Perceptions of Medical and Allied Health Students Towards Online Education during the COVID-19 Pandemic Phases and Its Future Impact in India

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ABSTRACT
The outbreak of COVID-19 has caused sensation and fear among the world population. Globally, the teaching and learning process has been greatly impacted by the pandemic. University and teaching institutes adopted the online mode for the continuation of the teaching-learning process. This research aims to evaluate the current online education practice, its effectiveness, and future prospects in various medical and allied health education in India. A standard self-administered questionnaire was prepared and circulated among the medical and allied health care students from different parts of India via the online platform. A total of 1042 participants submitted their responses. About 77% of students stated that they have attended online classes conducted by their respective educational institutes. The majority of the students were enthusiastic about online learning (via Google platform, Zoom, etc.), yet they all agreed that their practical knowledge was insufficient. Online education can be a good approach to learning, but it may not be as effective as traditional education in Medical and Allied Health students. Beyond pandemic lockdown, online learning may be implemented in conjunction with traditional methods.

Introduction
The Novel coronavirus is one of the lethal viruses with high transmission. In December 2019, the first Coronavirus case was reported in Wuhan City. After 2–3 weeks of COVID-19 outbreaks, Covid cases were reported in the USA, Europe, and many Asian countries [1]. According to the World Health Organization (WHO), the virus responsible for nCOVID-19 is severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) [2]. The patients of Coronavirus disease were reported with various symptoms like fever, running nose, cough, sneezing, headache, body ache, sore throat, diarrhoea, respiratory distress, and pneumonia. The WHO declared the serious situation a public health emergency internationally on 30 January 2020 and hollar for a collaborative effort of entire countries to the widespread of this Coronavirus [3,4]. India, the largest democratic country was also on high alert due to COVID-19. On 24 March 2020, India took the historical decision of a 21-days complete lockdown effective from 25th March till 14th of August. Due to the continuing rapid spread of the Coronavirus, the Government of India has decided to extend the lockdown from the 15th of April to 3rd May, furthermore extended it from 4th May to 17th May. During these 54-days of complete lockdown in India, the growth rate of new cases had gradually reduced and the recovery rate was much higher than in other countries [5].

The COVID-19 pandemic has produced the greatest disruption in education in history, affecting nearly all students and teachers around the world. By April 2020, the pandemic had afflicted 94% of learners worldwide. While online learning has traditionally taken place through recorded lectures and online platforms in the higher education, due to a shortage of information technology infrastructure for both students and professors, some universities have postponed learning and teaching until further notice [6].

However, continuing the educational process by effective use of technology was very important for students to continue their learning process. Considering the limitations of the lockdown the Ministry of Human Resource Development (MHRD) and the University Grants Commission (UGC) suggested continuing with the teaching-learning process.
using online modes such as Google classroom, Google Hangout, Cisco Webex Meeting, Youtube Streaming, OERs, SWAYAM Platform, and SWAYAMPRABHA, etc. The faculty members have contributed a lot for the benefit of students during the lockdown period by using many tools like WhatsApp groups, emails, and other social media applications [7]. The main goal of the study is to describe medical and allied health students perception towards online education practice during covid 19 pandemic and its future impact in medical and allied health education in India.

Materials and Methods
A web-based survey study was conducted during the midphase of the pandemic. This study targeted all allied health and medical students who were directly involved in their institution’s lectures. The minimum sample size was estimated with following formula:

\[ n = Z^2 \times p \times q \div d^2 \]

\[ n = (1.96)^2 \times 0.5 \times (1-0.5)/(0.05)^2 \]

\[ n = 384 \]

where \( z \) is 1.96 for the confidence interval of 95%; \( p \) refers to prevalence 0.5; \( q \) refers to 1-0.5; and \( d \) is margin of error or the half-width of the 95%-confidence interval, i.e. 0.05.

A standard questionnaire was prepared in the Google form and was forwarded to teaching faculties of different universities and institutes for the collection of data from students. The questionnaire consisted of two parts: The demographic part and Online Education Questionnaire. The demographic variables include Gender, Age, Department, and State. The questionnaire had 5 questions (Table 1), 4 questions were regarding the overall status of academic progress during the lockdown, and 1 question was regarding the mode of online platform used for academics during the lockdown. The participants were informed about the objectives of the study and informed consent was taken by answering a close-end question “Yes” or “No” to confirm the willingness to participate voluntarily. After taking the informed consent participants were directed to submit the self-administered questionnaire. The anonymity and confidentiality of all the data collected from the participants were maintained throughout the study. A total of 1042 students from 15 departments in various States and Union Territories of India participated in this survey study. Ethical approval was taken from the scientific research committee of charotar institute of paramedical sciences (CIPS) to perform the study (Ref:CIPS/SRC/21/002). The written consent was taken from all the participants involved before the survey study.

Statistical Analysis
The analysis of the data was done by using descriptive statistics of mean and standard deviation. Data Analysis was performed by using IBM SPSS Statistics for Windows, version 20.0 (IBM Corp., Armonk, N. Y., USA).

Results
A total of 1042 students from various disciplines of medical and paramedical professions participated in the survey study. Among which 482 (47%) were males and 560 (53%) were females having the mean age of 21.19 ± 3.20 years and 20.40 ± 2.28 years respectively.

The samples of the study were collected from different states of India by using Google forms and the majority of them were from Gujarat, West Bengal, and Tripura (Figure 1).

Students from different departments of Medical and Allied health sciences have engaged in this survey. The majority of the students participated from the department of Medical Imaging Technology (49%), Medical Laboratory Technology (19%), Operation Theatre and Anaesthesia Technology (8%), and Nursing (7%) (Figure 2).

The response of participants to question regarding overall progress was highest for average progress i.e. 386 students (37%) followed by 264 students (25%) had good progress, 184 (18%) students reported excellent academic progress, 110 (11%) students have reported unsatisfactory and 98 (9%) students revealed poor academic progress during lockdown (Table 2).

The majority of the Medical and allied health students have reported that their institution has actively

| Table 1. Questionnaire of Online Education during nCOVID-19 pandemic lockdown. |
|---------------------------------------------------------------|
| **Questions** | **Options** |
| Are online classes being conducted by your institution? | Yes, No |
| According to you are online lectures sufficient enough to improve your practical knowledge. | Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree |
| Rate your experience of online classes over regular classes. | Poor, Unsatisfactory, Average, Good, Excellent |
| Mode of online platform used for conducting online classes/Assignments submission/case report presentation. | Google platform, Zoom, Edmodo, Others |
| Rate your academic progress during the national lockdown period? | Poor, Unsatisfactory, Average, Good, Excellent |
engaged with students for Online classes like taking lectures, submission of assignments, and case report presentations in Google platform and Zoom application. Approximately 77% of students stated that the online class was conducted by their institutions in India whereas 23% of students revealed that there were no online classes taken during lockdown by their institution.

Most of the universities and colleges used the Google platform (like Google classroom, Google duo, etc) (419 students i.e. 52.6%) as their principal application for online classes followed by Zoom application (267 students i.e. 33.5%), Others (106 students i.e. 13.3%) and Edmodo application (5 students i.e. 0.6%) (Figure 3).

**Discussion**

A macro-level study was conducted by United Nations Educational, Scientific and Cultural Organization (UNESCO), the United Nations Children’s Fund (UNICEF), and the World Bank to assess the National Education Responses to COVID-19 School
Closures, among which India was also one of the countries to respond to the survey [8]. To the best of our knowledge, this is the first study conducted at the micro-level from a student's perspective towards online education for Undergraduate students during the lockdown in India.

In this pandemic situation, majority of the medical and paramedical institutes has changed their pedagogy to remote education in the mid-semester and started sending e-content, various online webinars, online case reports, and assignment submission to their students to gain knowledge. The present study showed that out of 1042 participants approximately 77% of participants responded that their institution has organised the online classes, as for the rest 23% of participants didn’t get the opportunity to attend any online classes. According to the study, majority of the medical and allied health students seems to be satisfied with online classes as compared to the conventional methods.

In April 2019, Saurabh R Shrivastava and Prateek S Shrivastava published a study on barriers in E-learning in medical education in which they reported that the major challenges of online education are the lack in human resources. Many institutes have faced challenges regarding hardware, software, and poorly skilled technical staff as a result of this it becomes challenging to deliver online medical and allied health learning [9]. In June 2018 O’Doherty D et al. conducted a study based on online learning in medical education in that they mentioned that online learning can provide more easily a wider variety of content and a greater quantity of information. They conclude that the development of online education and the implementation of online learning methods among medical faculties and students will better prepare them for the challenges faced in this digital age [10]. Vaona A et al., in January 2018 performed a study based on the e-learning of health professionals in which they reported that e-learning could be more successful than traditional learning in particular in medical education settings [11]. In the present study, the majority of the students reported that online classes are more useful and enjoyable than conventional classes. Online training seminars through video programs and live interaction were also conducted. Apart from online classes, the students were undergoing regular online counselling for psychological and mental support, and daily follow-up of their academic progress has been taken. Healthcare students also need practical exposure but during the lockdown period, the facilities to improve the practical knowledge were not accessible by all the universities and institutes in India. These facilities include the use of the virtual simulation laboratory for a demonstration of the medical procedures. The students are not getting adequate practical learning exposure as they need during the pandemic lockdown but when it comes to the overall academic progress the response of the students is altogether good and the majority of the participants are using the Google platform (52.57%) for online education in India.

Table 2. Table showing the response of participants regarding the academic progress, experience of the online class, and practical knowledge improvement among the students who have attended the online classes.

| Academic progress during the lockdown | Poor | Unsatisfactory | Average | Good | Excellent |
|--------------------------------------|------|----------------|--------|------|-----------|
| Overall progress of all participants (1042 students) | 98 (9%) | 110 (11%) | 386 (37%) | 264 (25%) | 184 (18%) |
| Online classes conducted by Institution (797 Students i.e. 77% of students attended online classes) | 81 (10.16%) | 119 (14.9%) | 234 (29.4%) | 227 (28.5%) | 136 (17%) |
| Experience of online classes over regular classes | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| Poor | 146 (18%) | 152 (20%) | 209 (26%) | 176 (22%) | 114 (14%) |
| Unsatisfactory | 386 (37%) | 264 (25%) | 184 (18%) | 146 (18%) | 136 (17%) |
| Excellent | 110 (11%) | 264 (25%) | 184 (18%) | 146 (18%) | 114 (14%) |
Alsoufi A et al. conducted a study based on impact of medical education in which they reported that the majority of the students (97.1%) had stopped attending lectures and educational programs due to the COVID-19 outbreak. Almost 86% of the participants reported that their medical school had put clinical and laboratory skills training on hold. During the lockdown period approximately 70.5% choose to relax and rest [12]. This will seriously affect the future, as they will not have sufficient knowledge for diagnosing and treating the patients.

Recently, UGC has already announced to reopen the universities, but due to the ongoing COVID-19 pandemic regular classes have not started yet in many of the teaching institutes. However, students should have practical exposure along with the ongoing online classes. The virtual simulation laboratory can be an ideal method of learning to facilitate practical knowledge [8,13–15].

Due to economic constraints [16,17] barriers to implementation of e-learning strategies include difficulties in accessing digital devices and having a quiet space for learning activities as well as unreliable internet connection. Teachers may also not be well trained in delivering e-learning, and on the long run medical issues (like ophthalmic, orthopaedic or neurologic problems) might also play a role.

Limitation
There may be potential sample bias in this analysis, as the selection of samples was unequal for all departments and all the states of India. Further research with a detailed questionnaire can be conducted to overcome these limitations of the present study.

Conclusion
The present study performed on undergraduate medical and allied health students reveals that the majority of the students in India have attended online classes conducted by their respective institutions. The overall academic progress among all medical and allied health students seems to be satisfactory, but gains in practical knowledge have probably only questionably been achieved. This may be overcome by developing suitable digital tools like simulation training. Blended learning consisting of webinars and live hands-on training might also be an option.

Most online courses have been offered on well known publicly available platforms. Outcomes assessment in e-learning is key to ensure high educational quality, which might have been compromised by the speed of change as compelled by the pandemic. Implementing virtual learning practises and a model-based education system, in addition to traditional teaching methods, will aid in the development of highly skilled professionals in the future.

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Data Availability Statement
The data supporting the findings of the study are reported in the form of figures and tables in the article.

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