

ONLINE TEACHING LEARNING SYSTEM DURING THE PANDEMIC COVID 19: MEDICAL STUDENTS' PERSPECTIVES

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ABSTRACT

Introduction: The COVID-19 has resulted in the temporary closure of schools and colleges all across the world. The reason for closing medical universities is dual – medical students' safety may be jeopardized and infected students may themselves become the portal of spread of the disease. Students' perceptions and attitude regarding the different teaching learning and evaluation methods are important for further development and restructuring of medical education in future. This study was undertaken to assess the opinion and experience of the students with respect to online learning system. **Materials and methods:** This was an observational, questionnaire based cross-sectional study, conducted by the Department of Pharmacology, Kalinga Institute of Medical Sciences, Bhubaneswar during the month of June 2020 by enrolling 350 students. All eligible participants were sent an email that contained a google link inviting them to participate in the survey. The survey consisted of 30 questions. It consisted of demographic, close-ended & open-ended survey questions. **Results:** We have divided the results into three main domains- learning experience, learning ability and behavioural reaction. Most of the students opined that regular classes were more beneficial and convenient in terms of learning and productivity, instead of online classes. **Conclusion:** For the time being, in the midst of the crisis, we have to adapt to the new normal i.e online learning until we get back from the virtual to the physical world wherein we can inculcate the experiences of online learning for the betterment of the medical students.

Keywords: COVID 19, Online learning, questionnaire, regular curricular class

INTRODUCTION

The COVID-19 has resulted in the temporary closure of schools and colleges all across the world. Globally, over 1.2 billion students are out of the classroom. As a result, education has changed dramatically, with the distinctive rise of e-learning, whereby teaching is undertaken remotely and on digital platforms. Medical education is no such exception and it is now confronted with novel challenges to impart knowledge through this newer mode of teaching-learning.

The reason for closing medical universities is dual – medical students' safety may be jeopardized during clinical rotations putting them at risk of exposure to COVID-19 positive patients, and/or infected students may themselves become the portal of spread of the disease. Even for preclinical medical students, social distancing measures have precluded the conduct of classroom-based teaching and discussions. But we need to maintain the continuity of medical education. Conventionally, the preclinical teachings have involved lectures, small group discussions and laboratory sessions. For the past decade, the medical fraternity has been trying to improvise pedagogy by introducing technology-based novel concepts such as flipped lectures and simulation-based learning. Though, many medical schools have become well versed with these concepts, in several countries including India, technology-enhanced learning is still in its infancy. There is a sudden shift from traditional face-to-face learning to distance education through e-learning in wake of the COVID-19 pandemic. A number of medical schools have rapidly converted their entire pre-clinical curriculum into online formats involving online lectures, webcasting and virtual group discussions.

Online teaching-learning, often referred to as e-learning, internet-based learning or web-based learning is the use of the internet for the purpose of education. The effectiveness of online learning is influenced by many factors. Some factors create barriers for online learning, such as administrative issues, social interaction, academic skills, technical skills, learner motivation, time and support for studies, technical problems, cost and access to the internet¹. Other factors could result in low-quality online learning, like an ineffective design and arrangement of multimedia materials².

Students' perceptions and attitude regarding the different teaching learning and evaluation methods are important for further development and restructuring of medical education in future and there is a need for robust research to measure the outcomes of e-learning. This study was undertaken to assess the opinion and experience of the students in respect to online learning system

AIMS AND OBJECTIVES OF THE STUDY:

- To study the demographic profile of the participants
- To evaluate the effectiveness of the online education system

- To evaluate students perspectives regarding the usefulness of the online classes
- To study it's possible impact on the medical curriculum during this pandemic.

MATERIAL AND METHODS

This was an observational, questionnaire based cross-sectional study, planned to evaluate the students' perceptives on online teaching during the lockdown period due to the Covid-19 pandemic. An anonymous online survey was conducted by the Department of Pharmacology, Kalinga Institute of Medical Sciences, Bhubaneswar during the month of June 2020 by enrolling 350 students.

The participants were 150 MBBS students, 100 dental and 100 nursing students, pursuing their respective degree courses at Kalinga Institute of Medical Sciences, Bhubaneswar, having Pharmacology as their core subject. All eligible participants were sent an email inviting them to participate in the survey. The email outlined the purpose, the voluntary nature of participation and emphasised the anonymity of the participants. This email also contained a google link to the questionnaire form for the online survey. The survey responses were collected online and only available to the authors in a non-identifiable form.

Description of the questionnaire: The survey consisted of 30 questions. It consisted of demographic, close-ended & open-ended survey questions. The demographic information was limited to age, sex and location of the students. The "close-ended" questions provided, had multiple options and students were free to opt for more than one options. Likert scale was used for few of the questions. Likert-type or frequency scales are ordinal scales, which use fixed choice response formats and are designed to measure attitudes or opinions (Bowling, 1997; Burns, & Grove, 1997). The "open-ended" questions allowed the respondents to express their opinions freely and they were not restricted by the options.

The close-ended survey questions were designed to evaluate the experience of the students with the online system and technology, to measure their learning ability and their behavioural reaction to the change in the trend of teaching-learning. Regarding their experience with the online system and technology, the students were asked about the type of devices and internet connection used for attending the online classes. They were also asked whether they had been sensitized earlier, were able to understand the features and use the online system for learning with ease. They were asked about the estimated number of hours spent using a computer for educational purpose and the online platform they are comfortable communicating electronically. The students were asked to opine whether face-to-face contact with the teachers is necessary for learning. All these determined the effectiveness of the online education system.

The learning ability of the students with the use of online system was measured by asking the participants whether the classes provided the right amount of theoretical and practical knowledge, the type of study materials / tools provided and they were asked to indicate the most helpful of the materials / tools provided to them. The students were asked about their evaluation during the online learning and whether they perceived it beneficial or not.

Behavioural reaction was measured by asking them to rate their level of satisfaction for the curriculum covered through the online classes, and the motivation, which the system provided. The reaction of students was measured by asking them to rate their enjoyment in using the online mode of learning. They were asked whether they felt that the online classes could be a substitute for regular curriculum based classes.

The open-ended questions asked the students to provide their opinions about the things they liked / disliked about the online teaching-learning method and any modifications required.

The results are expressed in figures and tables as percentage responses using Microsoft excel sheet.

RESULTS

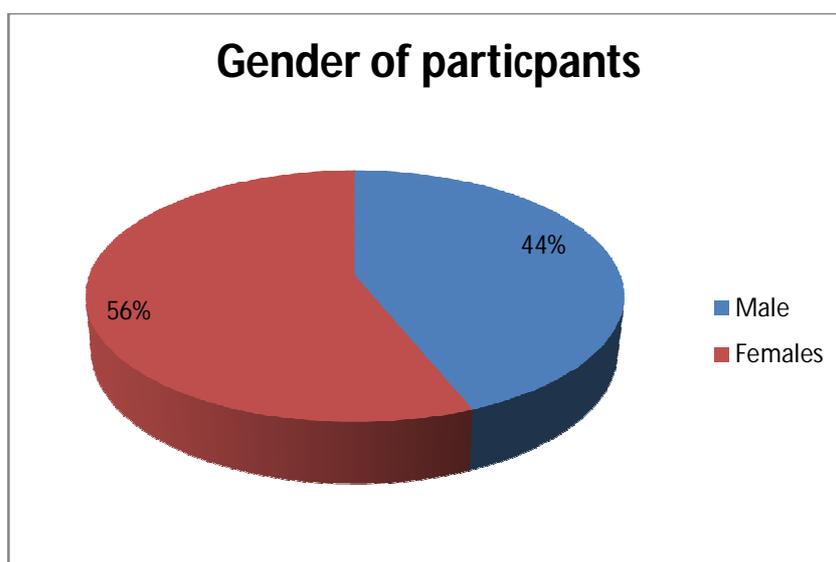
The study was initiated by enrolling 350 participants, which included 150 students from medical (MBBS), 100 from dental (BDS) and 100 from nursing (BSc) curriculum. Out of the 350 enrolled students, 15 did not respond to the survey so the data collected from 335 participants was considered for the study.

All participants were second year students, whose regular classes were suspended due to Covid-19 pandemic lockdown and were attending online classes conducted by Kalinga Institute of Medical Sciences, Bhubaneswar as per schedule. These students were being taught second year curriculum subjects - Pharmacology, Pathology, Microbiology, Forensic medicine, dental and nursing sciences through online system. Most of the students (46.3 %) were in the age group of 18-21 years, followed by (39.4 %) in the 22-25 years age group, while rest were between 26 to 30 years as shown in table number 1. Female participants (56%) were more than males (44%), as shown in figure 1. Most of the participants were hailing from urban area (70.4%) while some were from rural area (29.6%)

Table 1 showing the age of participants

Age (years)	Number	Percentage (%)
18-21	155	46.3
22-25	132	39.4
26-30	48	14.3
Above 30	0	0
Total	335	100

Figure 1 showing gender of participants



We have divided the results into three main domains. Firstly, the students have shared their experience regarding online learning system. Most of the participants used mobile (87.7%) as the primary device for attending online classes, followed by laptop (9.9%) and desktop (2.4%), shown in table 2. The type of internet connection utilised was mostly mobile data (65.2%), followed by broadband (24.2%), then jiofibre and very minimally used was landline, as shown in figure 2. Most of the students (45%) opined that they were not sensitized about the online classes as denoted in figure 3 but 55.6% of them could easily understand and became well acquainted with online learning system. The participants expressed their inconvenience because 41% of them were spending around 5 to 10 hours while 37% were spending more than 10 hours in this online learning. About 62% of the students said they were more comfortable using google meet as online learning portal while 35% were comfortable on zoom meet and rest 3% appreciated the use of Google Classroom. Most of the participants (75%) felt that face-to-face contact with teachers was more motivating and necessary to learn the subjects, as shown in table 3.

Table 2 showing types of devices used for online classes

Devices	Number	Percentage
Mobile	294	87.7%
Laptop	33	9.9%
Desktop	8	2.4%
Total	335	100%

Figure 2 showing Type of internet connection you use for online classes

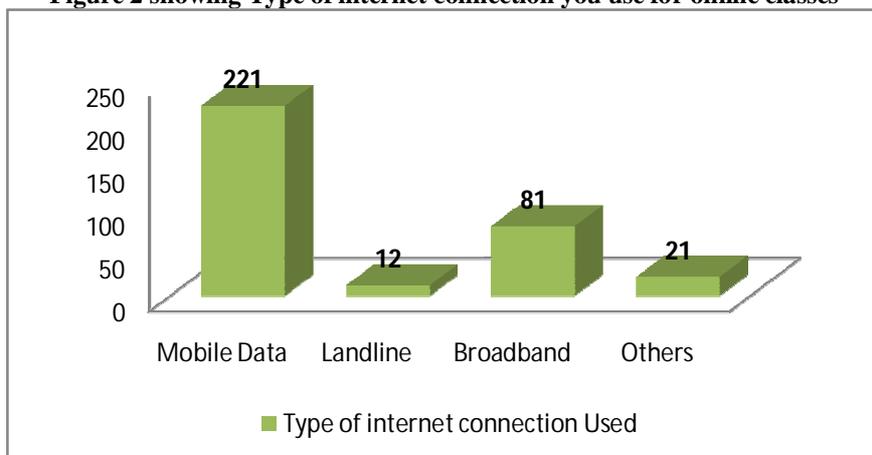


Figure 3 showing Sensitization about online learning before the start of the classes

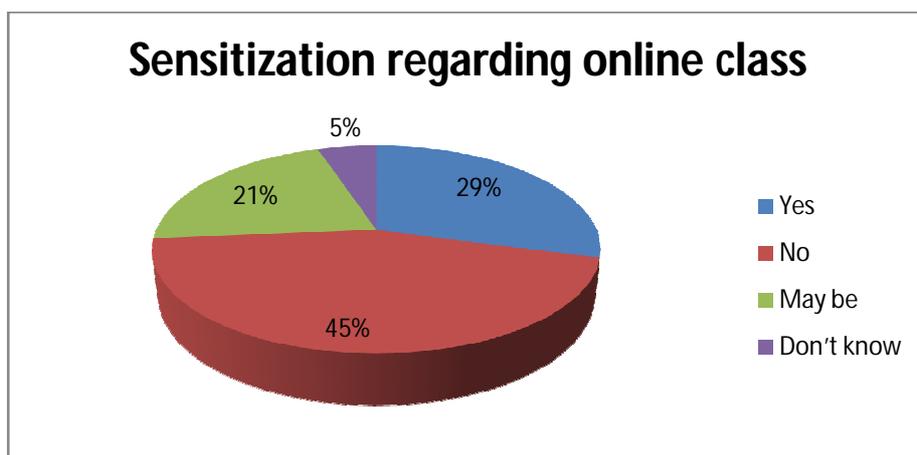
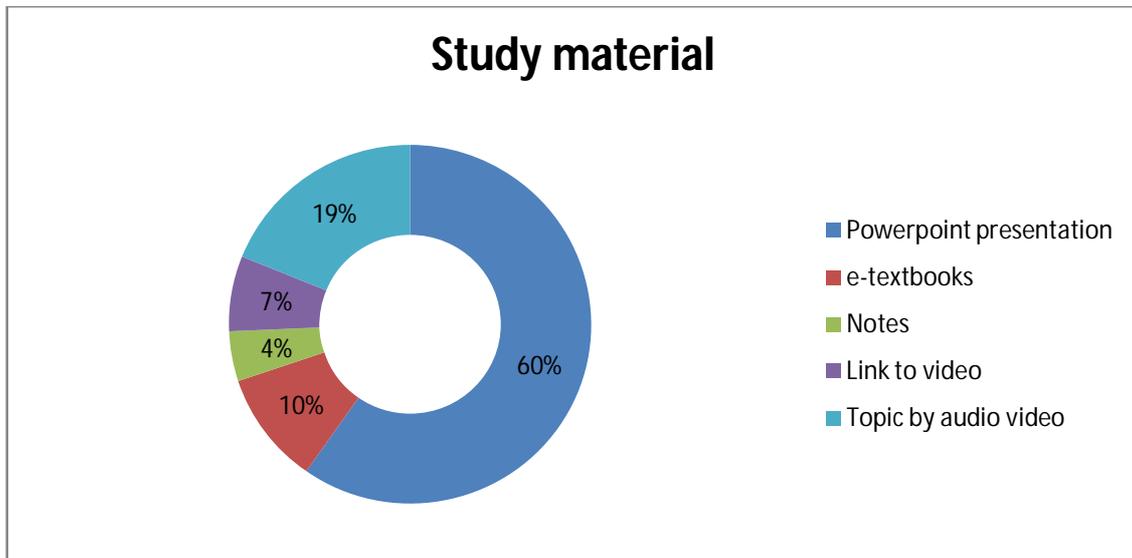


Table 3 showing whether Face to face contact with teacher is necessary to learn

Response	Number	Percentage
Yes	253	75%
No	19	6%
May be	51	15%
Don't know	12	4%
Total	335	100%

The second domain which we evaluated was the learning ability of the students. 21.3% of the students felt that right amount of theoretical and practical knowledge was provided by the online classes whereas 41.3% did not feel the same. Most of the participants (62%) opined that they were provided with adequate study material. Power-point presentations (60%) were the most commonly provided study materials followed by audio video links (19%) as shown in figure 4. Around 52% students expressed that these materials were somewhat helpful while 21% denied their usefulness and strongly supported regular classes. About 73% students were evaluated by the teachers at frequent intervals, but most of them (67%) did not find those evaluations via online system beneficial for them.

Figure 4 showing Study materials provided during online classes



Thirdly, we evaluated the behavioural reaction of the students regarding this online learning, during lockdown phase. About 48 % of the participants had neutral opinion when asked about the level of satisfaction they achieved in online classes while 24 % were satisfied and 15 % were dissatisfied as shown in figure 5. About 82.7% of the participants found regular classes with interactions, more motivating than the online classes, as depicted in table 4. The students (78%) expressed that online classes can never be a substitute for regular curricular class and about 61 % of students did not seek this way of learning-teaching as fruitful and enjoyable, as given in figure 6.

Figure 5 showing the level of satisfaction for the curriculum covered through the online classes

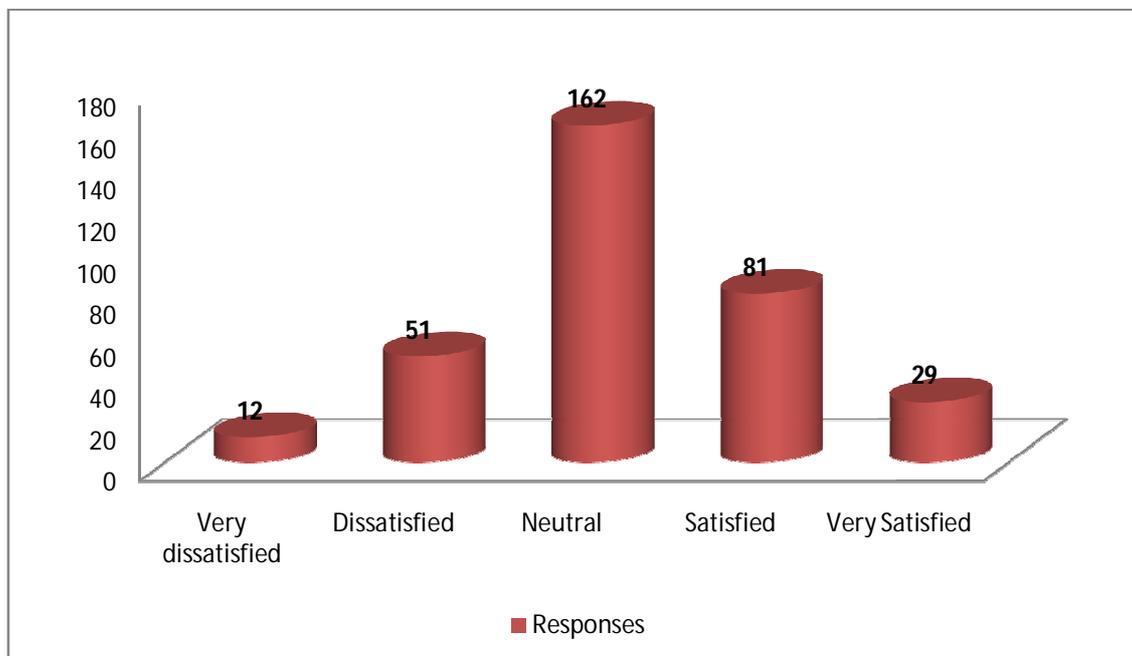
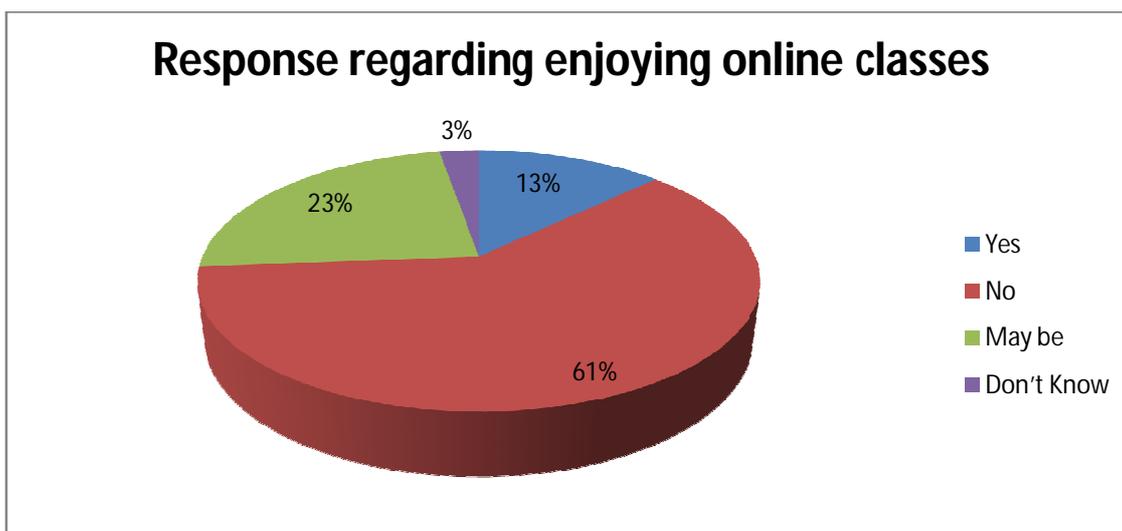


Table 4 showing motivation provided by online learning

Response	Number	Percentage
Yes	12	3.6 %
No	277	82.7 %
May be	38	11.3%
Don't know	8	2.4 %
Total	335	100%

Figure 6 showing response to whether online learning platform is enjoyable or not



At the end of the questionnaire, we asked some open ended question. First one was the two things that students appreciated the most, regarding online classes. Most of them said that they were at home and were safe during this pandemic as well as continuing with their education, which they felt useful. Secondly, we asked two factors that they disliked regarding online classes and most of them said that learning experience as well as productivity was better with regular classes as compared to online classes. Also they complained of eye pain and headache due to prolonged classes. Lastly we asked them to summarise their online learning experience on which majority of the students had same views. They said such classes are good and safe in regard to this pandemic but is not useful as a long term learning process.

DISCUSSION

In wake of this global emergency of Covid-19 pandemic, medical education has been greatly challenged and e-learning platforms are now increasingly utilized by medical schools around the world to impart knowledge in the present times. In the present study, we have evaluated the medical, dental and nursing students’ perspectives regarding the usefulness and effectiveness of the online education system through a questionnaire and its possible impact on the medical curriculum during this pandemic.

About 86% of the students were between 18 to 25 years of age and female participants (56%) were more than males (44%) showing that the individuals in this particular study are a representative sample of the target population for generalization purposes. Online learning has the advantage of transcending geographical boundaries and can include students and teachers from diverse geographical locations. This is supported by the fact that 29.6% of the participants were able to get access to it in spite of living in rural areas, proving that technology can be used in an innovative way to maintain learning, which is the need of the hour.

In the questionnaire, certain questions were based using Likert’s scale to measure the levels of opinions, thus tapping into the cognitive and affective components of attitudes of the students. Most of the participants used mobile (87.7%) as primary device for attending online classes, followed by laptop (9.9%) and desktop (2.4%). Nowadays, more than 90% of students have access to internet and students try to access web for medical studies³. We need to exploit this tech savvy attribute of learners for online teaching learning. In our study, the type of internet connection utilised was mostly mobile data (65.7%), followed by broadband (24.2%). But, not all students and teachers have regular or reliable access to the internet. In many cases internet access may be limited to dial-up speed, or there may be a capped monthly usage on their internet which can restrict their ability to access or engage with information.

The results of the present study shows that 45% of the learners were not assessed on their learning needs and that no prior knowledge was imparted to them relating to e-learning, before the start of online classes. Further results of this study made it clear that significant number of learners (56%) possess the ability to adapt and get acquainted with the new mode of teaching learning method. Online students are often expected by their teachers to look at the screen and stay focussed on the video feeds, this can result in feelings of prolonged eye contact which can be threatening and uncomfortable. The participants in this study expressed their inconvenience because 41% of them were spending around 5 to 10 hours while 37 % were spending more than 10 hours in this online learning. There are a variety of tools/platforms and learning management systems (LMSs) options that may be used for both synchronous (live lectures online) and asynchronous online learning (work at their own pace)⁴. All of these have demonstrated effectiveness as educational tools in medical education⁵. About 62% of the students said they were more comfortable using google meet as online learning portal while 35 % were comfortable on zoom meet, both of which are used for synchronous type of online learning.

Some students learn best by interacting with other students and instructors. However, online learning sometimes does not provide as much opportunity for this interaction as this system requires the teacher to work from written directions without face-to-face instructions. Further, the format of online video results in missing many nonverbal cues such as hand gestures and requires people to work harder to interpret the ones they can see. In our study, this aspect is reflected by the opinion of 75% of the participants who felt that face-to-face contact with teachers is more motivating and necessary for learning.

Research suggests that online learning has been shown to increase retention of information, and take less time. In our study, only 21.3% students perceived that the right amount of theoretical and practical knowledge was provided by the online classes. The right tool, right learner, right dose, at the right time, and route should be incorporated in online learning modes for sustainable and effective outcomes of online teaching-learning⁶. These educational media possess several distinct advantages over traditional didactic models of instruction, including the ability to update material in a timely manner to ensure delivery of the latest evidence-based content to students. Online learning allows the teachers to design and deliver their courses within a flexible framework that includes a number of different tools to enable learning and communication to occur. Most of the participants (62%) opined that they were provided with adequate study material and power-point presentations (60%) were the most commonly provided study materials followed by audio video links (19%). Around 52% students expressed that these materials were somewhat helpful while 21% denied their usefulness and strongly supported regular classes. Teachers must incorporate audio, video and links to other virtual worlds and create authentic, interactive problem solving activities to construct meaningful knowledge. In our study, 73% students were evaluated by the teachers at frequent intervals, though most of them (67%) said that, they did not find those evaluations via online system beneficial for them. But e-learning has been demonstrated to be as effective as traditional didacticism and can be instrumental in promoting self-directed learning⁷. At the same time, the teacher can evaluate competencies through online assessments, enabling learners to receive feedback for self-improvement⁸. E-learning will undoubtedly have a significant impact on the environment in which future medical students learn. The gradual shift towards e-learning is seen as a catalyst for applying adult learning theory, which will see more medical educators taking on the role of facilitator and assessor of competency.

The behavioural reaction of the students were evaluated regarding this online learning, during lockdown phase. About 48 % Of students had neutral opinion when asked about the level of satisfaction they achieved in online classes while 24 % were satisfied and 15 % were dissatisfied, while earlier studies on nursing and medical students have demonstrated that satisfaction is consistently higher in a blended learning environment compared with a traditional lecture setting^{9,10}. About 83% participants found regular classes with interactions, more motivating than the online classes. Most medical students view e-learning as enjoyable and effective but, interestingly, do not see it replacing traditional didactic methods¹¹. The students (80%) in our study expressed that online classes can never be a substitute for regular curricular class and about 61 % of students did not seek this way of learning and teaching fruitful and enjoyable to them.

The online model provides an interactive learning environment, in which there is easy communication between instructor and students and among students themselves. The online process requires both instructor and students to take active roles. The need for interactivity, monitoring, feedback, and learner support is many times more in online learning compared to conventional classrooms as shown by our study. Despite some outstanding questions, the findings of this study namely devices used, internet connection, adaptability and the learning process continuation, offer supporting evidence on the effectiveness of the technology of online learning in undergraduate medical education. Further research is needed to clarify the effects of online learning and the conditions under which it can be effectively used. We have seen that the present mode of online learning in medical curriculum is neither motivating nor enjoyable and does not provide the required amount of satisfaction, theoretical and practical knowledge to the students. This definitely requires improvement in the delivery strategies, by amplifying the advantages of online learning in teaching methods. The design of the assessment instruments and curriculum types used for online learning requires further study. It is also possible that students do acquire knowledge and skills through online learning that cannot be obtained through offline learning, and this knowledge could compensate for the loss of knowledge and skills during the present crisis.

CONCLUSION

Online teaching, learning, and assessment in medical education are still relatively new; however, it has the potential to become mainstream in the near future. In the present times, it is indeed a challenge for medical educators to obtain the required and desirable outcomes by adopting innovative ways. As medical educators, we have to put our academic experience into practice and strive to bring forth beneficial solutions which are compatible with the medical students' perspectives also. The results of our study can serve as positive feedback to make the teaching programme more interesting. When COVID 19 resolves, transformative changes are expected in medical education through the use of emergent technology¹². So, for the time being, in the midst of the crisis, we have to adapt to the new normal i.e online learning until we get back from the virtual to the physical world wherein we can inculcate the experiences of online learning for the betterment of the medical students.

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