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Medical students' perspective on online teaching during pandemic: Experience from a Government Medical College in Uttarakhand, India

Pooja Sharma Kala, Naveen Thapliyal, Hari Shankar Pandey¹, A. R. Piyush, Sonam Maheshwari², Vikram Singh Chaudhary

Abstract:

BACKGROUND: COVID-19 pandemic has forced medical education to undergo sudden metamorphosis from the traditional face-to-face education to distance online learning. This transition was dealt with a lot of infrastructure and technical difficulties from both teacher and learner ends, especially in a developing country like India. This study was conducted with the aim of analyzing students' perspective and problems faced in the live online teaching.

MATERIALS AND METHODS: This was a prospective longitudinal study conducted on medical students enrolled in the 1st, 2nd, and 3rd years of Bachelor of Medicine and Bachelor of Surgery courses at a government medical college located in hilly state Uttarakhand, India. Clearance from the institutional ethical committee was obtained. The students were invited to voluntarily participate in online survey by filling Google Forms which was E-mailed as well as shared in social media platform. A total of 237 medical students participated. The first survey was conducted at the time of initiation of online mode of teaching, during May 1–7, 2020, and second, after completion of 6 months of regular online teaching, during November 1–7, 2020. The questionnaire comprised initial section on demographic details and consent followed by 27 and 30 sets of statements pertaining to online medical education experience in the first and second questionnaires, respectively. A 5-point Likert scale was used. Data were analyzed using IBM SPSS version 24.0. Chi-square test was applied for association, and $P \leq 0.05$ was considered statistically significant.

RESULTS: A total of 237 students participated in the study. The response rate was 52.7%. Majority of respondents had suitable devices (89.1%) and Internet facilities (62%) for online classes. The students accepted the new method of teaching very well, but for practical sessions and clinics, traditional classes were necessary. Long screen time, lack of student–teacher interaction, and interaction with peers were major concerns of students. However, over the study period, the availability of resources, friendliness toward technology, and inclination toward virtual classes increased.

CONCLUSIONS: The pandemic has introduced to a new normal where online teaching cannot be ignored. Despite challenges faced during online learning, 65.5% of students preferred hybrid teaching in future for delivering medical education. Acceptance for online education by students increased over time in the study.

Keywords:

COVID-19, education, medical, online, professional, undergraduate

Department of Pathology,
Government Doon Medical
College, Dehradun,
Uttarakhand, India,

¹Department of Pathology,
Government Medical
College, Haldwani,
Uttarakhand, India,

²Department of Community
Medicine, Government
Doon Medical College,
Dehradun, Uttarakhand,
India

Address for correspondence:

Dr. Pooja Sharma Kala,
Assistant Professor,
Department of Pathology,
Government Doon Medical
College, Patel Nagar,
Dehradun - 248 001,
Uttarakhand, India.
E-mail: poojahimanshul@gmail.com

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Introduction

In the current era, with a rapid modernization of health-care system

and introduction of new technologies, for example, next-generation sequencing, flow cytometry, and automation, the medical graduates need to be well versed with

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the technology.^[1] Recently, there has been a drift in medical education, in India, being learner driven and outcome based rather than traditional teacher-driven and content-based education.^[2] On March 11, 2020, COVID-19 was declared as a pandemic, however, the very first case of COVID-19 infection was confirmed in India on January 30, 2020.^[3,4] During COVID-19 pandemic, medical education faced a setback worldwide and a halt for quite sometime when many medical schools had to switch to online learning.^[5] The electronic learning (e-learning), as defined by Mahajan and Kalpana, is “a means of education that incorporates electronic equipments and tools and the interactivity that occurs between these and the people involved in the educational process (i.e. instructors and learners).”^[1] E-learning is not new in medical education, however, complete replacement of classroom-based teaching to virtual online teaching is a newer development which was enforced during pandemic. Many medical schools have adopted the synchronous learning method, i.e. the teacher and learner are present virtually and have e-communication. Online teaching can be considered as one of the specialized methods of e-learning, which can be defined as educating virtually via the Internet, when teacher and learner participate from different physical locations.^[6]

The drastic shift to online or e-learning was challenging at both ends – teachers and students. With the introduction of entirely new modality in medical education, it becomes important to know its feasibility at students' end and challenges faced by students in order to identify lacunae in the current situation. This will help medical education evolve into a more innovative and robust education system.^[7] A few cross-sectional surveys of medical students' perspective on E-learning have been published from different parts of the world such as Jordan, the UK, Libya, Pakistan, and also, India.^[7-12] A simple cross-sectional survey may provide misleading results because of an overall “negative attitude” toward acceptance of a new technology.^[13] In this longitudinal prospective study, the investigators aim to provide an overview of students' perspective and challenges faced during e-learning process in our institute.

Materials and Methods

Study design and setting

This prospective longitudinal study was conducted at a government medical college located in Dehradun, Uttarakhand, India, on medical students studying in the 1st, 2nd, and 3rd years of Bachelor of Medicine and Bachelor of Surgery (MBBS) courses during the 1st week of May and November 2020.

Study participants and sampling

The study participants were 237 medical students

enrolled in the 1st, 2nd, and 3rd years of MBBS course in the institute. Two online surveys were conducted – first, at the time of initiation of online mode of teaching, during May 1–7, 2020, and second, after completion of 6 months of regular online teaching, during November 1–7, 2020. Online teaching comprised synchronous lectures, tutorials, seminars, and demonstration sessions. The respondents who voluntarily participated in both the surveys were finally included in the study.

Data collection tool and technique

Initially, a review of literature was done pertaining to the study, and a set of 27 statements was prepared for questionnaire, especially following previous studies.^[14] To confirm qualitative content validity, five experts in health education and biostatistics completed the questionnaires and opined on individual items in relation to accuracy and style. After suitable modifications, face validity was covered by giving it to twenty students to ascertain the relevance and importance of each statement. For reliability, Cronbach's alpha coefficient was used and the output was 0.71 and 0.74 for the first and second questionnaires, respectively.

The first questionnaire included initial section mentioning about confidentiality of the feedback and basic demographics of the students and consent followed by 27 items pertaining to online teaching. The latter section included four items on resources availability, five on attitude and acceptance with respect to online teaching, three on learning experience, four on degree of motivation and management, four on student–teacher interaction, four on student–student interaction, and the last three on students' performance and assignments during online teaching. Apart from these sections, the second questionnaire included two additional items on future prospects of online teaching and one item on participation in the first round of survey. A 5-point Likert scale was used for each item in questionnaire – 1 for “strongly disagree,” 2 for “disagree,” 3 for “neutral,” 4 for “agree,” and 5 for “strongly agree.”

The two structured feedback questionnaires were then distributed in the form of Google Forms which was E-mailed as well as shared in social media platform.

Results were expressed in terms of frequencies, percentages, mean (standard deviation), or median (range) and graphical representation where appropriate. Data were analyzed by IBM SPSS version 24.0, SPSS, Chicago, IL, USA. Chi-square test was used for association, and $P \leq 0.05$ was considered statistically significant.

Ethical considerations

Ethical clearance was obtained from the institutional

ethical committee (letter no IEC/GDMC/2020/85). Informed consent was obtained from all participants.

Results

Basic demographics

A total of 450 students, enrolled in the MBBS course in the institute, were invited to participate in the survey. Of these, 310 students responded in the first round of survey, while 237 students participated in both the surveys. Hence, the final response rate was 52.7%.

Of 237 responses collected, 58 (24.5%) were from 1st-year, 137 (57.8%) from 2nd-year, and 42 (17.7%) from 3rd-year students. The age range of participants varied from 17 to 25 years, median age being 21 years. The participants included 113 (47.7%) males and 124 (52.3%) females, male-to-female ratio being 1:1.1. Most of the participants were residents of Uttarakhand (151; 63.7%). Of all participants, 19 (8%) were residing in rural areas and 31 (13.1%) in hilly areas [Table 1].

Initial survey

Majority of respondents had any of computers/laptops/smartphones (211; 89.1%) and access to the Internet (148; 62%). Furthermore, most of the respondents were well versed with software and study material handling (126; 53.2%) as well as communicating electronically (132; 55.7%) [Figure 1].

Most of the respondents were willing to accept this new method of teaching (156; 66.1%). However, the

students' affinity for going to college (163; 68.8%) and meeting their teachers and classmates (186; 78.5%) could not be denied [Figure 1]. Furthermore, most of the respondents were not comfortable with long screen time (197; 83.1%).

Although majority of respondents were honestly attending entire sessions of online classes (163; 68.8%), time management and concentration issues were faced by most respondents. Furthermore, most respondents were self-motivated (79; 33.4%), but they felt that traditional face-to-face classes were more motivating as compared to online classes.

Most of the students opined that face-to-face interaction with teacher is necessary for high-quality learning (156; 65.9%), despite possible quick interaction during online classes (130; 54.9%). Most of the respondents were neutral when it came for liking lot of interaction with teacher (108; 45.6%).

Majority of respondents enjoyed studying independently (113; 47.6%), while 125 (52.8%) students enjoyed studying in groups. The majority of respondents could not discuss (139; 58.6%) and interact (125; 52.7%) with their peers during online classes.

Table 1: Basic demographic characteristics of study participants

Demographic characteristics	Category	Number of students, n (%)
Age (years)	17	6 (2.5)
	18	11 (4.6)
	19	22 (9.3)
	20	50 (21.1)
	21	73 (30.8)
	22	41 (17.3)
	23	25 (10.5)
	24	6 (2.5)
Gender	Male	113 (47.7)
	Female	124 (52.3)
State of residence	Uttarakhand	151 (63.7)
	Outside Uttarakhand	57 (24.1)
	No response	29 (12.2)
Place of residence	Urban	134 (56.6)
	Suburban	55 (23.2)
	Rural	19 (8)
	No response	29 (12.2)
Geographical area of residence	Hilly area	31 (13.1)
	Nonhilly area	177 (74.7)
	No response	29 (12.2)

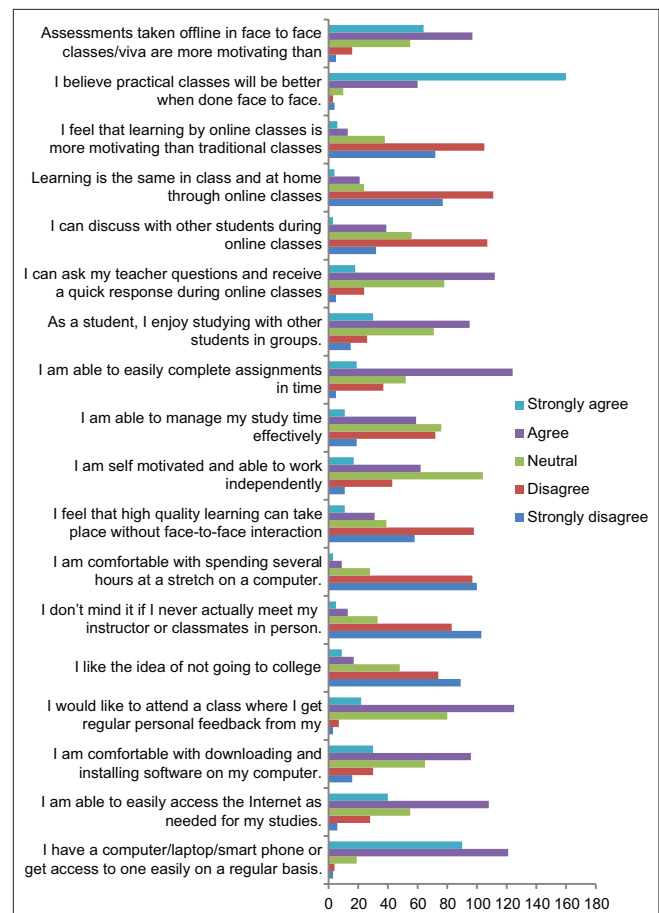


Figure 1: Response of students in the initial survey (n = 237)

39.6% of respondents felt that online classes will be beneficial to their studies. It was unanimously (220; 99.5%) believed that practical classes and clinics would be better when done face to face.

Majority of respondents were honest during online assessments (140; 59.1%) and were able to complete assignments in time (143; 60.3%). However, the students found offline assessments as more motivating (161; 67.9%) than online ones.

Follow-up survey

After 6 months of regular online teaching, there was a statistically significant increase in the availability of resources, i.e. a dedicated system ($P < 0.0001$) and an Internet connection ($P = 0.0066$). Furthermore, more of the students had become technology friendly ($P = 0.0358$). More of the students were able to complete assignments in time ($P = 0.0308$) [Figure 2].

Besides, more students feel that they were able to ask questions and get a quick response during online sessions ($P = 0.0425$). More students now accepted that they would not mind if they do not meet their instructors ($P = 0.0133$) and that regular feedback was now not on the top priority for teaching-learning sessions ($P < 0.0001$).

Majority of students (115;48.5%) considered that face-to-face teaching is better than online teaching, however, combining both methods in future after routine classes commence in the institute was favored by most students (114;48.1%) [Figure 3].

Discussion

During COVID-19 pandemic, medical schools had to Halt traditional classroom teaching and resort to some other alternative means of education to ensure safety students as well as teaching faculty and staff.^[8] With confirmation of more virulent newer strains of coronavirus has raised a possibility that COVID-19 era

may not end in near future.^[14] Sudden shift from face to face to virtual or online learning was not an easy task, especially for medical schools in developing country like India, unlike few other centers where some of the courses in medicine are completely online.^[8] Apart from basic infrastructure in the institute, a dedicated computer system, software, a premium Internet connectivity, and a dedicated team for scheduling these online classes and tackling the troubleshoot as and when encountered are required. Many user-friendly software are available nowadays Zoom®, WebEx®, Microsoft Teams®, and Google Meet® and Adobe Connect.^[5,8] Zoom was the preferred platform during COVID-19 pandemic.^[8,15]

Overall, resources and skills were not the issues for most of the students in the present study from the very commencement of the online classes. Alsoofi *et al.* and Lawande *et al.* also reported that majority of students, in their studies, had apt skills for handling online sessions and related software.^[7,11] This techno-savvy behavior is because most of the respondents in the present study belonged to “postmillennial generation,” who prefer social media as an important means of communication.^[16] However, in the present study, 13 (4.8%) students residing in hilly and rural areas faced frequent network and electricity issues, to the extent that they missed entire sessions. Studies from third world countries such as Iran and Pakistan have also reported lack of digital resources and Internet access as challenges in virtual medical education during COVID-19 pandemic in their setting.^[10,17,18] Making available recorded lectures can help in this setting to some extent.^[7] But the problem of deficient basic infrastructure, in terms of devices and stable Internet access for online education at students’ end, needs to be addressed by the government in their future policies.^[13] Costs of stable Internet access and devices should be curbed for medical students.

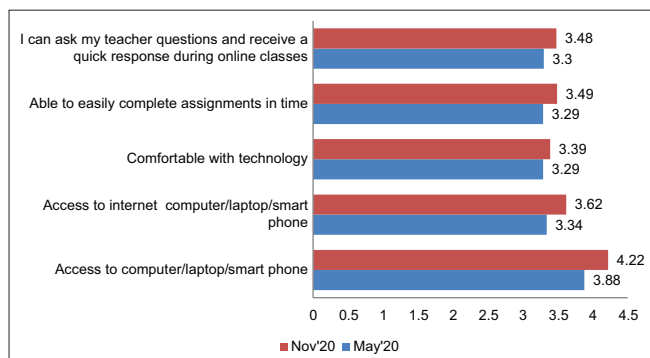


Figure 2: Statistically significant changes in students' perception during study period

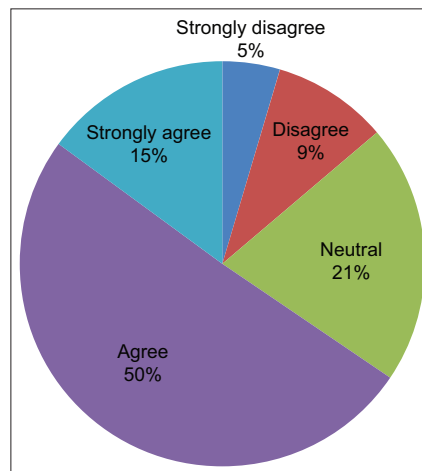


Figure 3: Students' perception regarding utilization of hybrid teaching in future

Offline traditional face-to-face teaching was the first love of students in the current study. However, after 6 months of regular online classes, 65.5% of students preferred “blended or hybrid teaching,” i.e. combining both online and offline teaching in future. Al-Balas *et al.* reported that 75.5% preferred blended teaching to deliver medical education in future.^[19] This will help students to enjoy the perks of both worlds.^[20]

Lack of face-to-face interaction with teachers as well as peers is a major shortcoming of online teaching.^[8] Students, in the current study, also opined the same. In fact, peer discussion facilitates critical thinking as well as better understanding of subject.^[21] Furthermore, “peer mentoring” also provides psychological support system to the students.^[22] Some studies from different parts of the world reported symptoms of anxiety and depression among 3.6%–10.5% and 31.3% of medical students during COVID-19 outbreak.^[11,23] This can be overcome by utilizing social media platforms for better interaction among students of a given academic year and also among seniors–juniors.^[24]

Long screen time was one of the major concerns for students in the present study. Similar shortcoming was reported in another study also.^[8] This also led to reduced concentration during classes. An optimum of duration of a lecture or session of 30 min will help improve the attention span of students and also reduce screen time at a stretch.^[7] Furthermore, poll questions or short quizzes may be incorporated in the teaching sessions to keep students “engaged” and alert. Traditional monotonous didactic lectures may be punctuated with interesting case scenarios and videos.^[13]

In the current study, students felt that practical classes in pre- and paraclinical subjects along with clinics in clinical subjects cannot be replaced with mere online classes. This has also been emphasized in other studies from different parts of the world, for example, China, Pakistan, and Malaysia.^[10,25,26] The impact of reduced patient exposure and deficient bedside teaching during the pandemic has been reflected in a study where deterioration in clinical and surgical skills among medical students was observed.^[27] The use of virtual simulated patients, mannequins, and recorded videos for practical demonstration can be somewhat helpful in this context.^[9,28-30]

Assessment, in distance medical education, remains a problem area. An online examination process was implemented at some institutes in order to prevent any delay in graduation.^[31] This process faced many technical challenges, for example, need of cameras and microphones and ethical challenges.^[11] Virtual Objective Structured Clinical Examination (OSCE) was utilized

as assessment tool at one of the medical schools, and it was found it to be as suitable as face-to-face OSCE.^[22,32] Achievement of core competencies should be emphasized rather than completion of academic year duration and difficult to conduct “summative assessment” in the current difficult times.^[18] In authors’ experience, formative assessment in the form of multiple-choice questions (MCQs) via a user-friendly software as Google Forms was very helpful. This helped in easy administration of question paper comprising MCQs, easy correction of answers, and release of marks. Furthermore, other new methods such as e-posters, mailed answers to problem-based questions, and short answers were also attempted and were found to be limited by challenges such as possible lack of honesty on the part of students, technical issues, and lack of strict invigilation. Keeping record of the answers and correcting them was also challenging. Summative assessment can be done following instated social distancing guidelines and use of masks with a prior COVID-19 reverse-transcriptase polymerase chain reaction negative result.

Limitations of study and recommendation

The limitation of the study was that the study was conducted in a single center. A multi-institutional study could have led to more generalizable results.

Conclusions

COVID-19 has been an eye-opener for the medical education system, when the need for a more sound system was recognized to overcome the challenges in present and future. The pandemic has introduced us to a new normal where online teaching cannot be ignored. However, there is a need of quality assurance and standard guidelines or recommendations for both students and the medical schools for smooth functioning and better utilization for this modality.

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Conflicts of interest

There are no conflicts of interest.

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