Education Section

Logistical Aspects of Different Online Teaching-learning Methods among Medical Students during COVID-19 in a Tertiary Care Teaching Hospital, Thrissur, Southern India

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ABSTRACT

Introduction: Due to the Coronavirus Disease-2019 (COVID-19) lockdown implemented by the government, we had to transform our classes into the online sphere. The most commonly used methods of online teaching in Government Medical College, Thrissur were, live online lectures, PowerPoint presentations with narrations, prerecorded videos and assignments.

Aim: To assess the logistical aspects, merit and demerits of different online teaching-learning methods among phase-1 medical student in a tertiary care teaching hospital during COVID-19 lockdown

Materials and Methods: This cross-sectional study was conducted from July 2020 to September 2020, among phase-1 MBBS students of Government Medical College, Thrissur, Kerala, India. Data was collected from 161 students through a questionnaire consisting of two parts. The first part dealt with logistical aspects, like net connectivity, gadget, expenditure, financial burden, residence and eye strain with online teaching learning methods.

The second part dealt with the merits and demerits of each type of teaching learning methods, according to the students. All statistical data was analysed using the Statistical Package for the Social Sciences (SPSS) software version 16. Qualitative data was expressed as a percentage.

Results: A total of 97.5% population of students was able to frequently access the online classes. Online learning strained the eyes of 47.8% of students. Mobile phones were used by 92.5% of students for attending online classes internet connectivity was mainly through 4G (71.4%) followed by Wi-Fi (19.9%) connections. Their most preferred method of online learning was online live lectures (35.4%) followed by PowerPoint presentations with narrations (33.5%). Blended learning (online and traditional together) was best preferred method of learning (46.6%).

Conclusion: Live online lectures and blended learning were preferred by the majority of students. Thus, the online classes can be continued along with the traditional teaching in future.

Keywords: Assignments, Coronavirus disease-2019, Eye, Lectures, Lockdown, PowerPoint, Strain, Videos

INTRODUCTION

Online learning is a delivery system in which learning takes place through the internet. Online learning provides educators an opportunity to teach the students who may not be able to attend traditional classrooms. The online education arena has developed rapidly because of internet connectivity, advanced technology, and massive marketing. It is unlikely to replace traditional higher education but is merely an alternative [1,2].

Due to the national lockdown in accordance with the government's COVID-19 guidelines, campus education had been put to a halt and the students were notified to go home from March 2020 onwards. Aside from the clinical overload of COVID-19 cases faced by the hospitals, the students being away from the colleges made conventional offline learning inconceivable. Maintaining physical distancing in the college for 175 students was difficult. Thus, ensuring effective classes to the students was one of the biggest challenges faced by faculty in the medical colleges. Faculties overcame these hurdles by introducing online teaching methods. Using gadgets like smart phones, tablet, laptop and desktop, students could fulfill their learning objectives at a convenient time and place, which was one of the biggest benefits of online learning. The most commonly used methods of online teaching were live online lectures, PowerPoint presentations with narrations, prerecorded videos and assignments. Kahn P et al., in their study, observed a positive relationship between the use of online learning, student engagement and outcome of learning [1]. Online classes appealed to millennials who were comfortable with technology and were used to ingesting large amounts of digitally provided information [2]. Gowda R and Ayush GK opined that the Indian education system was generally based on traditional classroom methods. Due to lockdown caused by COVID-19, education authorities practised online teaching [3]. A few studies were conducted in India to know the advantages and disadvantages of online teaching learning methods [4,5].

The primary aim of our study was to assess the logistical aspects of various online teaching-learning methods used for phase-1 MBBS students of Government Medical College, Thrissur, Kerala, India during COVID-19 lockdown. Secondary aim was to assess merits and demerits of the four different types of online teaching methods.

MATERIALS AND METHODS

This cross-sectional study was conducted among phase-1 medical students of Government Medical College, Thrissur, Kerala, India from July 2020 to September 2020. The study was approved by the Human Ethical Committee and Institutional Research Board (IEC/GMCTSR/050/2020 dated14-08-2020). Study subjects were counselled separately about the study and written consent was procured online.

Inclusion criteria: All phase-1 MBBS students of Government Medical College, Thrissur, Kerala, India were included in the study.

Exclusion criteria: Those who were unwilling or unavailable to participate in the study were excluded.

Study Procedure

The online teaching included four methods. First teaching method was live online lecture classes using a web conference tool. Second one was sending PowerPoint presentations with instructor's voice over. Third method was sending prerecorded videos. Fourth one was assignments and online evaluation. These methods were applied to the students on one week interval.

Based on a recent similar research conducted by Rafi AM et al., in Kerala, a questionnaire consisting of two parts was prepared by the investigators [6]. The first part dealt with general information related to logistics which included net connectivity, gadget, expenditure, financial burden, residence and eye strain. The second part dealt with the merits and demerits of each type of teaching learning methods. As the objective of study was to assess logistical aspects of different online teaching learning methods and all the medical students from phase-1 to phase-4 were having online classes, validation of the questionnaire was performed by pretesting among 15 phase-2 MBBS students. Later, the questionnaire was given to all the 175 phase-1 MBBS students as a Google form. They were asked to fill the form and return within four weeks. A total of 161 (response rate-92%) students responded to the questionnaire out of the 175 students.

STATISTICAL ANALYSIS

All statistical data was analysed using the SPSS software version 16. Qualitative data was expressed as percentages.

RESULTS

The study comprised of 161 participants out of which 66 were males and 95 were females. Demographic characters of study population are given in [Table/Fig-1]. A total of 135 students were of the age group between 18-19 years. Female students comprised around 59% of the study population.

Logistical aspects of online learning are depicted in [Table/Fig-2]. A total of 65.8% of students were able to access online classes

Gender	Age		
	18-19 years	20-21 years	>21 years
Male	52	12	2
Female	83	10	2

[Table/Fig-1]: Demographic characteristics of study population.

| Information	Results (N=161)			
Accessibility to Online Classes	Always Accessed	Frequently Accessed	Occasionally Accessed	Never Accessed
	65.8% (106)	31.7% (51)	2.5% (4)	0
Net connectivity	Mobile data package-2G	Mobile data package-3G	Mobile data package-4G	Wi-Fi or Fixed internet lines
	3.7% (6)	5.0% (8)	71.4% (115)	19.9% (32)
Average expenditure for internet per month	<Rs 200	Rs 200-500	Rs 500-1000	>Rs 1000
	16.8% (27)	70.8% (114)	10.5% (17)	1.9% (3)
Gadgets used to access classes	Mobile phone	Tablet	Laptop	Desktop
	92.5% (149)	1.9% (3)	5.6% (9)	0% (0)
Residence	Rural	Semi urban	Urban	Metropolitan
	46.0% (74)	33.5% (54)	19.3% (31)	1.2% (2)
Did you purchase new gadget or internet connection?	Yes	No	NA	
	19.9% (32)	80.1% (129)		
Any financial burden with respect to online learning?	Yes	No	NA	
	6.2% (10)	93.8% (151)		
Does online learning strain your eyes?	Yes	No	NA	
	47.8% (77)	52.2% (84)		

[Table/Fig-2]: Logistical aspects of online learning.

constantly. Online learning strained the eyes of 47.8% of students. The average expenditure for internet per month was around Rs 200-500 for 70.8% of the student's. A 92.5% of students used mobile phones for attending online classes. Preferred method of online teaching learning was live online lectures (35.4%) is shown in [Table/Fig-3].

According to [Table/Fig-4], blended learning (online and traditional together) was the most preferred method of learning (46.6%).
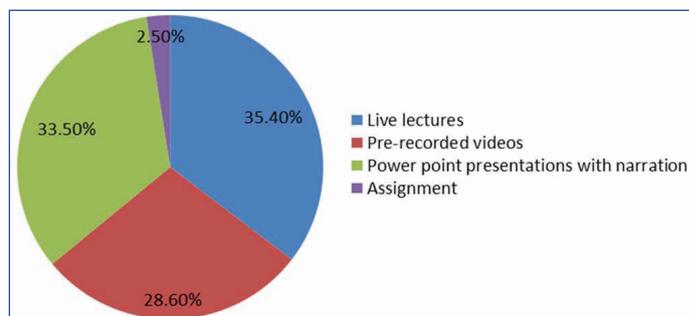
[Table/Fig-3]: Preferred methods of online teaching learning.
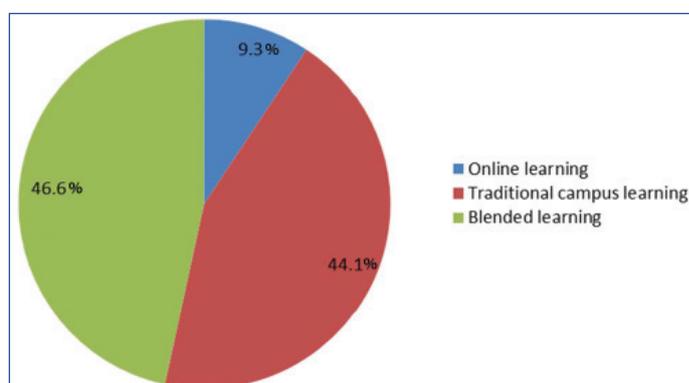
[Table/Fig-4]: Preferred method for learning.

In live online lecture, the concepts of the learning objectives were understood better as the doubts were cleared on the spot (91.3%). High bandwidth internet connectivity was required to view or download the prerecorded lectures (82%) as represented in [Table/Fig-5].

Online teaching methods	Merits	Demerits
Live online lecture	Interactive-86.3% (n=139) Interesting-80.1%. (n=129) Doubts were cleared- 91.3% n=147	Net connectivity issues-73.3% (n=118)
Powepoint presentation	Accessible for future reference-90.7% (n=146)	Less interactive-32.3% (n=52) Procrastination-82.6% (n=133)
Prerecorded video	Better comprehension-83.2% (n=134) Accessible for future reference-96.3% (n=155)	Net connectivity issues-82% (n=132) Less interactive-26.1% (n=42) Procrastination-78.9% (n=127)
Assignment	Helped in preparation of notes-90.7% (n=146)	Low comprehension-68.3% (n=110) Failed to submit on time-41.6% (n=67)

[Table/Fig-5]: Merits and demerits of online teaching methods.

DISCUSSION

The role of information technology in the academic arena has gained importance during COVID-19 pandemic lockdown. At the same time it has given rise to multiple challenges for teaching. Thus, a study was conducted among phase-1 MBBS students of Government Medical College Thrissur, Kerala, India, to assess the logistical aspects of different online teaching learning methods.

In our study, only 9.3% of students opined that online teaching alone was the best method for learning. Likewise, Abbasi S et al., opined that 77.4% students showed negative perception about e-learning, out of which 86% students felt e-learning has little impact on their

learning. They also pointed out that majority of the students preferred face to face teaching over e-teaching [7]. Similarly majority of our students too preferred either traditional or blended type of learning.

Reversely, Govindasamy T has opined that online teaching was widely appreciated by the learners due to ease of use, flexibility and better control over the environment. However, they added that e-learning has few limitations like social isolation, lack of student-teacher interaction and connectivity issues etc., [8].

Yilmaz O has concluded that mobile phones have become one of the most popular devices among students for e-learning as compared to laptops and tablets [9]. In a research by Abbasi S et al., it was found that 76% of students used mobile gadgets for their e-learning [7]. Similarly in our study, majority (92.5%) used mobile phones instead of tablets or laptops for e-learning. In a study from Bangladesh by Biswas B et al., on student's perception of using mobile phones for learning during COVID-19, it was found that students were very familiar with mobile phones, had a positive perception and they well used it during pandemic time [10]. They also added that it made students participate in class from anywhere, improved the relationship with their teacher and also fulfilled the long term study gap. They concluded that policymakers and educational institutions should consider the opportunity to incorporate mobile learning technology for the whole education system where social media may enhance the process of teaching and learning. Similar to above conclusion, our students too wished to have a blended type of learning in near future [10].

Mbukusa NR has opined that mobile phones have been widely used for attaining knowledge, asking questions and retrieving information. They have added that online learning helped students to work smarter and more effectively. But it can impact negatively on the performance of students who do not own smartphones [11]. Likewise, in our study, a few students were either not able to be at par with online learning or was facing a financial burden of buying a new gadget.

In this study, the majority of students used 4G data packages for e-learning. Likewise, Rafi AM et al., concluded that 72.8% were using mobile data and 17.8 % were using Wi-fi [6]. Wu Y and Turner P have studied the relationship of bandwidth and performance in online course. He has opined that narrow bandwidth was most often utilised for text-based information and broad bandwidth for transferring large files, real-time audio, and videos [12].

Berchtold J et al., has found that users spend 27 percent more time online, when they only had narrowband access [13]. Similar to this finding, the students who participated in our study has opined that narrow bandwidth connection has adversely affected their learning when prerecorded videos were used.

Wu Y and Turner P concluded that if a course required a significant amount of interaction among students and teachers, they have to utilise broad band access [12].

In the present study, 47.8% of students complained that they had eye strain due to online learning. Similarly a study conducted by Huseyin KA has observed that eye health of the students was negatively affected by the online teaching during COVID-19 pandemic [14].

Cuisia-Villanueva MC and Núñez J have studied the socio-economic status and e-learning during COVID-19 lockdown. Her survey showed that those students had unequal and asymmetrical access to information. She added that in a study from California State University San Marcos, researchers found a connection between household income and problems accessing materials for online courses. Likewise, in this study, only 2/3rd of students had continuous access to the online classes. This study showed an extra monthly expenditure for most of the students for accessing online classes [15].

In our study, four teaching platforms were used, namely live online lectures, PowerPoint presentation with narration, videos and assignments. Students mostly preferred live online lectures (35.4%)

over the other three methods. According to the opinion of students who participated in this study, live online classes were interactive, interesting and doubts were cleared on the spot.

However, there were few disadvantages of live online lectures due to connectivity issues. Only 19.9 % of the students have Wi-Fi connectivity at home. The students opined that the lectures can only be attended if the students were equipped with a high bandwidth internet connection, sufficient data and power supply. Another demerit of live online classes was that students who view the session in small gadgets for longer duration were prone to frequent eye strain. Agarwal S et al., also concluded that use of electronic gadgets for than six hours led to eye fatigue [16].

One of the main advantages of prerecorded video lectures was that it can be viewed at any time repeatedly according to the convenience of the students. It was very viable as it can also be downloaded while internet service was good and viewed later on. The students were able to have a thorough learning experience through repeated viewing of the videos. They opined that concepts were clearly taught and emphasis was given on the important areas by repeated viewing of those videos.

Noetel M et al., compared the effect of prerecorded videos with live lectures and online assignments on 7,776 students. The results were in favour of videos and it gave the students a better control of learning. Similar to our study they opined that live online lectures were interactive [17]. Rafi AM et al., opined that all the students wanted the recordings of online lectures for repeated viewing for better understanding and clarification of the concepts. This finding was at par with our study [6].

A comparison by Islam M et al., between prerecorded videos and live lectures were conducted through a study to assess the advantages and disadvantages of different online instruction. Research showed that 53.8% chose prerecorded videos, 7.7% preferred live lectures and 30.8% chose both. The better preference for prerecorded videos was due to their flexibility, convenience and educational effectiveness [18]. These results were at par with our studies.

Students opined that providing PowerPoint presentation along with the narrations was a good option as it can be downloaded when they have a good internet connection and viewed according to their convenient timings. Students also opined that one of the major disadvantages of PowerPoint presentations was lack of interaction and procrastination.

However, Savoy A et al., has concluded that for retaining information and concepts, traditional presentations were better as compared to PowerPoint presentation alone [19]. Howell DD has pointed out that face-to-face communication is the main feature of campus education [20]. Xingeng D and Jianxiang L added that sending PowerPoint presentations alone communicated less efficiently to science students [21]. Tang TL and Austin MJ, and Stephenson JE et al., had concluded that mixing of teaching methods like PowerPoint, internet and video promoted better learning by the students [22,23].

In our study, students opined that they were able to make notes through assignments given online. While, completing the online assignments was time consuming and it was less comprehensive. However, Dodson JR concluded that online homework helped in maintaining student performance [24].

Limitation(s)

This study has investigated the subjective outcome measures of students. The study was conducted among a small group of students therefore; more studies are needed to investigate the factors related to online teaching learning methods

CONCLUSION(S)

In the present study, live online lectures and blended learning were preferred by the majority of students. Thus, the online classes can

be continued along with the traditional teaching in future. However, the issues related with internet connectivity and strain on eyes has to be properly addressed.

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