International Journal Dental and Medical Sciences Research
Volume 4, Issue 5, Sep-Oct 2022 pp 47-52www.ijdmsrjournal.com ISSN: 2582-6018

Studyof Effectiveness of Online Classes among Undergraduate Medical Students during Covid-19 Pandemic

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Submitted: 05-09-2022 Accepted: 13-09-2022

ABSTRACT
Introduction: Due to the pandemic COVID-19 the medical education has shifted to the virtual mode in almost all the countries. Online learning is being practiced for quitesome time and it has proved to be useful but its effectiveness should be anticipated for countries like India. Methods: An online survey was conducted among undergraduate medical and allied health students for a period of 2 months (July- August)with the help of a structured self-administered questionnaire consisting of demographic information, modalities of online classes they are attending and their impression regarding the online classes. Results: Maximum students had access to devices and internet but some of the students responded that they have no internet facility at home. More than half of the students have responded that they are facing some sort of visual problem after online classes have commenced. Many students responded that the internet connectivity issue is a hindrance to online learning. Greater number of the students strongly disagree that online class should be continued even after the pandemic is over. Conclusion: There are lots of obstacles in virtual learning in resource-limited countries like ours. The efficiency of e-learning should be assessed among the students and the flaws of virtual learning are to be dealt by concerned authorities.

Keywords: COVID-19 pandemic, Medical education, Online class, Medical &Allied Branches, Rajahmundry

I. INTRODUCTION

In this ongoing COVID-19 pandemic one important measures to be followed for prevention is avoiding the crowds and maintaining physical distance of at least one meter.[1] Many of the schools, colleges and universities have been shut down after this pandemic has begun, for the safety measures to narrow the chain of transmission so because of that teaching-learning activities have shifted online.[2] Medical education has also been affected largely: classes have been suspended, evaluations including the examinations have been postponed and clerkships and residency have been delayed all over the world.[3,4] Amid this pandemic, medical schools have adopted online learning for their students by means of various virtual platforms like Zoom, Google Meets and other interactive software.[3] The method of learning with these platforms has been shown to be better in engaging and motivating for the medical students.[5] With the help of these forums online teaching has been initiated in different medical schools of our country among the undergraduate medical students after this pandemic has halted the regular classes. This study was conducted with the objective of assessing the perception of online classes among the medical and allied health students regarding its effectiveness and usefulness in their learning process. We intend to take feedbacks from the students who are taking online classes regarding the difficulties they are facing and the level of satisfaction for them in the learning process. Also, it will help to guide the respective authorities to improve the flaws regarding the online learning process and if this could be continued in an integrated approach in the days to come after the pandemic is over.

Aims and Objectives

To study the efficacy of Online Classes among medical students during COVID-19 situation.

II. METHODS

An online survey was conducted for a period of 2 months (1 July2020 -31 August2020) to know the perception regarding online classes among undergraduate students of medical and allied health branches studying in GSL Medical College in Rajahmundry, Andhra Pradesh. A self-administered questionnaire was developed by the authors consisting of the following parts: demographic information, modalities of online class they are taking and their opinion regarding the online class. Likert scale questionnaires were used

to know their perception and effectiveness of online classes where they rate their experience in five points scale. Questions were entered in a Google form in a structured way. Pre-testing of the questionnaire was done among the small sample after which suggestions from them were incorporated to form the final version. After that, it was circulated among the undergraduate medical students studying in different medical schools by means of social media, Viber and messenger groups after which the responses were collected. The introduction along with the objectives of the study was mentioned on the first page of the form and anonymity of the subjects filing the form was assured. Those who were willing to take part in the survey need to tick on the consent that they agree to participate in the study after which only the questionnaire page is displayed.

III. RESULTS

A total of 722 responses were received out of which 28 didn't agree to participate in the survey and skipped the study. The response rate was calculated as 96% i.e;694 students.

Demographic characteristics

Female participants comprise the major of respondents (52%) in our study. The mean age of the participants is 21 years. Most of them belonged to the MBBS stream (83%). Maximum students that participated in the survey were from the third year (37%) followed by the second year (33%) and the first year (17%). The detailed information on demographic characteristics is shown in Table 1.

Accessibility to IT services and modalities of online class Most of the students (98%) have their own devices for attending the online class. Some of the students (16%) responded that they have no internet facility at home. The institutions havemostly used incorporated application Zoom Video Communications, San Jose, CA, USA (74%) as the platform for the virtual learning followed by Google meets (22%) and Microsoft teams (3%). The majority of students (35%) have reported that they take 3 hr of online class per day. More than half of the students (58%) have answered that they are having some sort of visual problem after the online class has started. Also, the majority of the students (54%) have responded that online lectures are not always feasible as per their time. Besides the online lectures, the students are using Youtube videos, e-books, textbooks and self-made notes for learning purposes. The detailed information on Accessibility to IT services and modalities of online class is shown in Table 2. Perception and effectiveness of online class Students were asked to respond their perception and effectiveness of online class on five points Likert scale. Most of the respondents agree to some extent that the software used for online learning is user friendly but internet connectivity is an important issue hindering the smooth conduction of their class. Many students are of the opinion that the process of learning has been hindered due to a lack of practical classes. More than half of the students (53%) strongly disagree with the statement online class should be continued even after the pandemic is over. Also, their response has inclined over the fact that online classes are less effective over traditional lectures. The detailed response regarding their opinion towards online learning can be found in Table 3.

IV. DISCUSSION

e-Learning and teaching activities have been practiced since long earlier before the COVID-19 pandemic started and it has been found to be effective among the medical students.[5,6] It has shown to provide greater educational opportunities for the students and also enhances the effectiveness and efficiency of the faculty simultaneously.[7] After the occurrence of pandemic, virtual learning has gained more attention and has been followed all over the world.[8] In our study, we tried to explore the pros and cons of the e-learning and its effectiveness in undergraduate medical education in resource-limited countries. Most of the students had access to the devices and internet facilities for virtual learning though some of the students responded that they have no internet facility at home (15.6%). Notably, smartphones and the internet have eased not only the communication among the people but also the teaching-learning activities in medical education too.[9,10] Most of the institutions (87.7%) have used incorporated application by Zoom Video Communications, San Jose, CA, USA as the platform for the virtual learning followed by Google meet and Microsoft teams. Other similar studies had also shown that zoom application has been widely used in this COVID-19 pandemic for delivering lectures and presentations in medical education.[8,10]

Maximum students have reported that they take 3 hours of online class per day. More than half of the students (55.9%) have answered that they are having some sort of visual problem after the online class has started. The use of digital devices for a long time for work and social purposes may increase the risk of digital eye strain and visual problems.[11] All might not have developed visual problems because of going on online classes as the regular digital screen time has increased amid of the lockdown and staying in home, but it's a matter

that needs to be dealt with while imposing long virtual lectures for the students. And more than half of the students have acknowledged that online lectures are not always suitable according to their time. Besides the online lectures, the students are using YouTube videos, e-books, textbook, and self-made notes for learning purposes. Internet connectivity, easy accessibility, and power interruptions are the common issues that we face often being in developing countries for virtual learning.[12,13] In our study too, though more respondents believe that used software for online learning is user friendly but the internet connectivity is an important issue hampering the medical education has also concluded that inadequate infrastructure, limited internet bandwidth, lack of skilled staffs, and unreliable electricity supply are the major hindrances in the resourcesmooth operation of class. A study conducted in Liberia for introducing e-learning solutions in limited settings for virtual learning.[14] Many of the students believe that the learning process has been hampered due to a lack of practical classes. A study conducted in the UK among undergraduate medical students to know the value of e-learning in clinical skills has concluded that it was a useful tool in learning of clinical skills if a good learning environment and approach is followed.[6] More than half of the students strongly disagree with the statement online class should be continued even after the pandemic is over. Also, their response suggest that online classes are less effective than traditional lectures. A similar study conducted among the orthopaedic residents in Chile to know about the perception of online education during the COVID crisis had concluded that face-to-face theoretical activities are still valued by most of the residents for their learning process rather than only virtual learning process.[10] There may be various issues that a significant number of students were not satisfied with the virtual learning methods currently practiced here in the medical colleges . We have also taken open responses if the students have suggestions for improvement of the ongoing virtual classes. Internet connectivity issues, power cut off are the major issues reported by them. Many students suggested rather than live virtual class, recorded lectures would be of greater help as it would be convenient for them to watch during their free time as internet connectivity and power cut-offs would not hamper to a greater extent. Similarly, many of the students responded that eye strain and headache has become a issue for them after the online lectures have been started as they spend lot of time watching the screen during their home stay after the pandemic has started. Also, many of them have raised the issue that lack of practical class is relatively hampering their learning process. We faced certain limitations in our study. One is, our questionnaires were not validated by prior research as there are very few similar studies conducted in similar settings. More participants of the study were from MBBS and BDS faculties and we could not collect more data from other nursing and paramedical students.

Online teaching and learning during this COVID-19 pandemic has somehow kept the educational activities going among the medical students and helped the students as well as faculties engaging in the teaching-learning process. But, there are a lot of obstacles in virtual learning in resource-limited countries like ours. The effectiveness and usefulness of e-learning should be evaluated among the students and the shortcomings of virtual learning should be addressed by concerned authorities by any means as far as possible.

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TABLES

Table 1: Demographic characteristics.

Demographic characteristics	Modalities	Number (N=694)	Percentage (%)
Gender	Female	361	52
	Male	333	48
Age range	17-19	166	24
	20-23	499	72
	24-27	20	3
	>27	09	1
Stream	MBBS	576	83
	BDS	78	11
	Physiotherapy	14	2
	Nursing	22	3
	Paramedical	4	1
Year of study	First	118	17
	Second	230	33
	Third	257	37
	Fourth	90	13

Table 2: Accessibility to IT services and modalities of online class.

Questionnaires	Modalities	Number (N=694)	Percentage (%)
Own device to attend class	Yes	681	98
	No	13	2
Devices used to attend classes (Multiple responses taken)	Mobiles	514	74
	Laptop	412	59
	Ipad/tablet	125	18
Facility of internet service available at home	Yes	583	84
	No	111	16

International Journal Dental and Medical Sciences Research
Volume 4, Issue 5, Sep-Oct 2022 pp 47-52www.ijdmsrjournal.com ISSN: 2582-6018

Internet service mostly used for online learning	**Wifi**	**500**	**17**
	Mobile Data	**167**	**24**
	Both	**27**	**4**
Software used for online learning	**Zoom**	**514**	**74**
	Google Meet	**153**	**22**
	Microsoft-Teams	**21**	**3**
	Others	**02**	**1**
Class hours per day	**1**	**21**	**3**
	2	**222**	**32**
	3	**243**	**35**
	4	**160**	**23**
	5	**27**	**4**
	>5	**21**	**3**
Encountered vision-related problem after online class started	**Yes**	**403**	**58**
	No	**291**	**42**
Feasibility of class timing	**Yes**	**291**	**42**
	No	**28**	**4**
	Not always	**375**	**54**
Resources used for studying other than online class (Multiple responses taken)	**Textbooks**	**333**	**48**
	Pdf/ebooks	**472**	**68**
	Self-made notes	**243**	**500**
	Youtube videos	**500**	**72**
	Others	**14**	**2**

Table 3: Perception and effectiveness of online class.

Questionnaires	**1 % (n)**	**2 % (n)**	**3 % (n)**	**4 % (n)**	**5 % (n)**
Interruption due to internet connectivity (1-Never, 5-Always)	**76 (11)**	**160 (23)**	**229 (33)**	**153 (22)**	**76 (11)**

User-friendliness of the software used for e-learning (1-Not very, 5-Very much)	**49 (7)**	**104 (15)**	**229 (33)**	**222 (32)**	**90 (13)**
Level of satisfaction of the online class (1-Not satisfied, 5-Very satisfied)	**125 (18)**	**174 (25)**	**250 (36)**	**125 (18)**	**21 (03)**
Easy to grab information (1-Very hard, 5- Very easy)	**111 (16)**	**201 (29)**	**264 (38)**	**97 (14)**	**21 (3)**
Sincerity level of the attendees of online class (1-Not at all, 5-All the time)	**28 (4)**	**90 (13)**	**160 (23)**	**194 (28)**	**222 (32)**
Concerns being neglected by the tutor (1-Not at all, 5-Very frequently)	**194 (28)**	**208 (30)**	**174 (25)**	**76 (11)**	**42 (6)**
Learning process hampered due to lack of practical classes (1-Not at all, 5-Very much)	**23 (3)**	**28 (4)**	**90 (13)**	**167 (24)**	**388 (56)**
Online learning effectiveness is equivalent to the lectures in class (1-Strongly disagree, 5-Strongly agree)	**250 (36)**	**194 (28)**	**153 (22)**	**69 (10)**	**28 (4)**
Continuation of online lectures after pandemic is over(1- Strongly disagree, 5-Strongly agree)	**368 (53)**	**139 (20)**	**90 (13)**	**76 (11)**	**21 (3)**
Effectiveness of ebooks in the learning process (1-Not at all, 5-Very much)	**139 (20)**	**215 (31)**	**208 (30)**	**97 (14)**	**35 (5)**