



# Medical Student's Perspective Regarding Undergraduate Surgical Education with Special Reference to Pandemic

Ishita Ray<sup>1</sup> · Vrinda Agarwal<sup>2</sup> · Tanishq Agarwal<sup>2,3</sup> · Anoushka Pande<sup>4</sup>

Received: 12 April 2021 / Accepted: 3 May 2021 / Published online: 17 May 2021  
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## Abstract

The COVID-19 pandemic has disrupted teaching in medical schools across the world. Online learning has become the core method of teaching during this pandemic. The aim of this study was to investigate the impact of this mode of education among medical students in India. A survey was conducted by distributing online questionnaires to medical students across India. Data gathered from the survey was analyzed using SPSS® version 16. The overall response rate of survey was 58.4%. Practical training was most severely affected by online classes (93.32%) as compared to theory classes (60.93%). A total of 71.98% students agreed that canceling of physical medical conferences adversely affected the building up of their resumes while only 28.79% agreed that virtual conferences and meetings enhanced their learning. A total of 56.81% agreed that online exams adversely affected their performance. A total of 46.79% feels that online classes using simulated patients and simulation technology is not useful but 41.90% think that simulated teaching should be a part of the medical curriculum. A majority of the students (87.66%) had technical issues with online classes and 89.72% complained of poor concentration during online teaching due to distractions. A total of ~75% felt that the pandemic has adversely affected the availability of research opportunities and development of skills, ethics, communication, and behavior. Online education has adversely affected all aspects of learning, performance in exams, research, and the overall future plans of students. Moving forward from this pandemic, in order to maximize the benefits of both face-to-face and online teaching, we suggest medical schools resort to a hybrid pattern.

**Keywords** COVID-19 · Online learning · Knowledge · Skills · Perception · Undergraduate medical students · Surgical education · Pandemic

## Introduction

The coronavirus disease (COVID-19) pandemic caused by the SARS-CoV-2 virus has caused a widespread disruption of undergraduate surgical education all over the world [1]. SARS-CoV-2 is a highly transmissible virus which is estimated to be twice more contagious than the seasonal influenza virus [2]. This has resulted in unprecedented public health measures taken by the governments like social distancing, use of mask, nationwide medical school closures, banning of

public events, and several “lockdowns” globally [3]. There was a suspension of in-person classes, and cancellation of clinical rotations resulting in a total disruption of undergraduate surgical education [4]. This has created a unique dilemma for medical educators to deliver lectures efficiently yet safely ensuring the integrity of the undergraduate surgical education process. Hence, it is imperative to assess the incorporation of online teaching methods and determine its feasibility and adequacy for the medical students [1]. The aim of this study is to identify the impact of the COVID-19 outbreak on medical students' examinations, theoretical lectures, clinical training, and the overall effect of this sudden change on undergraduate surgical education.

✉ Tanishq Agarwal  
Agarwal.tanishq97@gmail.com

<sup>1</sup> MGM Medical College, Indore, MP 452001, India  
<sup>2</sup> DY Patil Medical College, Pimpri, Pune, MS 411018, India  
<sup>3</sup> Jabalpur, India  
<sup>4</sup> Chirayu Medical College, Bhopal, MP 462030, India

## Material and Methods

A web-based cross-sectional Google forms questionnaire was sent via Whatsapp and Email to medical students across India.

Participants were asked to further disseminate the questionnaire to their contacts. The questionnaire was kept open for responses from 1st January to 30th March 2021. The term “medical student” here included 2nd professional MBBS students to interns. We have excluded the students from first professional year as they are not exposed to surgical education. Each student was allowed to complete the questionnaire once. All respondents were informed about the objectives of the study and agreed to voluntarily participate. It was a prospective observational study without any intervention; therefore, institutional ethics committee approval was not required.

Questionnaire included 5 demographic questions and 15 qualitative questions (Table 1). The questions featured the ability to select only one answer. Apart from demographics, the questionnaire focused on how online teaching affected their leaning (theory, practical, and overall), how the cancellation of exams/conferences affected their future plans, impact of simulated patients on learning, and the effect of online teaching on research, skills related to ethics, communication, and behavior.

The study responses and data were collected and managed using the Google forms electronic tool. The data analysis was done using SPSS® version 16. The categorical variables were expressed as numbers and percentages. The chi-square test was used for categorical variables. A two-sided  $p$  value  $<.05$  was considered statistically significant.

## Results

We collected 389 questionnaires completed by medical students from 8 states across the India. The estimated response rate was 58.4%. Male to female ratio was 192:197. The majority of the responders (79.69%) were in the age group of 21–24 years. Highest numbers of the respondents were final-year medical students (33.93%), followed by second year students (30.07%); least number of responses was from third year (8.99%). Majority of the students are from government medical colleges (73.52%) while the remaining were from private medical colleges.

Practical training was most severely affected by online classes (93.32%) as compared to theory classes (60.93%). A total of 71.98% students agreed that canceling of physical medical conferences adversely affected building up of their knowledge and resume while only 28.79% agreed that virtual conferences and meetings enhanced their learning. A total of 56.81% agreed that online exams adversely affected their performance while majority (43.96%) were not sure that canceling of foreign medical graduate exam adversely affected their future plans. A total of 46.79% feel that online classes using simulated patients and simulation technology are not useful but at the same time 41.90% think that simulated teaching should be a part of the medical curriculum. A total of 87.66% students had technical issues with internet speed, electronic devices, and applications which adversely affected their

**Table 1** Survey questionnaire and response rate ( $n=389$ )

S No	Question	Agree		Disagree		Not sure		$p$ value
		$n$	%	$n$	%	$n$	%	
1	Has online classes adversely affected your OVERALL learning?	280	71.98	53	13.62	56	14.40	<0.05
2	Has online THEORY CLASSES adversely affected learning?	237	60.93	88	22.62	64	16.45	<0.05
3	Has online classes adversely affected your PRACTICAL learning?	363	93.32	11	2.83	15	3.86	<0.05
4	Has canceling of physical medical conferences adversely affected building up your knowledge and resume?	280	71.98	34	8.74	75	19.28	<0.05
5	Has virtual conferences and meetings enhanced your learning?	112	28.79	175	44.99	102	26.22	<0.05
6	Has online exams adversely affected your performance?	221	56.81	65	16.71	103	26.48	<0.05
7	Has canceling of foreign medical graduate exam adversely affected your future plans?	119	30.59	99	25.45	171	43.96	<0.05
8	Are online classes using simulated patients and simulation technology useful?	96	24.68	182	46.79	111	28.53	<0.05
9	Do you think simulated teaching should be a part of the medical curriculum?	163	41.90	142	36.50	84	21.59	<0.05
10	Do technical issues like internet speed, devices, and applications adversely affect your learning?	341	87.66	33	8.48	15	3.86	<0.05
11	Do you think that concentration is poor during online teaching due to distractions (inattention by teacher, house activities, phone calls, and incoming messages)?	349	89.72	29	7.46	11	2.83	<0.05
12	Do you think pandemic has adversely affected the available research opportunities?	297	76.35	34	8.74	58	14.91	<0.05
13	Has pandemic adversely affected development of skills related to ethics, communication and behavior?	295	75.84	44	11.31	50	12.85	<0.05
14	Is there a need to restructure the current evaluation system with reference to computer-based tests (CBT), objective assessment and use of newer technologies using experience obtained during pandemic?	286	73.52	46	11.83	57	14.65	<0.05
15	Should the lessons learnt during pandemic be utilized for future development of curriculum?	291	74.81	50	12.85	48	12.34	<0.05

learning and 89.72% thought concentration is poor during online teaching due to distractions. A total of ~75% felt that pandemic has adversely affected the available research opportunities and development of skills related to ethics, communication, and behavior and agreed that lessons learnt during pandemic should be utilized for future development of curriculum and the student evaluation system with the use of newer technologies. All the values were statistically significant ( $p < 0.05$ ) (Table 1)

## Discussion

The advent of the COVID-19 pandemic has presented infinite adversities worldwide in the undergraduate surgical education which may have a revolutionary impact on medical students at various levels [5]. Medical schools have canceled all face-to-face classes, clinical rotations, and have shifted to online teaching [6]. Before the era of COVID-19, distance E-learning was not a part of undergraduate surgical education in India. Medical schools have a pressing demand to train doctors effectively to ensure high-quality future surgeons to improve patient care, but this interruption in teaching may result in decreased competency of doctors [5]. There is a need to provide an insight of the changing situation experienced by students in various medical colleges of India during the pandemic that lead to sudden transformation of the conventional medical teaching methods to a completely contactless online platform.

Traditional face to face teaching has always been the ideal approach in undergraduate surgical education however; a subtle shift in traditional undergraduate surgical education to online distance learning has been noticed in the past couple of decades especially in the developed countries [7]. Such new modes of learning are indispensable during the COVID-19 pandemic and may be a suitable alternative to traditional learning. Distance learning is flexible and comfortable as students can study more effectively in their home environment at their own pace. It also provides opportunities for students to anonymously ask and answer questions and save on travel time/cost which therefore improves attendance [8, 9]. The non-availability of essential infrastructures and adequate institutional strategies are a major challenge for integrating E-learning in undergraduate surgical education in developing countries like India [7, 10]. Additionally, family distraction, no reliability of Internet connection, insufficient digital skills, timing of tutorials, and lack of space are other barriers [11].

As a consequence of the pandemic, traditional clinical classes were discontinued which are essential to become a competent physician [12]. Students' clinical skill competence will decline due to lack of access to patients or simulation models under supervision. This active communication between teachers and students allows many ambiguous concepts to

be answered immediately to increase student involvement, creating a more active learning environment [11, 13]. The majority of students prefer conventional bed-side teaching where one can ask questions in real time which therefore allows for a multi-dimensional, analytical discussion about the patient's care with the educator [5]. Perhaps, the implementation of virtual consultations with simulated patients may be an alternative measure to tackle this problem. Virtual patients and simulation of real-life clinical scenarios may enable the learner to prepare him/herself before a real patient encounter [5, 14]. The creation of online components promotes well-structured courses and can help students in distributing their studies throughout the term, thus suggesting enhanced learning [15].

However, online pre-recorded video tutorials (e.g., YouTube) are most effective online resource for preclinical students due to the short and esthetic nature of such videos. In contrast, live tutorials were considered to be the most effective by clinical students. This may be due to the more interactive nature, with scope for real-time discussions, reflecting more closeness to actual clinical practice [11]. Medical students displaced from traditional medical care environments are now undergoing clinical training in new virtual rotations and clinical classes which has created new opportunities for training of medical students in telemedicine [16]. However, fear of this new digital technology, limited telemedicine capacity, lack of patients' involvement, and lack of awareness/trust in these digital tools have been shown to hinder the proper implementation of such resources [17–19]. Though undergraduate surgical education via teleconferencing and virtual work-shops cannot substitute for hands-on clinical training, however, this new mode of learning and teaching is the only hope in such desperate times of the pandemic [4].

Cancellation of conferences and paucity of non-COVID patients, many students were unable to complete research projects with mentors, attend conferences, or conduct oral and poster presentations. The loss of such opportunities may induce anxiety over career progression as such activities play a key role in building a student's curriculum vitae [5]. Since we have no idea when the situation will normalize, arrangements are required for medical students to promote their clinical skills and knowledge via teleconferencing [4, 20]. The utilization of newly developed resources, like virtual anatomy dissection, WebEx (Cisco WebEx, Milpitas, CA, USA), and Zoom<sup>TM</sup> (Zoom Video Communications, Inc., San Jose, CA, USA), to conduct conferences and continued online communication may be key to learning [21].

The advent of COVID-19 has resulted in many exams becoming online in the open book pattern and with an unrestricted setting; hence, students are less prone to exam anxiety. However, this does not take into account the family and noise

disturbances which may still detrimentally affect performance in exams [11]. It also poses many technical issues like the availability of specific technical requirements like cameras, microphones, and speakers so as to prevent any disruption. It also poses ethical challenges such as leaked questions preventing a genuine in-person assessment. Hence, the situation should be assessed further as online examinations can help avoid postponing student graduations and medical training [1]. Formative online assessments are already widespread in undergraduate surgical education; this facilitates learners and teachers to identify areas of weakness and provide prompt feedback for continued development. In contrast to formative assessments, summative assessments, such as medical school final year examinations, with high stakes, with the consequence of students passing or failing, should be done face to face [22].

In this study, the general perception of medical students about online teaching was poor and caused severe disruption of learning. Majority of the students had technical issues with online classes and complained of poor concentration due to distractions which also affected their performance in the examinations.

Limitations of the study include that the students have been suddenly exposed to this new system of learning; therefore, the comparison with conventional system cannot be made very objectively. Secondly, the findings cannot be generalized because only handful students participated in the survey. Finally, we did not measure student learning outcomes of online teaching objectively. Further educational research is needed to validate the findings across various institutional settings.

## Conclusions

Online teaching has enabled the continuation of undergraduate surgical education during these unprecedented times. Online classes have adversely affected all the aspects of learning, performance in exams, research, and the overall student plans for their future. However, there are numerous advantages like ease of use, flexibility, and better control over the environment. Moving forward from this pandemic, in order to maximize the benefits of both face-to-face and online teaching, we suggest that medical schools resort to a hybrid pattern. Students must adapt to the changing system and strive for success in a highly competitive environment.

## Declarations

**Conflict of interest** The authors declare no competing interests.

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