 (49)	
Do you have appropriate setting (room/place) to attend online class		
Yes	148 (57.6)	0.0006
No	109 (42.4)	
Do you face any technical problem during online classes		
Yes	193 (75.1)	<0.0001
No	64 (24.9)	
Do you have access to reference books at home		
Yes	96 (37.4)	<0.0001
No	161 (62.6)	
Do you feel hesitant in interacting during online classes		
Yes	159 (61.9)	<0.0001
No	98 (38.1)	
Do you want your teachers to share PPTs/ electronic study material with you?		
Yes	238 (92.6)	<0.0001
No	19 (7.4)	

Table 2. Suggestions for improving the online classes (n=257)

1	Limiting the time to a specific duration (e.g. for up to 30 minutes or so)	190 (73.93)
2	Lectures taken during morning / noon (e.g. between 9 am to 12 pm etc.)	171 (66.54)
3	Limiting the number of slides (e.g. 20-25 slides)	179 (69.65)
4	Limiting the number of lines per slide (e.g. 8 lines)	95 (36.96)
5	Other	19 (7.4)
6	Timing	3 (1.17)
7	Offline	3 (1.17)

sessions after COVID-19 Pandemic. Nearly one-fourth of the students (n=64, 24.9%) were in full agreement with the notion that online teaching enhanced the pressure on them for self learning. Furthermore, 64 students (24.9 %) strongly disagreed with the idea that online teaching develops interpersonal skills among learners. According to most of the respondents, online teaching would make it difficult to complete the curriculum in the stipulated time. Students were mostly in favor of sharing the PowerPoint presentations

before the start of the online lectures (see the Appendix). The mean total perception score among participants was 25.5±13.18, and a statistically significant difference was observed when comparing the mean total perception scores of the participants from various academic years. The students did also make some suggestions for the improvement of the online classes (Table 2).

Discussion

Medical schools worldwide have now

adopted online teaching as an alternative means of teaching medical students to minimize the impact of lockdown. Fortunately, current technology paves the way for embracing e-learning as the main method of delivering curriculum during the COVID-19 pandemic. The widespread closure of physical classrooms has further highlighted the urgent need for reform in medical education. As it appears, there is a major uncertainty surrounding the duration of this pandemic, hence the need for online classes for an unforeseeable future. In this respect, the students' perception is of utmost importance regarding this online approach.

In our study, around half of the students were enthusiastic about their online classes. Most of them were conversant with the use of ICT gadgets, but a higher percentage faced technical issues or were hesitant in interacting with instructors.

On a global scale, there are currently more than 1.2 billion children in 186 countries affected by school closures due to the pandemic (8). With regard to the gadgets, mobile phones have become the most popular devices among students for e-learning as compared to laptops and tablets. In one of the studies conducted on university students, it was found that 66% used mobile devices for e-learning (9), which is much lower than the percentage reported in our study (93.8%).

Verma et al. concluded that almost all of the students found online sessions to be relevant and tailored to their educational needs (10). Seventy five students (57%) felt that these classes were safe, comfortable and enjoyable, and most of them asserted that studying the presented topics alleviated their stress during the pandemic (10). A clear majority believed that these classes helped with proper utilization of time (10).

There are several advantages of online classes including ease of access to educational materials and learners' ability to choose the favorite place to study. Online learning also reduces the cost of accommodation and transportation. However, there are

certain drawbacks like limited interaction with patients and lack of bedside teaching. Teaching in these settings is highly critical in medical education and cannot be realized in online teaching mode. Since most of the students did not experience this online teaching before the pandemic, they faced technical issues in this approach (11, 12).

A Poland-based study investigated the learners' perceptions of learning methods and their role in increasing knowledge, and the results revealed that there was no statistical difference between face-to-face and online learning (13). Face-to-face learning was considered more effective than e-learning in terms of increasing skills ($P < 0.001$) and social competencies ($P < 0.001$), and the students maintained that they were less active during online classes compared to traditional classes (13).

Two other studies revealed that online classes are less appealing due to the absence of bedside learning and practical aspects of learning in the laboratory/clinical environments (14, 15). Mamattah also demonstrated that in comparison to traditional in-person learning, students expressed greater satisfaction with e-learning (16).

Scagnoli et al. (17) concluded that students' satisfaction with online learning had a significant relationship with positive learning experience. In our study, a sizeable majority of participants contended that they were less attentive in online lectures than in classroom lectures and they did not want to continue attending these lectures after the pandemic. Most of them welcomed live-streaming classes with board and chalk, or using PowerPoint presentations followed by PPT sharing. In a study by Bergl et al. (18), the majority of resident respondents observed that Twitter had enhanced their learning. Students' social and collaborative learning techniques allowed them to interact with each other as well as instructors in an open forum so that they can work together to share ideas and expand their knowledge (18).

The coronavirus pandemic has had a

grave impact not only on physical and mental health but also on educational routines around the world. Various containment measures have been taken to prevent its spread. It has brought about the forced shutdown of all schools and colleges across the world. There was an already growing trend and high acceptance of educational technologies before the COVID-19 pandemic. However, this trend was reinforced by a significant surge in the usage of language apps, virtual tutoring, video conferencing tools and online learning software since the outbreak.

The present study concluded that although online classes cannot replace the classroom teaching, they are still considered as a cheap and feasible method at this time of COVID-19 lockdown. They also help students to acquire knowledge, maintain learning routines and remain in touch with their teachers. Teachers are trying to improve the quality of online classes by providing online materials, online practice questions, procedures and examination videos in advance. Assessments should be conducted in the form of MCQ/ scenario-based questionnaires.

The main limitation of this study was that the research sample was drawn from undergraduate medical students at a single government college. Therefore, the results of the study cannot be generalized.

Ethical Considerations

In this study, the following ethical issues were considered: After obtaining permission from the college officials, the online survey began at the SHKM GMC Nalhar. At the beginning of the survey after the researchers had introduced themselves, they explained the objectives of the study and the need to implement them to the students and the written online consent was obtained from students participating in the study. The students were also assured that all information collected will remain confidential.

This study was approved by the Ethics Committee of IEC SHKM GMC (EC/OA-36/20)

Authors' Contributions

S.H. devised the study concept, designed the study, supervised the intervention, data collection and analysis, participated in the coordination of the study, and critically revised the manuscript. A.D and P.R. collected data, ran the study intervention, participated in the study concept, performed the analyses and revised the manuscript. P.C., V.K. and S.D. contributed to the design and analysis of the study data, and drafted the manuscript.

Conflict of Interest

The authors declare that they have no conflict of interests.

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