

Original Research Article

Learning should never stop: a survey of surgery residents and supervisors on online teaching during COVID-19 pandemic

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ABSTRACT

Background: The pandemic has imposed a prodigious limitation on surgical training and has disrupted hospital procedures, hindering continuing medical training. We have established an online classroom platform at our institute to pursue medical education, which has been a new experience for our residents and consultants.

Method: Across-sectional survey was conducted in the department of general surgery to know the perception of surgical consultants/registrars and junior residents regarding online classes and conventional teaching methods. Survey was conducted online, wherein questionnaires related to online teaching were circulated to resident surgeons and consultants/registrars.

Results: A total of 91 surgery residents and 26 surgical supervisors consisting of faculty members and registrars completed the survey. Junior residents provided encouraging feedback and supported online education in the COVID-19 period; they felt that courses were well discussed, except clinical case presentation. A total of 84.6% of surgery residents and all the surgical supervisors felt that lack of a functional operating theatre impeded their training. Majority of surgical supervisors (66%) were moderately satisfied by the quality of online training, whereas junior residents (79%) were very to extremely satisfied and most (83%) approved online classes in future. Majority of junior residents (90%) found the virtual platform very easy to use, opposite to surgery supervisors.

Conclusions: Our study demonstrated that online education is a feasible way to train surgical residents. However, since surgical specialties depend heavily on practical experience, it is very important to implement new ways of acquiring practical skills.

Keywords: Pandemic, Resident, Education, Online classes, COVID-19

INTRODUCTION

The global COVID-19 pandemic has had every conceivable impact on the health care system, including upon the education of young residents. The pandemic led to a disruption in medical education, and COVID-19 has had a major effect on continuing medical education. Surgical residents feel more competent when they go through a structured learning program, with more clinical exposure to patients in outpatient and inpatient departments and more exposure to various

operations.^{1,2} In India the first few cases of novel coronavirus (COVID-19) were reported in January 2020; to mitigate disease exposure and transmission, social distancing was implemented and all educational institutions suspended their teaching programs.^{3,4}

Consequently, there has been a general shift from traditional face-to-face instruction to online teaching.⁵ Challenges to online education reported in the medical literature so far include issues relating to time management, use of technology tools, students'

assessment, communication and the lack of in-person interaction.⁶ In addition, online education may not be effective as far as the quality of teaching is concerned. Some residents may not have access to laptops or high-speed internet at home or in an institute. Besides, many senior consultants themselves are technophobic, and not confident enough about handling the online platforms used for teaching.

On the other hand, others have predicted that the COVID-19 pandemic will lead to increased acceptance of online and technology-based education.⁵ Even before the pandemic, there was a growth in online education technology and acceptance of the same in western world, although online learning is less frequently practiced in medical education in developing countries such as India due to lack of infrastructure, expertise and feasibility.^{7,8}

Online platforms have emerged as the only possible mode of education for students, during COVID crisis. Surgical education is even more challenging, it involves bedside clinical courses and skills training, which cannot be delivered via an online platform. We therefore conducted this study to assess perceptions of surgery trainees/residents, surgical supervisors, including faculty and senior residents, towards online classes as mode of education implemented during COVID-19 pandemic.

METHODS

A cross-sectional descriptive study was performed at the department of general surgery; PGIMER the study was approved by the Ethics Committee of the Institution, with the IEC number INT/IEC/2021/SPL-438 dated on 17/03/2021. All residents enrolled in surgical training and all trainers in the department giving valid consent were included as participants. Two sets of questionnaires, one for the surgical supervisors and one for residents, were developed through discussion between three junior faculty of the general surgery service and two senior residents. The questionnaires were subsequently edited and improved by two senior consultants. The study was carried out from March 2021 to June 2021 after at least one year of online medical education.

All the junior residents who have joined general surgical residency program after July 2017 and who will be completing their residency program by 31st December of year 2020 and current faculty in the dept. of general surgery at various post who participated in online training of the residents were included in our study while residents and faculty who has exposed of similar online program and not submitted survey in time were excluded.

Participants were given questionnaires using a Google online form, to assess their perception of online teaching during the COVID-19 pandemic. There were 21 questions in the resident questionnaire and 13 questions in the surgical supervisor questionnaire (faculty and senior residents). The questions concerned the

comparison of online courses with the previous classical teaching method, the time devoted to self-study and learning, and the overall quality of online teaching. They also assessed the percentage of online classes each resident was able to attend. In addition, the gap in surgical training due the lack of a running operation theatre was assessed. Various impediments such as technical glitches in the participants' use of the online platform were analyzed. The question regarding the overall quality of online teaching was graded on a scale of 1-5, with 1 representing not at all satisfied and 5 highly satisfied. Regarding the preference for online classes in the future options ranged from 1 not at all to 5 highly recommend. To identify the compatibility of the surgical trainees and faculty/senior residents with the technology, we asked about their experience of using the online platforms, with 1 representing very easy to use and 5 not able to use the virtual platform. Further views on improvisation in teaching methods were noted through multiple-choice questions that were included in the surgical trainee and supervisor questionnaires. We also analyzed the success rate of residents in past 3 university sessions, to compare effectiveness of online education.

Statistical analysis

Data were recorded on a MS Excel sheet and analyzed using SPSS, version 24. Quantitative data were expressed as mean and standard deviation and significance level of the differences between the means was tested using the student's t test (unpaired). Proportions were compared by chi-square test or Fisher's exact-test. A $p < 0.05$ was considered statistically significant. Likert scale analysis was carried out and mode was calculated.

RESULTS

Of the 102 junior residents posted in the department of general surgery, 91 participated and replied to the questionnaire. In all, 26 responses were collected from surgery supervisors, which included two senior professors, one additional professor, one associate, six assistant professors and 16 senior residents (Table 1). For the last 6 months (July 2020-November 2020), our institute had all the classes in an online format, which included eight journal clubs, 12 morbidity and mortality meets (M and M), and 27 seminars and 32 clinical case presentations which were almost similar to the pre-COVID-19 era. Of the 91 young residents, 70 men and 21 women filled in the questionnaire. A total of 20 first-year residents and 42 second-year residents, and 28 third-year students participated in this activity. As regards attendance, 17.8% of residents attended less than 25% of the classes, whereas 32.2% attended 25-50% of classes and 44.4% attended 50-75% classes, although only 5.6% residents managed to attend all the classes. Around 77.8% of residents attended the webinar from outside the institution. The participants' perspective on the online courses was evaluated for various surgical training formats and compared to the physical courses. A majority

of surgery junior residents (62.2%) were in favor of online seminar discussion, and 58.9% also favored online discussion of journal presentations and virtual M and M discussion (Figure 1). Unlike surgical supervisors, only 37.50% of faculty and senior residents favored online M and M, whereas 29.17% favored online journal and online seminar discussion, only 41.1% surgical residents and 15.4 % trainers were in favor of virtual case presentation (Figure 1). At least 60% of the students were able to clear their doubts in online classes and around 57.7% of trainers felt that there was good two-way communication between the presenter and the residents. The absence of an operating table and time limitations affected the practical training of residents, with 84.6% of surgical supervisors and all the residents being of this opinion. Most of the residents (77.8%) were able to devote more time to self-study and learning during the pandemic period than in the pre-COVID period.

Technology does fail sometimes, and 48.9% of residents and 83.3% of trainers faced technical glitches during the classes, with the majority (64.4%) encountering problems in both audio and video quality, which hampered the online classes (Table 2).

The surgical supervisor questionnaire included four questions on a Likert scale, and similar questions were included in the residents' questionnaire. Overall, the quality of online teaching was assessed using a 5-point scale question with the responses ranging from "not at all satisfied" to "highly satisfied", wherein the majority of residents (90.12%) and trainers (76.92%) were moderately to highly satisfied with the quality of the online classes (Figure 2 A). Trainers and residents both contemplate an impact on surgical residency training due to the COVID-19 pandemic, 52.6% and 80.42% in respective groups (Figure 2 B). On our question about continuing the online classes in future, they highlighted their preference for the online teaching by residents' (52.6%) and trainers' groups were neutral (42.13%) (Figure 3a), which showed a positive response. Residents and trainers were more in favor of improvements in the current online teaching, through bedside clinical classes along with online classes and surgical procedure videos being explained online during class. One 5-point Likert scale question with responses from "very easy" to "not able to use it" was intended to identify the ease of using the online platform for classes, with residents finding it very easy (41.78) to function with, whereas the trainers found it neither easy nor difficult (42.31%) (Figure 3 B), of the participating residents, 23 tested positive for COVID-19; 81.1% of them were able to attend classes during their quarantine period and 77.8% found the online classes to be a boon. In our study, we found that the passing percentage of final year residents had decreased in the last three academic sessions. Residents who underwent conventional learning through their final year had 90% passing percentage, whereas among those who were taught online 67% residents passed their post-graduation exit exam.

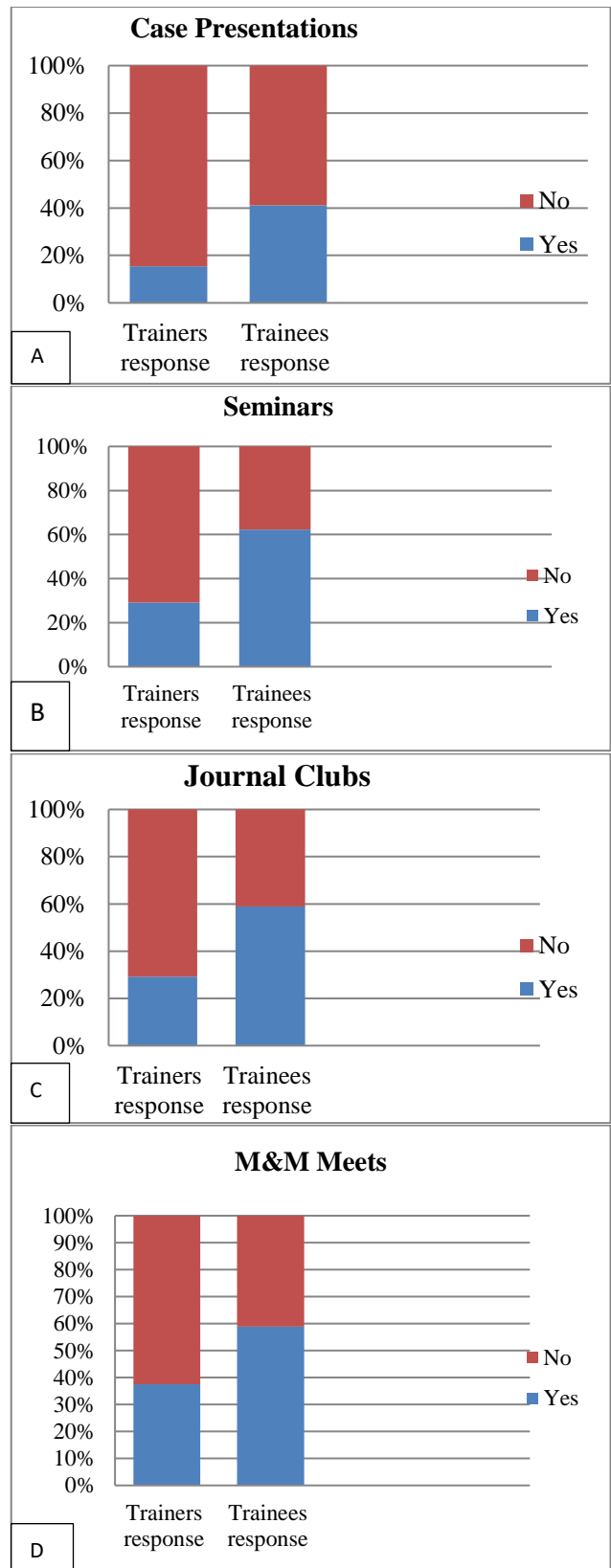


Figure 1 (A-D): Surgery supervisors 'and residents' perspective on comparison of various academic activities in online platform with physical classes, no=online classes not better than physical classes, yes=online classes discussed better than physical classes.

Table 1: Demographic representation of study subject.

Trainer group		Trainees	
Men	Women	Men	Women
20	6	75	16
Total=26		Total=91	

Table 2: Technology errors encountered by the surgery residents during online classes.

Technology glitch	Frequency	Percentage (%)
Audio only	28	30.8
Video only	4	4.4
Both	59	64.8
Total	91	100

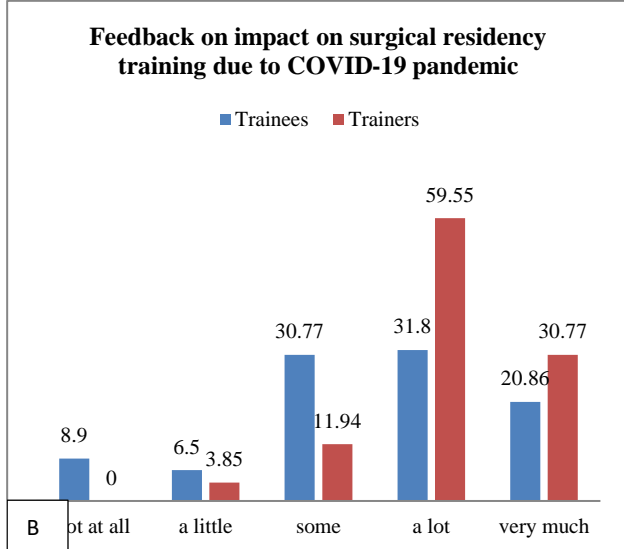
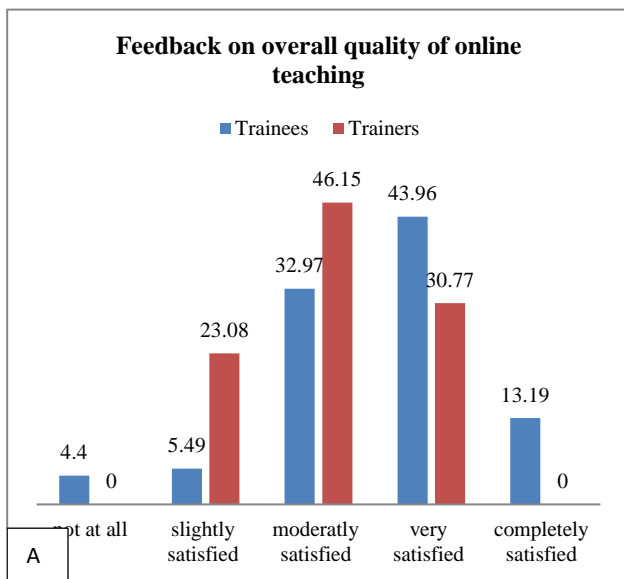


Figure 2 (A and B): Feedback on overall quality of online teaching-trainers' and residents' perspective, feedback on impact on surgical residency training due to COVID-19 pandemic.

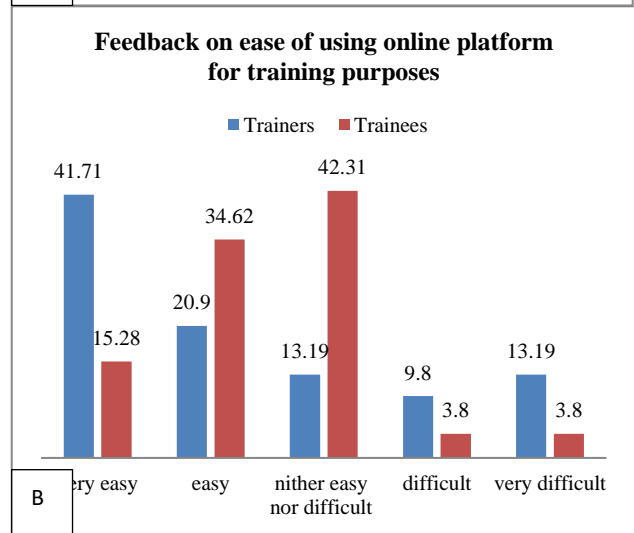
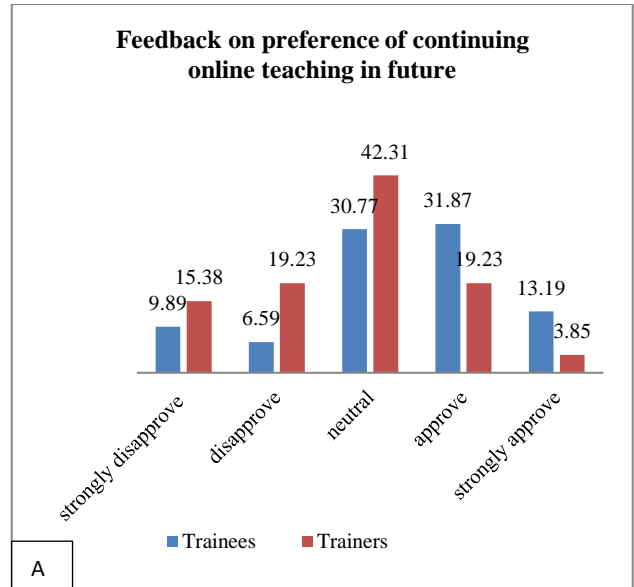


Figure 3 (A and B): Feedback on preference of continuing online teaching in future, feedback on ease of using online platform for training purposes.

DISCUSSION

With the emergence of the COVID-19 pandemic, all facets of medical education have been severely affected. Because clinical training and lectures were unsafe without adequate social distancing measures, these traditional training methods have been gradually replaced by online education with the use of available technology. Surgical trainees face even greater challenges during the pandemic.^{9,10} In developing countries such as India, the traditional method of education is widely followed; students and faculty are not very familiar with online education.

In our study, we analyzed the quality of teaching with respect to various types of classes, such as clinical case presentation, seminars, journal and M and M. Most of the surgical trainees preferred online discussion seminars,

mortality and morbidity meet and journal club, but only 41.1% surgical trainees were in favor of online clinical case discussion, with the majority preferring the traditional method of bedside case presentation. A similar study done by Srivastava et al where they compared online classes to traditional classroom teaching, showed borderline results.¹¹ Regarding the preference for online classes to be conducted in the future once the pandemic subsides, the majority of faculty, senior residents and junior residents showed a positive response, contrary to the results of a similar study by Singh et al., where the majority (50.9%) of students preferred the traditional classroom.¹² A significant number of surgical residents were able to devote more time to self-study during the COVID-19 pandemic compared to pre-pandemic period.

Clear communication between the student and the teacher is key to appropriate training and learning. We found that at least 60% of surgery residents were able to communicate within the online classroom and were able to resolve their queries and doubts, while the majority of the faculty members and senior residents felt that there was good two-way communication. Similar results were shown in a study conducted by Srivastava et al.¹¹ Singh et al. also concluded that the majority of the students felt they were given the opportunity to ask questions (92.3%) and that their interaction with the teacher was better than (27%) or as good as (27.8%) that during a physical classroom.¹² A few studies reported poor communication of student with the teacher/trainer and lesser in-depth group discussion for clarification of the doubts, which the researchers concluded as being a drawback of the online teaching program.^{13,14}

Faculty and senior residents reported that their surgical activity had been substantially reduced, with 70.8% of surgical supervisors reporting that their surgical activity had decreased by 50-75%. Study done in Greece showed that junior and senior trainees performed or assisted in almost 50% fewer cases during the COVID-19 era when compared with the previous period. In all, 91 (100%) trainees and 84.6% surgery supervisors felt that practical training was affected by reduction in operating time.¹⁵

Innovative solutions utilizing technology may help to bridge the educational gap for surgical residents during this unprecedented circumstance.¹⁶ We included a multiple selections question, suggesting improvisation and innovations of online teaching methods, and in response a majority of the surgery residents and supervisors suggested that bedside clinics should be continued along with the online teaching program. Surgery residents also suggested online demonstration using surgical videos with a consultant, explaining to the students' critical steps involved in that particular surgery.

Since residents do not have access to a good network connection all the time, therefore technical glitches either in audio, video or both are likely to occur. In our study, we raised this issue with surgical residents and found that

49.5% of them were unable to attend certain online classes because of a technological deficiency. The problems they encountered were due to poor audio and video quality, as noted by 64.8 surgical residents. In a study done by Gupta et al the researchers found that poor connectivity was the common hindering factor in online classes, followed by lack of human interface and poor sound or acoustics.¹⁷

With the COVID-19 pandemic putting exceptional pressure upon hospitals and healthcare organizations in general, surgery residents were also recruited as a frontline force in the management of the pandemic. So, as per institutional protocol residents had to stay in quarantine for a week, a few residents who were infected with COVID-19 were also isolated and home quarantined, so that online teaching did play a vital role during that period. In our study, 23 residents tested positive for COVID-19 and 81.1% of such surgery residents attended the online classes during their quarantine period, with the majority of the residents considering online teaching very essential.

Finally, we analyzed the overall opinion regarding the online teaching method and its quality and found that the majority of surgery residents and faculty felt that the overall quality of online teaching is satisfactory, and continuing medical education through online programs was favored by all.

Limitation

This study was limited by the small sample size. Another limitation of this study was that it was a cross sectional study. There was a need to have large trials to record the long-term effect of online teaching in surgical residents.

CONCLUSION

This study highlights the online education experience of residents and faculty of surgery during a pandemic, and demonstrates that online education is a feasible way to train surgical residents. However, since surgical specialties depend heavily on practical experience, it is very important to implement new ways of acquiring practical skills. All health care systems depend upon their young residents, so an adequate and sustainable education program is essential

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Conflict of interest: None declared

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