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ASSESSING THE IMPACT OF ONLINE MEDICAL EDUCATION ON MEDICAL STUDENTS IN INDIA DURING THE COVID-19 PANDEMIC

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Article Info

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Abstract

The COVID-19 pandemic necessitated a global shift towards online education, including in the field of medicine. In India, where a vast population resides in rural areas and network connectivity remains a challenge, the transition to online medical education posed unique challenges. This study, conducted at Dhanalakshmi Srinivasan Medical College, aimed to assess the impact of online medical education on Phase 4 (Final Year MBBS) medical students from December 2021 to March 2022. Our findings reveal that a significant portion of students were unaware of online teaching before the pandemic, and around 44% of students hailed from rural areas, where network issues were prevalent. This digital divide presented challenges, with over 60% of students spending more than 20 hours per week attending online classes. The lack of practical exposure, including bedside clinics and lab demonstrations, led to concerns about knowledge acquisition. Challenges cited by students included inadequate knowledge gain, limited rest between lectures, and network problems, especially in rural areas. Interestingly, about half of the students attended classes during travel, revealing a lack of engagement and responsibility. Despite these challenges, students highlighted opportunities offered by online education, such as increased comfort, reduced stress in the home environment, and the ability to record lectures for future reference. However, there was a consensus that face-to-face teaching might be necessary for high-quality learning, and interactive lecture classes were preferred over recorded videos. In conclusion, this study sheds light on the impact of online medical education in India during the pandemic. While online education offered certain advantages, including comfort and flexibility, challenges like limited practical exposure and network issues persisted. Addressing these challenges and striking a balance between online and offline teaching methods is crucial to ensure the effective education of medical students in India.

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Introduction:

On December 31, 2019, the Globe Health Organization (WHO) informed the world of multiple cases of atypical pneumonia in Wuhan, China, a city with a population of over 11 million. There had been over 9000 instances recorded worldwide as of January 31. The WHO proclaimed a "global emergency" in response to the new virus's rapid spread panic. By March, the virus had spread to more than 11 nations, and the pandemic status had been established.(CDC, 2020)

Due to COVID-19, India, the world's largest democracy, was also on high alert. India made the unprecedented decision on March 24, 2020, to implement a 21-day total lockdown starting on March 25, 2020, and lasting through August 14, 2020. The Indian government has chosen to prolong the lockdown from April 15 to May 3 and again from May 4 to May 17 due to the ongoing rapid spread of the coronavirus.(Ray et al., 2020)

Following it, many nations enacted containment policies, such as complete shutdowns. These included academic institutions like colleges and medical schools. Due to the lockdown, almost all students went back to their hometowns. Medical conferences were also rescheduled or called off entirely. When medical educators and students looked into new teaching and learning methods, they discovered online learning.(Rashid et al., 2020) Online classrooms, webcasting, live web simulations, and online chat rooms are just a few examples of the many shapes that online learning can take.(Ish et al., 2022) In addition to the above fact, today's medical graduates must be proficient in technology due to the quick modernization of the healthcare system and the advent of new tools like flow cytometry, automation, and next-generation sequencing.(Mahajan & R, 2020) According to Mahajan and Kalpana, electronic learning (or e-learning) is "a method of education that involves electronic tools and equipment as well as the interaction that takes place between these and the individuals participating in the educational process (i.e. instructors and students)".(Kala et al., 2021)

India is eager to put the new competency-based education system into place at the same time.(Herur & Kolagi, 2016) Competency-based medical education (CMBE) prioritizes professional growth and skill building to produce Indian medical graduates who are globally competitive and capable of meeting society's expanding healthcare needs. Indian medical students must therefore receive instruction in clinical settings, practice on actual patients, and frequently visit outpatient clinics.(Modi et al., 2015) Prior to COVID pandemic, medical education took place in classrooms and clinical settings in numerous nations, including India. Throughout the standard courses offered at medical schools, truly little use of internet teaching resources was made. Even though there were a lot of online platforms available for distance learning, neither the faculty at medical schools nor the students were accustomed to using these resources throughout the development of daily teaching and learning.(Nirav et al., 2021)

As a result, medical schools are having a hard time keeping up their high standards of instruction while adjusting to the new online learning environment and the technology improvements in the healthcare industry. Despite all of these obstacles, it has been shown that online learning has some advantages over traditional learning, particularly when it comes to delivering the most recent evidence-based medicine.

Nearly 77 percent of students claimed to have taken lessons offered online by their respective colleges and universities. Although most of the students were enthused about online education (through Zoom or Google classroom), they all concurred that their practical understanding (like bedside clinics and lad demonstrations) was inadequate. Online learning can be a useful learning strategy, however, students studying medicine and allied health may find it less effective than traditional learning.(Debnath et al., 2021)

Given this context, the current study's objectives were to describe the opportunities and identify the difficulties that Phase 4 (Final Year MBBS) medical students had when learning general medicine through online platforms.

Methods:

Study design:

The current study used both a cross-sectional design and the focus group discussion method, making it a mixed-type study. Study place and study period:

The study was carried out in the Perambalur District's Dhanalakshmi Srinivasan Medical College. Phase 4 medical students participated in this trial, which lasted for 4 months from December 2021 to March 2022.

Inclusion and exclusion criteria:

All the phase-4 Medical students were willing to participate in the study. The students who were not responded even after three reminders through the mail were excluded from the study.

Sampling technique:

For the qualitative part of the study, eight medical students in phase-4 who agreed to participate in the focus group discussion were chosen at random from a random number table. For the quantitative part of the study, there were 150 students available at our college in total, and they all answered the questionnaire through the mail (Universal sampling).

Data collection:

The debate in the focus group was captured on live video and audio. With the intention of examining the difficulties and prospects of online education, the focus group discussion lasted 45 minutes. A sociogram was created to guarantee the interviewees' equitable participation. Then, 150 phase-4 medical students at Dhanalakshmi Srinivasan Medical College and Hospital participated in a quantitative study using a semi-structured questionnaire. The opportunities and problems that were discussed in the focus groups are also listed on the questionnaire. This data tool was a pre-validated semi-structured questionnaire. Google Forms were used to collect the answers to the questions.

Ethical clearance:

The current study had been conducted after getting the ethical clearance from the institutional ethics committee.

Data analysis:

The analysis was carried out using SPSS version 21 and the data were entered in Microsoft Excel. The qualitative data were analyzed using Microsoft Excel. Frequency and percentage were used to express the findings (all of which are categorical data). The data from this study were expressed using a multiple bar chart.

Results:

Totally 150 students participated in this study. The description of general characteristics was shown in Table 1. About 31 percent of the students hail from rural areas. About 44 percent of them had no idea about online teaching in the medical curriculum before the COVID-19 era. Nearly 62 percent of students spent more than 20 hours of online classes per week. Most of the students (64 percent) were using smartphones to connect with online classes.

Table 1: Distribution of general characteristics of the study participants (n = 150)

Variables		Frequency	Percentage
Residing place of students during online class	Urban	103	69
	Rural	47	31
Duration of time spend for online classes per week by the medical students	Less than 10 hours	27	18
	10 to 20 hours	30	20
	More than 20 hours	93	62
Students been Known about online teaching in medical curriculum before COVID-19 era	Yes	84	56
	No	66	44

Type of device used by the medical students for online classes	Laptop	27	18
	Tablet	27	18
	Smart phone	96	64

During the focus group discussion, the members who participated in the discussion were addressed with what were the challenges they faced in online learning. Similarly, during the focus group discussion, the members who participated in the discussion were addressed with the opportunities they got from online learning. The responses were recorded as both audio and video and listed in Table 2. The students who participated in the focus group discussion also recommended small group teaching has engaged them more than large group teaching. Also, they comment that the feedback which was collected at the end of the session was not rectified in the next class.

Table 2: The responses given by the participants for challenges they faced and the opportunities they got in Focus group discussion.

Responses given by the participants
Cell phones were overused and damaged
Network problem in rural areas
Knowledge gained in online is not so much
Attended some classes with travel
They felt that full curriculum was not covered
The stress in learning is reduced in home environment
Interactive lecture classes were better than recorded videos

The challenges faced by the students were quantitatively estimated with a structured questionnaire among the study participants and the results were shown in table 3. Most of the students (62 percent) felt they gained not much knowledge through online classes. The second common reason they felt was they got less chance for rest between lectures (61 percent). Half of the students felt that they attended some classes during travel. About 54 percent of the students felt that they have network problems in rural areas. About 12 percent of the students admitted that there is a lack of faculty skills in handling new technology.

Table 3: Challenges faced by the students during online classes (n = 150) (Multiple options).

Challenges faced by the students	Frequency	Percentage
Less chance for rest between lectures	92	61
Lack of schedule	50	34
Lack of infrastructure	39	26
Lack of faculty skills in handling new technology	18	12
Cell phones were overused and damaged	48	32
Network problem in rural areas	78	54
Knowledge gained in online is not so much	94	62
Attended some classes with travel	75	50
They felt that full curriculum was not covered	52	35

The opportunities of the online teaching which were felt by Phase-4 medical students was shown in Table 4. About 82 percent of the students felt they were comfortable with online classes rather than classroom teaching. About 74 percent of them felt less stress in the learning process in their home.

More than half of them felt they had the opportunity to record the video.

Table 4: Opportunities to the students during online classes (n = 150) (Multiple options).

Opportunities faced by the students	Frequency	Percentage
Comfort	123	82
The stress in learning is reduced in home environment	111	74
Interactive lecture classes were better than recorded videos	65	43
Have a recorded video	78	52
Raise a hand for doubt in comment section	23	15

The comparison of online learning experience between college hostel and home among the students was described in figure 1. About 41% of the students admitted that they were comfortable in college whereas 30% of the student admitted that they were comfortable at home. About 22% of Students have distracted during class at home whereas 14% of students admitted that they were distracted in the hostel. When comes to sleep almost a similar number of students in both college and home had admitted that they were sleepy.

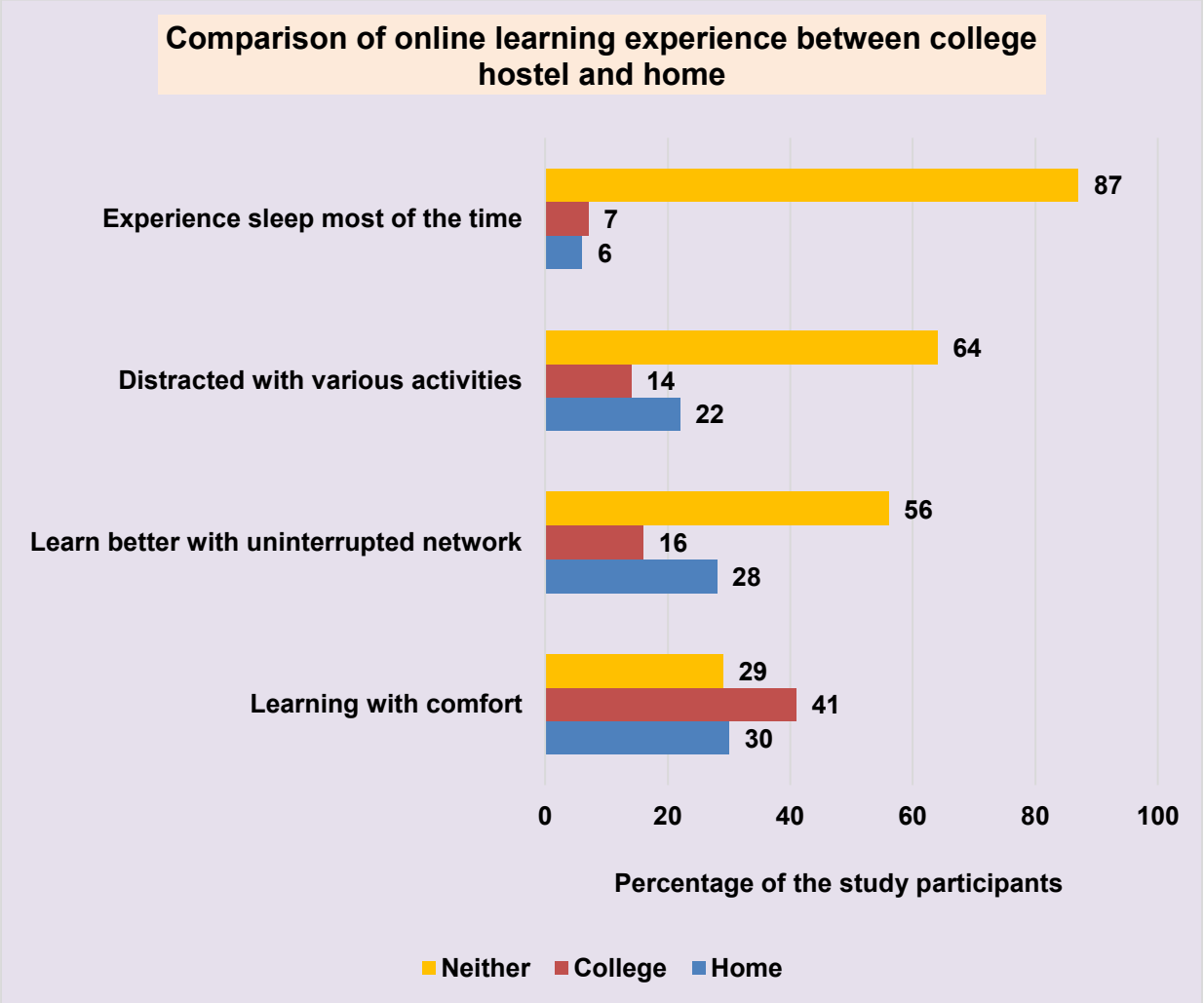

Figure 1: Comparison of learning experience between college and home (n = 150)

Discussion:

Our study aimed to describe the opinion of phase-4 medical students about the opportunities and challenges of online teaching in the medical curriculum. Online teaching in medical curriculum is a new topic in India. We found that about 44 percent of the students had no idea about online teaching in the medical curriculum before the COVID-19 era. About 31 percent of medical students hail from rural areas. And about 54 percent of the

students felt that they had network problems in rural areas. Like our study results, a study done by Saurabh et al., 2021 concluded that about 62.7 percent of undergraduate students had adequate internet access.(Saurabh et al., 2021)

In contrast to our study results a study done by Kala et al., in 2021, in Uttarakhand found only 8 percent of the students hail from rural areas and about 13 percent resided in hilly areas.(Kala et al., 2021) This difference might be due to the rate of admission of students from rural and urban areas varying in different states of India. In the same study, they found about 62 percent of the students had access to uninterrupted networks.(Kala et al., 2021) This result was almost similar to our study results. In that study, they also conclude that almost 69 percent of the students accepted online teaching and about 78.5 percent of students also wanted to meet teachers and classmates in person.(Kala et al., 2021) The most common challenge felt by the students was that they felt not much knowledge gained by through online teaching. This could be due to a lack of a practical approach through online mode. The second common one was they did not get enough rest between lectures. The time between the classes could be altered in the teaching schedule for a better learning experience. Nearly half of the students attend online classes during travel. This showed the lack of responsibility by the students in online mode rather than offline mode. Similar to our study results a study done by Kala et al., in 2021, in Uttarakhand found more than 65 percent of the students felt that face-to-face teaching might be necessary for high quality learning. And also they comment that more than half of the students admitted they were not discussing or interacting in the online class.(Kala et al., 2021) A study done by Rohila et al., in 2022 with the aim of assessing barriers to online teaching among teachers concluded that about 67.7 percent of the teachers felt they have no interaction with the students.(Rohila et al., 2022)

A study done by Singh et al., in 2021, in India, stated that class duration of more than 4 hours a day was associated with eye strain, backache, and headache among nursing and medical students.(Singh et al., 2021) In our study, more than 60 percent of the students admitted that they were online for more than 20 hours a week. This could challenge the physical ability of the students and result in poor knowledge gained from the lecture. They also conclude that only 30 percent of the students have adequate time for interaction.(Singh et al., 2021)

A study done by Hameed et al., in 2020, in New Delhi, concluded that about half of the students felt that not a full portion of the syllabus was covered.(Hameed et al., 2020) Our study also showed similar findings where 35 percent of the students felt the same. A study done by Menon et al., in Kerala, stated that nearly half of the students were not fully satisfied with learning from home which was similar to our study results where only 41 percent of students were comfortable with learning from home.(Menon et al., 2021).

In a study on virtual instruction in medical education that was conducted in 2018, by O'Doherty D. et al. noted that online training can more easily give a wider range of subject matter and a larger amount of information. They come to the conclusion that medical schools and students will be better prepared for the problems of the digital age if online learning is developed and implemented.(O'Doherty et al., 2018) According to research by Debnath et al. about medical students' attitudes towards online learning, they did not receive much knowledge from practical training like bedside clinics or lab demonstrations during the pandemic lockdown. The academic activity's overall performance when integrating theory and practice was good, and they also draw the conclusion that the majority of online classes were held using the Google platform.(Debnath et al., 2021)

The current study found that comfort during class was the most common opportunity felt by medical students. The second and third common opportunity was less stress and recording the lecture as video, respectively. Recording a video by a student would be helpful for future reference or during the exams for better understanding. Feeling less stress and more comfort would make students interactive during lectures, which gives a fruitful

teaching-learning experience. With online learning, our study found that there was no difference in sleepiness between listening from a college hostel or home. These findings need further research to pile up the evidence.

Limitation of the study:

This study was a descriptive study, so no inferential statistics were performed. Our stud only included the phase-4 students, including all the students of undergraduates may yield better results. Only the perception of students about the barriers or opportunities was discussed in this article, not the teacher's perception. All the questions asked in this study were subjective in nature which could influence the study results.

Conclusion:

Nearly one-third of the medical students in India resides in rural areas and half of the students felt that they have network problem in rural areas of India. The majority of the students did not aware of online teaching before the COVID-19 pandemic. The main challenges felt by the students about online teaching of general medicine subjects were not gaining much knowledge and not getting enough rest between lectures. Similarly, the main opportunities felt by the students during online teaching were comfort, less stress, and recording the lecture. Our study also recommended giving concern about the timing of the teaching schedules to give enough rest to the students between lectures.

Conflicts of Interest

The author declares no conflicts of interest.

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