Original Research Article

Perception of online teaching in medical education in the backdrop of COVID-19 lockdown: a cross-sectional study among medical students of NEIGRIHMS

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ABSTRACT

Background: The current COVID-19 pandemic has forced us to adopt online teaching for medical learning. While there are undoubtedly benefits that online learning provides, the sudden transition to online teaching presented different challenges to the students as well as the teachers. The aim of this study is to explore the perception and experiences of medical undergraduates on online classes in the backdrop of COVID-19 pandemic.
Methods: A cross-sectional study was conducted among 166 medical students in NEIGRIHMS who had exposure to online teaching during the COVID-19 pandemic. A semi-structured questionnaire was distributed after getting informed consent. SPSS 21 version software for Windows was used for data entry and analysis.
Results: Eight in 10 of the students do not prefer online learning. Moreover, they believe that practical skills will not develop through online learning. They cite internet connectivity, device-related and software- related issues as the main difficulties they faced during online classes.
Conclusions: More than two-thirds of the students do not prefer online learning. The institution can be advised to provide the students with adequate skills and knowledge coupled with appropriate technology to address the issue.

Keywords: Online learning, COVID-19, Medical education

INTRODUCTION

COVID-19 was first reported in Wuhan, China on 31st December 2019 and was declared a pandemic by the world health organization (WHO) on 11th March 2020. It presents with pneumonia-like symptoms and in order to contain the spread of infection, quarantine and isolation are required. The second wave of the pandemic has been brutal for India with the country registering record-breaking cases and infections per day. As of 30th June 2021, India recorded a total of 30,362,848 cases and 398,454 deaths.[1]

COVID-19 has disrupted every aspect of the healthcare system, medical education being one of them. In a bid to contain the spread of the virus, India mandated a nation-wide lockdown. As a result, the online mode of teaching replaced the traditional classroom teaching method for the duration of the lockdown. This sudden transition to online teaching presented different challenges to the students as well as the teachers. Practical classes and clinical postings were cancelled which posed a difficulty in effective skill learning. Contact with patients is essential in educating medical students and they cannot only rely on books for medical knowledge and competency.[2] Medical students face challenges that set them apart from most college students, since they can get infection during a clinical session with a patient who is SARS-COV-2 positive, or they can serve as a vector, thus harming the patient and their colleagues including professors and doctors.[3]

It has been established that the barriers to medical E-learning are due to time constraints, poor technical skills, poor infrastructure, lack of institutional strategies, and a general negative attitude towards the huge shift in education methods.[4] Medical education requires bedside and soft skills, which the students cannot learn through online classes. Many medical students have at least once heard during the course of their education, "*What you read, you might forget. What you see (in clinics), you will always remember*".[5]

However, online learning does have some benefits. Teachers, as well as students, see that online learning methods encouraged pursuing lessons from anywhere and in difficult circumstances that prevent them from reaching universities and schools. The student becomes a self-directed learner and learns simultaneously and asynchronously at any time.[6] As academic learning has to continue in spite of the pandemic, it necessitates the importance of exploring student's perception regarding online teaching to come up with solutions for effective learning. This study was conducted with aim of exploring the perception and experiences of medical undergraduates on online classes in backdrop of COVID-19 pandemic.

METHODS

This cross-sectional study was conducted among MBBS Students of academic years 2016-2019 who attended online classes during COVID-19 lockdown in North Eastern Indira Gandhi regional institute of health and medical sciences which is located in Mawdiangdiang, about 7 km from the capital city of Shillong belonging to the state of Meghalaya. A total of 200 students were expected to take part in the study since 50 students are admitted during each academic year. The study took place between 1st March to 26th March 2021. Students who refused to participate and those who were not available even after three visits were excluded from the study.

A questionnaire was used which consisted of 26 questions divided into three parts as follows: Part A: Participants Profile, part B: Online tools, part C: Perception on online classes after explaining the purpose of the study, consent was taken from the participants. They were reassured about their anonymity at the time of distribution of questionnaire. A code number was assigned, and no names were taken to maintain confidentiality.

Data was entered in SPSS 21 version software for Windows. Descriptive statistics like mean and standard deviation were used for continuous variables while frequency and percentages were used for categorical variables. Chi square was used to see the association between variables. A $p<0.05$ was statistically significant.

RESULTS

A total of 184 students attended online classes during the study duration, of which 166 participants gave their consent. Hence, the response rate was 90.21%. The mean age of the participants was 22.10 ± 1.490 years with the minimum age being 18 years and maximum age of 26 years. The mean duration of online classes per day was 2.06 ± 1.044 hours. Table 1 shows the characteristics of the participants. Most of participants were female (52.4%), belonged to 2nd year MBBS batch (31.9%) and whose family income is less than/equal to Rs 40000 (28.9%).

Table 1: Characteristics of the participants, (n=166).

Participant's profile		N (%)
Gender	Male	79 (47.6)
	Female	87 (52.4)
Year of study	Second	52 (31.9)
	Third	34 (20.9)
	Final	42 (25.8)
	Intern*	35 (21.5)
Family income	≤40000	33 (28.9)
	40001-60000	29 (25.4)
	60001-100000	28 (24.6)
	>100000	24 (21.1)

*Interns belonged to the 2016 MBBS batch who experienced online teaching during their final year of study

Table 2 shows online tools used by the participants during online classes. The students mostly used mobile phones (89.8%) during online class. Large majority (92.8%) of the students used mobile data, 61.4% spent less than Rs. 500 for their internet connection and used Cisco-webex (87.3%) as the software for their online classes. Buffering of the internet during the classes occurred multiple times for 42.1% of the students and only 26% of them faced difficulty in using their device during the class.

Table 2: Online tools used by the participants (n=166).

Online tools		N (%)
Type of device used	Mobile phone	149 (89.8)
	Tablet	33 (19.9)
	Laptop	22 (13.3)
	Desktop	2 (1.2)
Type of internet	Mobile data	154 (92.8)
	Broad band	16 (9.6)
	Optical-fibernd	9 (3.4)
Type of software used during online class	Google meet	73 (44)
	Cisco-webex	145 (87.3)
	Zoom	75 (45.2)
	Vidyo	25 (15.1)
Frequency of buffering during online classes	Never	5 (3)
	Rarely	32 (19.5)
	Sometimes	58 (35.4)
	Multiple times	69 (42.1)
Amount spent on internet during online classes in a month (Rs.)	Below 500	102 (61.4)
	500-1000	51 (30.7)
	000-2000	11 (6.6)
	Above 2000	2 (1.2)
Difficulty using device during online class	Yes	39 (26)
	No	111 (74)

Table 3 shows the perception of online teaching by the participants. Only 28.9% of the students had online practical classes during the lockdown. Learning practical clinical skills through online learning was not possible for 86.1% of the students. A third (33.1%) attended the classes regularly; handwritten notes (48.2%) were used as study materials and 99.4% of them were given online assignments. The main difficulties faced during online classes were attributed to internet connectivity issues (72.3%), family distractions (19.9%) and device-related issues (13.3%). The most common symptom faced after completion of the day's virtual teaching sessions was straining of the eyes (61.4%). The students stated that no active training (48.2%) can be achieved from these online classes. A measly 2.5% of the students felt that they had the best interaction with the faculty during the classes. Majority (83.1 %) of the students do not prefer online classes over the traditional classes for the medical students.

Table 4 shows the association between the characteristics of the participants and their preference for online classes. Female students were more against online classes as compared to male students and this was found to be statistically significant. There was no association with year of study and family income.

Table 3: Perception on online teaching by the participants, (n=166).

Perception on online teaching by the participants		N (%)
Practical classes taken online during COVID-19 lockdown	Yes	48 (28.9)
	No	118 (71.1)
Frequency of online classes attendance	Rarely	9 (5.4)
	Sometimes	25 (15.1)
	Mostly	77 (46.4)
	Regularly	55 (33.1)
Type of study materials used	Handwritten Notes	80 (48.2)
	Printed notes	25 (15.1)
	Recorded lectures	46 (27.7)
	Online live lectures	37 (22.3)
Interaction with the faculty on a scale of 1-5 where 1 is very bad and 5 is the best	1	30 (18.4)
	2	60 (36.8)
	3	55 (33.7)
	4	14 (8.6)
	5	4 (2.5)
Difficulties faced during online classes	Internet connectivity related	120 (72.3)
	Device related	22 (13.3)
	Software related	19 (11.4)
	Family distractions	33 (19.9)
	No difficulty	14 (8.4)
	Others	6 (4.8)
Any online assignments given during lockdown	Yes	165 (99.4)
	No	1 (0.6)
Difficulties faced while submitting the online assignments	Internet connectivity related	77 (46.4)
	Device related	23 (13.9)
	Software related	11 (6.6)
	No difficulty	71 (42.8)
	Others	1 (0.6)
Preference of online classes as a mode of teaching over live classes for medical students in future	Yes	14 (8.4)
	No	138 (83.1)
	Not sure	14 (8.4)
Ability to learn practical clinical skills through online learning	Yes	3 (1.8)
	No	142 (86.1)
	Yes, but to some extent	12 (7.3)
	Not applicable	8 (4.8)
Written examinations affected as compared to exams after traditional classroom learning	Yes	94 (57.3)
	No	38 (23.2)
	Not sure	32 (19.5)
Reasons for anxiety during online classes	Not able to clear doubts	49 (29.5)
	Exceeding the limit of your daily data	28 (16.9)
	Instability of the Data connection	62 (37.3)
	No, I didn't feel anxious	43 (25.9)

Continued.

Perception on online teaching by the participants		N (%)
Health symptoms faced after completion of the day's virtual teaching sessions	Headache	44 (26.5)
	Backache	20 (12)
	Neck pain	44 (26.5)
	Eye strain	102 (61.4)
	Others	7 (4.2)
Common problems faced during these classes	No active training	80 (48.2)
	Lack of simplicity in explanation	31 (18.7)
	Lag of audio-visual content	59 (35.5)
	Too fast	30 (18.1)
	Too many in a day	10 (6)
	Time clashes	16 (9.6)
	Too long	21 (12.7)
	I am not facing any problems	15 (9)
	Others	4 (2.4)
Comfort in using the remote learning tools for online study on a scale of 1-5 where 1 is very hard and 5 is the very easy	1	14 (8.5)
	2	42 (25.5)
	3	81 (49.1)
	4	20 (12.1)
	5	8 (4.8)

Table 4: Association between characteristics of the participants with the preference for online classes as a mode of teaching medical students in the future.

Variables		Do you prefer online classes as a mode of teaching over live classes for medical students in the future? ()			P value
		Yes, (%)	No, (%)	Not sure, (%)	
Gender	Male	14 (17.7)	59 (74.7)	6 (7.6)	0.000
	Female	0 (0)	79 (90.8)	8 (9.2)	
Year of study	Second	6 (11.5)	41 (78.8)	5 (9.6)	0.573
	Third	3 (8.8)	26 (76.5)	5 (14.7)	
	Final	2 (4.8)	37 (88.1)	3 (7.1)	
	Intern	3 (8.6)	31 (88.6)	1 (2.9)	
Family income (Rs)	≤40000	4 (12.1)	26 (78.8)	3 (9.1)	0.882
	40001-60000	4 (13.8)	22 (75.9)	3 (10.3)	
	60001-100000	1 (3.6)	25 (89.3)	2 (7.1)	
	>100000	2 (8.3)	20 (83.3)	2 (8.3)	

DISCUSSION

The advancement in digital technology has enabled us to continue medical education in spite of the pandemic. The traditional classroom teaching method, though superior in many ways, had to be substituted in order to make sure the academic activities for the students remain unchanged. With it, came the necessity of using various online tools in order to conduct the classes. Internet connectivity is a prerequisite for all these activities. As such, students have to be well equipped with utilization of all these tools. The students in this study were mostly using their mobile phones (89.8%) and mobile data (92.8%) for attending their online classes. Cisco-webex, a software used for web conferencing and video conferencing was the main software used (87.3%). No doubt being functional, feature-rich, and reliably secure, Cisco Webex is one of the best alternatives to other conferencing platforms.[7] However, students are experiencing buffering of the network multiple times (42.1%) while attending these classes. The maximum bandwidth consumption for a large meeting of 150 people for voice, video and sharing content is 4.5-6 with peaks of 8 Mbps (megabits per second).[8] Webex, in its website has stated that a webinar should consume around 1 GB of data per hour. This amount of data consumption for mean duration of classes in a day being 2.06±1.044 hours will put the students in a financial difficulty as 30.7% of them were spending between Rs. 500-1000 internet pack in a month. Moreover, 72.3% of the students stated that internet connectivity related issues were the main problems that they face during online classes. This is similar to a study conducted in Tamil Nadu by Ramachandran et al where internet connectivity was posing as a challenge as students face either a lag in the video or the audio connectivity, thereby disrupting the natural flow of understanding of the subject.[9] Instability of the data connection (37.3%) was also responsible for the anxiety felt by the students during the class.

Majority (83.1 %) of the students did not prefer online classes as a mode of teaching to live classes. In a recent study conducted in Nepal by Singh et al 94.6% of the students were not in favour of online classes.[10] Another study in France also stated that only one third of the participants favoured online teaching after the end of the COVID-19 crisis.[11] The physical presence of students in clinical settings allows them to actively engage with patients and learn clinical skills through both observation and execution. Working closely with real, volunteer, and standardized patients throughout undergraduate medical education is crucial to developing and refining essential skills.[12] In our study as well, 86.1% reported that they could not learn practical clinical skills through online classes. Moreover, 57.3% of the students believed that their written examinations were affected by the adoption of online learning. The interaction level with the faculty was also not satisfactory with majority of students giving the rating of only two out of 5 (36.8%). Kaya et al observed that the eye health of the university students was negatively affected by the online education of the COVID-19 pandemic process.[13] The students in our study also complained of eye strain (61.4%) being the most common health symptom that they experienced.

Although students are comfortable using the learning tools, most of them do not prefer online classes (83.1%) in the nearer future to traditional live classes. This study found that there is a significant difference in gender towards online learning. Females (90.8%) are more against online learning than males (74.7%). This is in contrast to a study conducted by Wang et al where male students gave lower evaluations and expressed less satisfaction with online learning than female students.[14] A possible explanation for this finding could be the ease with which males have with using digital technology and the easy accessibility of online learning from the comforts of their own home.

CONCLUSION

The pandemic has shifted our focus towards digital mode of learning for medical studies. With it, comes the issues of internet connectivity and device related issues. Reliable connectivity is the key to a successful online educational experience. There is also less interaction with the teachers and the inability to develop practical clinical skills, which is indispensable for future doctors. Problem-based learning can be applied during the online classes in an attempt to develop students' abilities to synthesize and integrate foundational concepts into clinical medicine. The faculty can limit the number of participants in each learning session to avoid bandwidth issues whereby each student can take part. Addressing the issues on online teaching could improve the perception of students towards online teaching. Hence, the institution can be advised to provide the students with adequate skills and knowledge coupled with appropriate technology.

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