

Assessment of online teaching as an adjunct to medical education in the backdrop of COVID-19 lockdown in a developing country – An online survey

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Purpose: The aim of this study was to assess awareness about online classes and to assess if they can aid learning in the field of medicine amid lockdown. **Methods:** Online survey comprising a questionnaire related to the aspects of online teaching was undertaken. There were 16 questions, and responses were collected from undergraduates, postgraduates, and the teaching faculties. **Results:** Online classes were viewed favorably by the vast majority of respondents. Out of 412 respondents 79.9% actively attended the classes. While 42% felt the timings were inappropriate as they clashed with duty hours, a set of 35% had difficulty understanding the content and most of them were undergraduates. Poor internet connection was a main hindrance identified. In total, 69.2% respondents were happy with the feasibility of the classes and believed these classes had the advantage of being economical as they offered exposure to national and international faculty from the comfort of their homes. **Conclusion:** Conducting online classes on a national scale is a herculean task for a developing country because of poor internet connectivity and deficient access to high-speed broadband services. Nevertheless, their popularity among students during the current crisis shows that it is a very pragmatic and feasible teaching option and can definitely supplement traditional classroom teaching.

Key words: COVID, developing country, e-learning, lockdown, medical teaching

We live in an era where our day-to-day activities have been made easy with the use of technology. Therefore, it comes as no surprise that in the current pandemic online teaching evolved quickly to fill the void created in medical teaching by the lockdown. In the face of an unprecedented health scare, a new normal has to be set up with respect to medical education. The outbreak of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), also known as 2019 novel Coronavirus (COVID -19), was reported in China around late 2019 and was subsequently declared as a pandemic on March 11, 2020.^[1,2] The first COVID positive case was detected in India on January 30, 2020. India has now entered into Phase 4 lockdown which started on March 24, 2020 in an attempt to curb the spread of pandemic.^[3] All walks of life including business, sports, entertainment, travel have been affected, but the hardest hit sector has been education. Health sector has been overburdened with most of the hospitals stopping routine services initially and catering to emergency and COVID-related services only.^[4] Thus, the routine training of medical students in all teaching hospitals has been compromised which is a collateral damage.^[5]

Since the course duration of both postgraduate and undergraduate students is fixed, the suspension of theory classes and clinical rotations has hampered the pedagogical process. As a part of the mitigation strategy, there has been a surge in the number of online classes and webinars. Since the current pandemic is expected to last a year, perhaps more, and with teaching classes being suspended, conferences and workshops

being conducted online; the world is rapidly adapting to a new normal protocol in education – that of online classes.

It is a well-known fact that medical field involves continuous updating of knowledge, skill, and information. Hence, the ones who are on the receiving end of knowledge from such online teaching classes can be from any end of the medical hierarchy. Several studies using specifically designed software have been used to gauge the effectiveness of the online teaching in medical profession.^[6,7] The way the discussion is perceived differs on an individual basis. The success of online teaching in a developing country depends on various factors like administrative planning, technical support, instructional planning and execution of classes, and feasible high-speed internet connection.^[8,9] In India, few studies have been conducted to assess the efficacy of online learning in medicine. In developing countries, though the basic structure is the same, the ground reality is much different depending on the infrastructure. This study is conducted to address the lacuna by an online survey to bring out these varied opinions among the teachers and the taught.

Methods

A standardized online questionnaire was circulated among various medical schools using Google forms on social media platforms such as Whatsapp and Facebook after ethical clearance. The survey was circulated after initiation of

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Lockdown 3.0 and was accessible for 1 week. Appendix 1 shows the questions asked in the survey. It was mandatory to answer all the questions.

The study was cross-sectional in nature. It included undergraduates, postgraduates, and teaching faculties. Using snowball sampling, a total of 412 persons were included in the survey. After the data were collected via the online survey, it was analyzed and description of the responses was performed. Participation was voluntary and consent was taken at the beginning of the survey questionnaire.

Statistical analysis

Data collected were downloaded in Microsoft Excel spreadsheet format and analyzed using IBM SPSS v 23.0. Data were cleaned for outliers and invalid responses. Descriptive analysis was done by summarizing the categorical variables as proportions and continuous variables in terms of means (with standard deviation). Inferential statistics used for assessing the difference in proportions was Chi-squared tests. For all analyses, the α was preset at 0.05 and β at 0.8.

Results

A total of 412 responses were collected; out of which, 214 (51.9%) were males and 196 (47.6%) were females, and since the numbers are quite similar, there is no gender inequity in the data set. The average age of the respondents was 30.46 years with a standard deviation of 11.39 years (Age range: 18–68 years). A total of 165 (40%) respondents were undergraduates, 147 (35.7%) were postgraduates, and 100 were consultants or teaching faculty members.

Three hundred twenty-nine (79.9%) of those who participated were active participants of the webinars or online classes while the rest discontinued. The two main reasons given by the respondents for not attending the webinars were too many classes conducted (65.8% respondents) and clash of timings of these classes (56.1%). Other reasons included lack of internet connection, lack of time and interest in the subject matter, speakers were speaking too fast to take down notes or attract attention, and lack of novelty [Fig. 1]. On comparison with classroom teaching only 15% respondents felt online classes were better while 35% were neutral and rest disagreed.

On the Likert scale, the usefulness of the classes was graded on a scale of 1 to 10. Altogether, 31.5% considered the classes very helpful (Likert grade 7–10), 44.9% somewhat helpful (grade 4–6), and 23.5% not helpful (grade 1–3) [Fig. 2]. Students who found the classes difficult to understand totaled 35% and out of them 70 were undergraduates. The timing of the online classes was considered appropriate by 58.5% of the respondents.

The number of surveyed candidates who felt that the classes were flexible with ease of home study was 69.2%. Other advantages cited by the respondents were – Exposure to national and international faculty (40.5%), exposure to newer methods of disease management (34.5%), and acquiring knowledge about global research and development while being at home (25.7%). This might be the reason why 29.9% of them found it economical as opposed to the 13.8% who did not gain any advantage. In total, 33.7% people were not able to focus on such classes from their home/hostel/room for which the main two reasons cited by them were – distractions and chores at home and poor internet connectivity. In total, 51.9% students felt that essential doubts regarding the topics could not be solved with the limited amount of time allotted at the end of the sessions. Poor self-motivation at home, fast pace of the classes with no practical demos seemed to demotivate the students, especially

the undergraduates. Monotonous schedule along with family responsibilities at home and clash with hospital duty timings was a deterrent in case of postgraduates and faculties.

To add to the list, continuous screen exposure causing eye strain and headache is a real health scare. In total, 56.1% respondents experience eyestrain, while 31.1% had headache and 20.9 and 17.2% complaint of neck ache and backache, respectively. [Fig. 3] Thus, it making computer vision syndrome an actual threat of these online classes.^[10]

Coming to the application of online teaching in practical field, 29.9% felt that surgical webinars are not useful in long run; however, 50.5% have a neutral opinion and 19.7% do find them useful in long run.

Table 1 briefly summarizes the issues faced by the respondents and how they can be rectified for a better outcome.

On comparing the various subgroups, namely faculties, postgraduates, and undergraduates, all shared similar thoughts on the usefulness of online classes. In total, 58% undergraduates, 41.1% postgraduates, and 53.1% faculties felt classroom teaching was better than online classes. Ease and flexibility of online classes or webinars were the main advantages as per the undergraduates and postgraduates, while faculties cited the exposure to national and international faculties as an added advantages. Looking at the disadvantages cited faculties had prior commitments and duties clashing with the class timings, whereas for undergraduates, the change in the teaching environment from didactic lectures was a drawback. Postgraduates cited both change in the environment and class with duties as major disadvantages. However, all the three groups agreed that the lack of proper communication in clearing doubts and understanding concepts was one of the major drawbacks of these classes. Table 2 enumerates the views of the three subgroups.

Discussion

We, as medical professionals not only bear the burden of diagnosis and treatment but also that of continually educating ourselves as well as creating awareness among the masses. India has been very prompt in adopting preventive measures for the current pandemic; of which, social distancing plays a pivotal role.^[11] Pertaining to this norm, all the mass gatherings like schools, offices, etc., have been discontinued globally. Medical education has been a collateral damage of the pandemic in both developed and developing countries.^[12] According to the World Economic Forum, there is a sudden shift that has been noticed globally to the methodology of teaching in all fields, from traditional classroom teaching to various forms of online learning, following the COVID-19 pandemic.^[13] A similar crisis was faced by the medical fraternity during the SARS outbreak in 2003, and at that time, online learning was introduced in medical education in Hong Kong and found so good that it was subsequently incorporated in their routine curriculum.^[14]

In the present scenario, most of our country is attending virtual teaching classes in their respective fields of interest, education, vocation, or leisure activity. Since the method is newly implemented in our medical education system, its efficacy and usefulness is yet to be ascertained. This survey has helped gain some insights with clarity and captured the perspective of participants at the ground level.

Our survey has shown that as a response to the teaching stalemate produced by the lockdown, online webinars gave increased control and individual engagement with the web-based content, thus enhancing and enriching the learning experience. This is in agreement with the study by Schimming which additionally exposed the lack of participants control

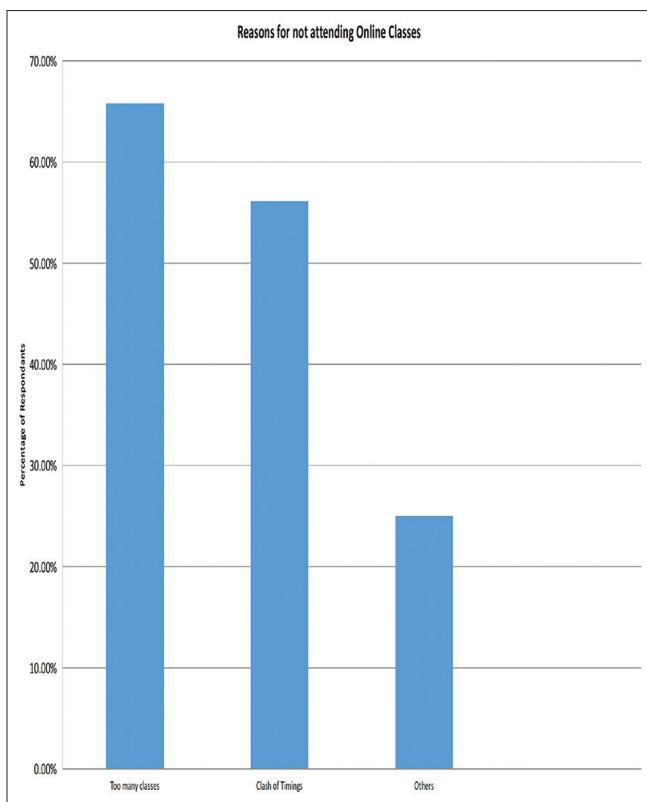


Figure 1: Reasons for not attending classes

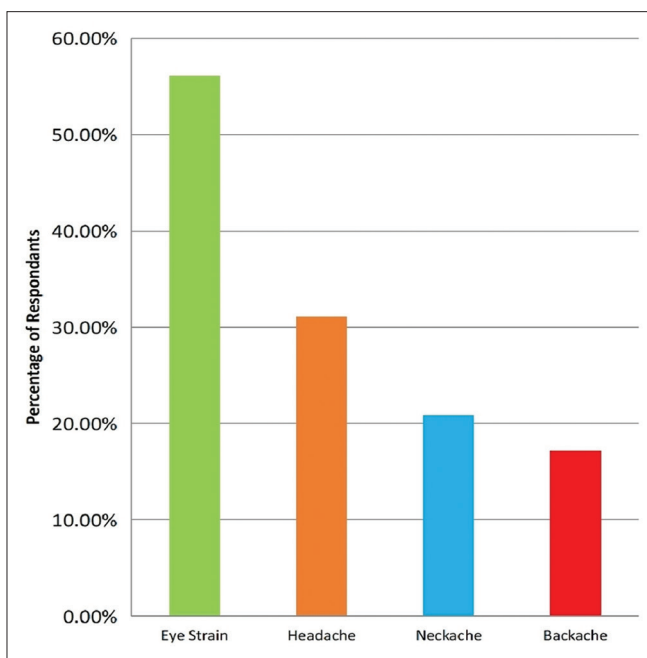


Figure 3: Health problems associated with continuous classes

over the pace and content of class, just as in the present as in the present study.^[15]

The approach of undergraduates towards these online classes is expected to be different because they are driven by the curriculum and university examinations as against postgraduates and faculties, who are interested in advance knowledge and practice-based teaching.^[16] The learning process

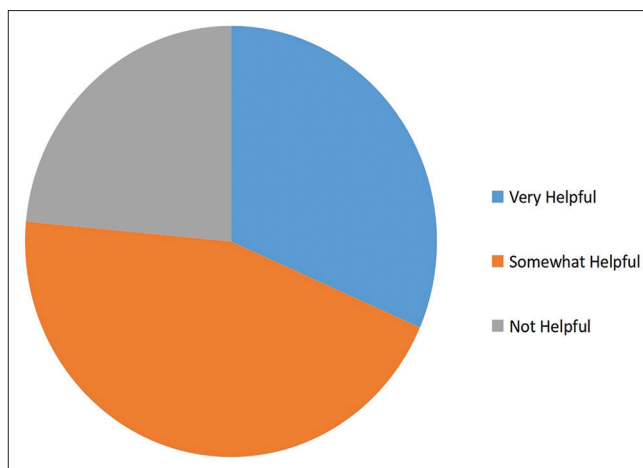


Figure 2: Usefulness of classes as per Likert's Scale

is also affected by individual traits such as their attitude, the level of involvement in the programs, and to some extent their gender.^[17-19] Just as we have concluded, other studies also agree with the cost-saving benefits of online classes.^[20]

For learning to be meaningful, the learning environment has to be conducive and there must be sufficient time at hand. Medical professionals engaged in clinical duties have to squeeze time out of their hospital duties, which have been modified in view of several pandemic-related guidelines which keep changing as the pandemic evolves and new information becomes available. This is also being projected in our study as one of the reasons why people are not able to attend such classes. According to Mohindra *et al.* the stress related to such work can also hinder faculty involvement in online classes.^[21] As far as surgical training is concerned, real-time training obviously yields better results and takes less time as compared to online demonstration of surgical procedures.^[22,23] However, most of our study subjects seem to have a neutral opinion regarding the same.

The earliest meta-analysis of online versus offline learning in health professionals was conducted by Cook *et al.*, which concluded internet-based learning was better than no intervention, but effectiveness was similar when compared to noninternet-based training.^[24] The most recent meta-analysis concluded that through an interplay of various factors online medical education is beneficial to undergraduate teaching.^[25]

Medical conferences and workshops are an integral part of medical training not only for students but also for faculties. Due to lockdown, the conferences have gone completely online and virtual conferences have become the current norm.^[26,27]

Even though all current measures are being taken in good faith so that the flow of knowledge from one to the other is not hampered; the usefulness of this method in a developing country in the field of medicine during such a kenopsia is still not fully explored. This study has brought some clarity on the issue, and it has been documented via our survey that online classes are a way forwards in medical teaching and skills enhancement. The method is new and our survey shows much needs to be done at both the teacher and the student level to adapt to this new method of teaching.

As India is preparing to salvage the losses incurred in different sectors due to the lockdown, the process of incorporating online teaching in the curriculum has started in most medical institutions. To compensate for the loss of

conferences and workshops, the number of webinars is on the rise which needs to be regulated to some extent both in terms of content, timings, and feasibility so that they are in alignment with the medical students learning goals.

As a developing country, our resources are different in different parts of our huge subcontinent and not every student or faculty may be tech savvy as in the west. Online teaching has been suddenly thrust upon the system with sudden spurt of webinars and online classes. In such a situation, it becomes difficult for both students and faculty to cope up with

Table 1: Summary of issues faced by respondents and suggestions

Issue	Suggestions
Time clashes and too many number of classes	Arranging all classes under one governing authority whether in institutions or under state or national societies of the respective discipline
Technical issues	Proper software development and basic training before starting classes
Content and its understanding	Classes should be well structured to cater to the respective audiences. Content and teaching should be according to the target audience
Doubt control	Sufficient time for interaction to clear doubts should be there
Status after lockdown	Online classes can act as a supplementary tool along with traditional teaching.
Others	Support for internet connection Real-time training for procedures Short classes on particular topics rather than rushing into several topics in one session

the dazzling number of choices and poor Internet connectivity as our survey has revealed. Many webinars were arranged by pharmaceutical companies as an altruistic measure supporting education. The compulsion to arrange online webinars also stemmed from the pressure of covering the curriculum in case of undergraduates. These factors lead to not only a steep rise in the number of webinars and also to clash in timings which was not appreciated by many respondents. Therefore, we suggest that if online classes must continue, then they must be structured and designed to meet the curricula of both undergraduate as well as postgraduate students. They should also follow a predesigned time table, which is announced well ahead of the classes so that students especially the residents can incorporate the time slot in their daily work. We also suggest that instead of lengthy lectures, and even longer panel discussions running into several hours as seen in some recent webinars, each webinar must be pragmatic, have a strict short time limit, and be structured like a regular classroom lecture rather than a panel discussion on splitting hairs of esoteric problems.

There is definitely a difficulty to focus experienced by the attendees of the online classes in terms of distractions and poor net connectivity. According to our study, these are two of the most plausible reasons given in a developing country like ours where students from remote areas were sent home due to lockdown, which prevented them from attending classes effectively. Apart from these reasons, the content of the seminars also did not cater to all participants attending these classes. Other trivial reasons such as distractions caused by phone calls and social media notifications causing breach in the link and continuity of the class; peer distractions during class via distracting messages or noises, no interaction with teacher except at the end, continuous teaching with no breaks; and poor understanding of technology by the teacher and student can definitely not be overlooked.

Table 2: Subgroup analysis between faculty, postgraduate, and undergraduate

Subgroup		Faculty	Post graduates	Under graduates
Questions				
Are virtual teaching classes better than classroom teaching?	Agree	12.1%	18.4%	12.7%
	Disagree	53.1%	41.1%	58%
	Neutral	34.8%	40.5%	29.3%
Are virtual teaching classes easy to understand?	Yes	69.7%	75.5%	54.1%
	No	30.3%	24.5%	45.9%
Is the timing of virtual teaching classes appropriate for the attending?	Yes	57.6%	60.1%	58.5%
	No	42.4%	39.9%	41.5%
Are there too many webinars at a given point of time?	Yes	86.4%	68.7%	55.2%
	No	13.6%	31.3%	44.8%
Are there time clashes between these classes?	Yes	83.3%	66.9%	55.8%
	No	16.7%	33.1%	44.2%
Are you able to focus on online classes from home/ room/hostel setting?	Yes	71.2%	74.2%	65.9%
	No	28.8%	25.8%	34.1%
Are the doubts being cleared effectively?	Yes	37.9%	52.8%	48.1%
	No	62.1%	47.2%	51.9%
Is the academic knowledge being refined adequately?	Yes	36.4%	41.7%	24.9%
	No	19.7%	20.2%	31.5%
	May be	43.9%	38%	43.6%
Would surgical webinars will be useful in the long run?	Yes	24.2%	30.1%	8.3%
	No	13.6%	21.5%	43.6%
	May be	62.1%	48.5%	48.1%

Our study has shown that different people have different expectations and points to learn from online classes though the primary concerns with respect to timings and interactive component remain the same for all groups. If online classes are to be made, a regular feature of medical studies then they must be structured and modified looking at these issues. It is well known that medical education in developing countries needs somewhat separate modules as against developed world.^[28] We believe that newer algorithms should be designed, which are appropriate for undergraduate and postgraduate levels and put to use. Since we are a developing country and modes of online learning are not yet integrated in our teaching curriculum, the whole process has to be gradual to avoid technological shock. Both teachers and students have to be sensitized and trained for such online classes to avoid confusion and unnecessary disturbances. Measures to counteract the novel corona virus have to be as novel even in the field of medical education. Hence, it might be worthwhile to combine the advantages of online and offline teaching methods and improve medical teaching by blended learning.^[29]

Limitations

A bigger sample size is always desirable and could have given somewhat different, perhaps better, results. Also, the same set of questions were asked to both faculties and students, which could have created some bias as the level of knowledge and the aim of attending these classes is different for different groups.

Conclusion

In a pandemic, it is uncertain until when its deleterious effects may last. The current pandemic is expected to last for at least a year with its attendant disadvantages of social distancing and curbs on classroom teaching, workshops, and seminars. All this will have profound negative impact on medical teaching. To combat it, it would be beneficial to continue online teaching along with traditional offline teaching at least in the foreseeable future. This study has shown that in spite of problems like poor internet connectivity, or access to it, online classes were popular among students and proved to be a very pragmatic and feasible teaching option and can definitely supplement traditional classroom teaching. So, to conclude, we can deduce that soon enough people will get used to the online teaching environment and blended learning comprising of both online and offline teaching will be a part of our standard curriculum.

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Conflicts of interest

There are no conflicts of interest.

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