

# Impact of COVID-19 Lockdown on Clinical Training for Indian Medical Students

## ABSTRACT

**Background and Aims:** With the implementation of the COVID-19 lockdown, conventional teaching had to be replaced with online teaching, to ensure the continuity of medical education. This has impacted the clinical training of medical undergraduates. We aimed to explore their perceptions and differences before and during the COVID-19 lockdown.

**Methods:** A cross-sectional online survey using a self-administered, retrospective pre-post questionnaire, was conducted among students from pre-final and final year between December 2020 and March 2021. Agreement scores with 15-items about the various domains of clinical training were recorded. Open-ended question was asked to know about the reasons for the students' preferences. Chi-square test and Wilcoxon signed rank test were used to compare the proportion and medians respectively.

**Results:** We received 1000 responses from students of 191 medical colleges {Median (IQR): 6 (2,10) per college}. Most (81.6%) opined that their experience with clinical training was better before COVID-19 lockdown, irrespective of the mode of teaching in clinical skills ( $P < 0.001$ ). In addition, despite being more comfortable, focused, and interactive, online clinical training could not offer interaction with patients, residents and colleagues. Students who had gone through in-person training during lockdown period also perceived disadvantages like limited exposure to patients, limited time for faculty to teach, and less time for clinical practice.

**Conclusion:** The learning experiences of clinical training during COVID-19 lockdown were perceived as inferior than that before lockdown by the medical undergraduate students, irrespective of the mode of clinical training.

## KEYWORDS:

COVID-19, Clinical clerkships, clinical competence, Undergraduate medical education

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## Introduction

To maintain the continuity of medical education during the COVID-19 pandemic, conventional teaching had to be replaced with online teaching, which otherwise was seldom used in the context of medical education in India. Infection control measures including social distancing led to the closure of medical schools, confined students to their homes, thus excluding in-person teaching and assessments.<sup>[1,2]</sup> The most important aspects of undergraduate medical education - bedside clinical training and patient interaction, had been impaired. The situation was worse in some teaching hospitals fully dedicated to COVID-19 cases, as there were no non-COVID cases for the students to learn from, in addition to the shortage of personal protective equipment (PPE) kits.<sup>[3,4]</sup>

Clinical placements are designed to correlate cognitive learning with psychomotor skills. They offer the traditional apprenticeship for future doctors to learn from experienced clinicians while caring for patients, therefore reinforcing what is learned.<sup>[5]</sup> During the pandemic, classroom teaching, demonstrations of skills, and bedside learning have largely been replaced by online platforms, the benefits of direct teacher-student contact and real-time two-way feedback are often difficult to replicate in online forums.<sup>[2]</sup> There are studies on the transition of medical education to online mode, there were none documenting the effect of COVID-19 lockdown on the clinical training of Indian medical undergraduates.<sup>[6,7,8]</sup> It is likely that there will be a need for rethinking and reformatting how medical education is delivered in the world post-pandemic. There are many potential advantages of using a digitally enhanced learning platform and for assessments, which may be a boon in remote locations, combined with the advancement of remote medical practice.

We aimed to explore the impact of COVID-19 lockdown on clinical training of Indian medical undergraduates and their perception of the differences before and during the lockdown restrictions. An assessment of the adaptation forced by the pandemic would offer essential information to help design future technology enhanced or hybrid form of medical education.

## Methodology

### Study Design

A mixed method, cross-sectional, online survey was conducted among the third (pre-final) and fourth (final) year medical undergraduate students between December 2020 and February 2021, after obtaining ethical clearance from the Institutional Ethics Committee [IECHR\_2021\_48\_8].

Being an online survey, it was not possible to ensure randomization during sampling, and therefore the standard techniques for sample size calculation couldn't be used. To ensure a pan-India participation, we decided to have a minimum sample size of 800 with 200 from each of the four zones i.e. North, South, East, West. A pre-tested, pre-validated self-administered, online retrospective pre-post questionnaire was devised on Google Forms and circulated online on social media messaging platforms, and groups on these platforms to medical students from all parts of the country. Face and construct validation of the questionnaire was ensured by independent feedback from two faculty members from the medical education unit of the institute.

The online questionnaire had the following sections:

- Socio-demographic variables such as their year of medical undergraduate course, the type of medical college (government or private), and the state in which their medical college was located. The states were categorized based on the burden of COVID-19 cases, as follows:
  - category 1 (those with less than 100k cases),
  - category 2 (with one to 500k cases), and
  - category 3 (with more than 500k cases).<sup>[9]</sup>
- Students were also asked to enter the month in which their college re-opened after lockdown.
- Students were asked to compare their experience in clinical training before and during lockdown, by rating 15 items (8 items and 8 sub-parts), pertaining to different aspects of clinical training, on a five-point Likert scale (1= strongly disagree, 2= disagree, 3=neutral, 4=agree, 5=strongly agree). These included

- the development of clinical reasoning and integration;
- improvement in competencies with respect to history taking, clinical examination,
- interpreting lab results,
- understanding management,
- establishing a rapport with the patient,
- case presentation skills and
- problem-based learning;
- adequacy of time given for discussing cases,
- patient evaluation,
- self-learning;
- availability of residents and finally
- ward exams
- The number of hours of clinical training received per week, in the form of online and in-person training
- An open-ended question was asked to know the reasons for their preference between the clinical training held before COVID-19 lockdown and that held during the lockdown.

The total score ranged from a minimum of 15 to a maximum of 75. Higher scores indicated a better

clinical training experience during that phase, for that particular item. The results were indicated in a tabular form in the form of a comparison, before and during the lockdown.

### Analysis

For the purpose of analysis, the medical colleges were grouped in three categories based on the burden of COVID-19 in their respective geographical areas. The Google sheet generated by the Google form was converted to Microsoft Excel sheet and the data was cleaned for analysis on IBM SPSS software v26.0. Categorical variables such as course year, type of medical college, etc. have been shown as percentages. Continuous variables such as the agreement scores for each of the 8-item questionnaire is presented as median (IQR), as they were non-normal in distribution. Chi-square test was used to compare categorized variables, whereas Wilcoxon signed rank test was used to compare agreement scores for before and during the COVID-19 lockdown. Rapid content analysis was performed by MJ and AMK to find out the themes from the text responses to the open-ended question, which are presented along with selected quotations.

Results

A total of 1000 completed entries were received from 191 medical colleges across the country, with the median (IQR) number of responses per college being 6 (2,10). The demographic composition has been represented in Table 1.

Table 1: Demographic particulars of the respondents

Demographic particulars	Number of students	Percentage
Gender		
1. Male	476	47.6
2. Female	521	52.1
3. Other	3	0.3
Year of study at medical college		
1. Third (pre-final) year	452	45.2
2. Fourth (final) year	548	54.8
Type of Institution		
1. Government	724	72.4
2. Private	276	27.6
Indian state in which the college is located		
1. Category 1 (<100k cases)	128	12.8
2. Category 2 (1-500k cases)	702	70.2
3. Category 3 (>500k cases)	170	17.0
Mode of teaching clinical skills during the COVID-19 lockdown		
1. Only online	565	56.5
2. Only in-person	46	4.6
3. Both online and in-person	152	15.2
4. Neither online nor in-person	237	23.7

Most (816, 81.6%) students opined that their experience with clinical training was better before COVID-19 lockdown, while 121 (12.1%), reported it being better during lockdown, and the remaining 63 (6.3%) felt no difference.

The primary objective of this study was to compare the perceptions of students about their clinical training before and during the lockdown, with respect to various components of clinical clerkships. Table 2 shows the item-wise comparison of agreement scores of medical students' perception about clinical training before COVID-19 lockdown and during lockdown. The students rated the clinical training before lockdown as significantly better for all the items. (P<0.001).

Table 2: Item-wise comparison of agreement scores of medical students' perception about clinical training before and during the COVID-19 lockdown (n=1000)

Item	Before lockdown Median (IQR) score	During COVID-19 lockdown Median (IQR) score
1. The cases facilitated development of clinical reasoning and integration.	4 (5,3)	2 (3,1)
2. The clinical activities have improved my competencies in the following areas:	4 (5,3)	1 (3,1)
i) History taking		
ii) Physical examination	4 (5,2.25)	1 (2,1)
iii) Interpret laboratory values	3(4,2)	1 (3,1)
iv) Making an appropriate management plan	3(4,2)	2 (3,1)
v) Patient-doctor relationship	4 (5,2)	1 (2,1)
vi) Communication with the seniors, colleagues and other people involved in the health-care delivery system.	4 (5,2)	1 (2,1)
vii) Case presentation skills	4 (5,3)	1 (3,1)
viii) Problem-based learning	4 (5,2)	2 (3,1)
3. The time for discussing the given case was sufficient	4 (5,2)	2 (3,1)
4. The time for evaluating the patient was sufficient	4 (5,2)	1 (2,1)
5. The time for self-learning was sufficient.	3 (4,2)	2 (4,1)
6. The residents were available to teach and answer queries.	4 (5,2)	1.5 (3,1)
7. Ward Exams/ Viva based on actual case scenarios/simulations.	4 (5,3)	1 (2,1)
8. I gained the fundamental understanding of common conditions and their management encountered in the major clinical disciplines.	4 (5,3)	2 (3,1)

There was no significant correlation between the mode of clinical training during COVID-19 lockdown and factors such as the course year of students, COVID-19 burden in the respective states; except the type of institution (Table 3). The proportion of private medical colleges shifting to online clinical training during COVID-19 lockdown was significantly more than that in government medical colleges (P<0.001).

Table 3: Mode of teaching clinical skills during COVID-19 lockdown, with respect to the course year of medical students, type of institution, and the states in which college is located, categorized by COVID-19 case-burden.

Variables	No clinical training	Only Online clinical training	Only in-person clinical training	Both online and in-person clinical training	P-value
Year of medical course					0.24
3rd	114 (25.2%)	248 (54.9%)	26 (5.8%)	64 (14.2%)	
4th	123 (22.4%)	317 (57.8%)	20 (3.6%)	88 (16.1%)	
COVID-19 case burden in the respective states					0.34
High prevalence	33 (19.4%)	106 (62.4%)	9 (5.3%)	22 (12.9%)	
Moderate prevalence	169 (24.1%)	397 (56.6%)	30 (4.3%)	106 (5.1%)	
Low prevalence	35 (27.3%)	62 (48.4%)	7 (5.5%)	24 (18.8%)	
Type of medical college					<0.001
Government	185 (25.6%)	425 (58.7%)	38 (5.2%)	76 (10.5%)	
Private	52 (18.8%)	140 (50.7%)	8 (2.9%)	76 (27.5%)	

Most of the students, irrespective of the mode of teaching clinical skills during COVID-19 lockdown have reported that their learning experience in clinical training was better pre-lockdown phase. (Table 4)

Table 4: Comparative status of learning experience in clinical training before and during the COVID-19 lockdown, with respect to the mode of clinical training during the lockdown period.

Mode of teaching clinical skills during COVID-19 lockdown period	Before COVID-19 lockdown was better	No difference	During COVID-19 lockdown was better
No clinical training	192 (81%)	20 (8.4%)	25 (10.5%)
Only online clinical training	486 (86%)	30 (5.3%)	49 (8.7%)
Only in-person clinical training	34 (73.9%)	2 (4.3%)	10 (21.7%)
Both online and in-person clinical training	104 (68.4%)	11 (7.2%)	37 (24.3%)

Qualitative analysis of the open-ended responses of 717 (71.7%) students who were exposed to online clinical training revealed the following reasons for their perceived advantages and limitations of online clinical training during COVID-19 lockdown period. These were analyzed thematically using 3 main themes:

1. Advantages of online clinical training [during COVID-19 lockdown]
2. Disadvantages of online clinical training/ Advantages of in-person clinical training [during COVID-19 lockdown]
3. Disadvantages of in-person clinical training [during COVID-19 lockdown]

Perceived advantages of online clinical training during COVID-19 lockdown period:

1. More comfortable  
*“Because we're at home, more flexible hours, comfortable environment.”*
2. Plenty of time for self-study



*"I could study theory properly during my time at home which helped understanding [clinical] cases better. When in hostel I attended postings just for attendance."*

3. More focused learning  
*"Every case was explained in detail with audio-visual aids; thus, we could access resources and information first hand and even pose questions to residents directly."*
4. One to one interaction with faculty/residents  
*"Mostly in in-person training what happens is that there is only one teacher explaining, while the other students gather around. Therefore, only some students are able to learn properly, rest of them just stand along to contribute to the crowd. In online teaching, every student is able to understand every concept, and no one is left out. Yes, for practice we have to attend face to face but learning is much better online."*
5. Availability of various online audio-visual resources for clinical training  
*"We have YouTube for videos."  
"More clinical case discussions on online coaching platforms."*

Perceived limitations of online clinical training during COVID-19 lockdown period.

1. Lack of interaction with patients.  
*"I cannot examine or learn anything while sitting in front of a Smartphone. If that was possible, everyone would have been doing his/her medical practice from home."*
2. Internet access.  
*"Bad network connectivity in rural area. Unavailability of gadgets like laptop or tab."*
3. Difficult to simulate real clinical scenarios.  
*"Not able to simulate the actual findings. Even during training teachers do not really guide us along. Very few actually explain how to examine or what to infer"*
4. More focus on theoretical knowledge.  
*"Online clinical training was just like a theory class in which we neither appreciated the clinical signs nor able to correlate as used to do in clinical training before."*
5. Difficulty in adapting to the Sudden transition to online learning.  
*"Couldn't cope up with the sudden transition from offline to online scenario."  
"Most of our teachers are not well acquainted with the whole idea of operating a computer system and taking online classes."*
6. Distractions during online learning.  
*"While attending the class, I would often open other apps, like facebook etc."*

We found that 198 (19.8%) students who were exposed to in-person clinical training during COVID-19 lockdown preferred clinical training before COVID-19 lockdown period than that during the COVID-19 lockdown period, because of the following reasons:

- A. Less number of patients during lockdown.  
*"Lack of patients and fear of covid"*
- B. Staff busy in Covid management.  
*"Staffs were busy with covid issue. They didn't have enough time to concentrate on us. No proper schedules. No proper classes taken"*
- C. Limited physical exposure to patients [due to Covid].  
*"No interaction with patient. Not able to talk to patient, not able to see the patient."*

Reliability of the questionnaire:

For reliability, the items in the 5-point Likert scale were analyzed using reliability measures on SPSS v26.0. The Cronbach's alpha was calculated for 8 sub-parts of Q2, and the remaining 8 main parameters for before and during the lockdown, separately (value > 0.70 in all 4 cases) [Table5]. The inter-item correlation was also >0.7 for most items and >0.5 for all items.

Table 5: Reliability analysis of the questionnaire using Cronbach’s alpha

Item	Before lockdown	During lockdown
1. The clinical activities have improved my competencies in the following areas: i) History taking	0.975	0.945
ii) Physical examination		
iii) Interpret laboratory values		
iv) Making an appropriate management plan		
v) Patient-doctor relationship		
vi) Communication with the seniors, colleagues and other people involved in the health-care delivery system.		
vii) Case presentation skills		
viii) Problem-based learning		
2. The cases facilitated development of clinical reasoning and integration.	0.959	0.923
3. The time for discussing the given case was sufficient		
4. The time for evaluating the patient was sufficient		
5. The time for self-learning was sufficient.		
6. The residents were available to teach and answer queries.		
7. Ward Exams/ Viva based on actual case scenarios/simulations.		
8. I gained the fundamental understanding of common conditions and their management encountered in the major clinical disciplines.		

Discussion

We conducted this study to find out the perceptions of medical undergraduate students about their learning experience of clinical training, before and during the COVID-19 lockdown. We found that during COVID-19 lockdown most of the students received clinical training through the online mode, some through the in-person mode, and others in combination of these. This could be because of the difference in the type of institution, the different University norms and the COVID-19 caseload of the states and their hospitals, which impacted the time of college re-opening and resumption of bedside clinical training.

With no patient interaction, students felt that their skills/competencies in rapport building with the patient, history taking, physical examination, case history deduction, case presentation and patient management skills have been significantly affected by the COVID-19 lockdown. Talking to the patient, and then extracting the relevant points to one’s utility is an art, that comes by years of practice. Although students start attending clinics, from second year

onwards, it is in 3<sup>rd</sup> year only that they are introduced to clinical subjects as a part of their curriculum. Closure of medical colleges during the COVID-19 lockdown seems to have adversely affected the students by pushing them into their homes and taking away the opportunity to interact with patients, residents, peer/group-based learning that these students were supposed to have in their medical schools.

Most students opined that their learning experience of clinical training was better during the pre-lockdown phase, irrespective of whether they received clinical training by online or in-person mode. This could be because of the sudden transition from mainly in-person training to a primarily online based learning, and our unpreparedness for this change. Unlike other countries like the USA, China, Saudi Arabia, that have faced such situations of complete physical lockdown during the epidemics of SARS-CoV-1 and MERS CoV diseases, India, like many other countries, had a first-time experience with such a situation. <sup>[10,11]</sup>

We found that students who were provided online clinical training during the COVID-19 lockdown



perceived many advantages, as well as limitations associated with it. On one hand, it had the pros of being more comfortable, more focused, more interactive while on the other hand, students strongly believed that their learning experience was being hampered due to the lack of hands-on experience and interaction with patients and residents. Students felt that even though the faculty was trying hard to simulate actual case scenarios, they were far from reality and difficult to interpret.

Majority of the students had no experience of online learning in India, prior to the COVID-19 lockdown, as estimated in a study done at AIIMS, Jodhpur, which also found that majority of the students agreed that in-person classes were better than online classes.<sup>[12]</sup> A cross-sectional study on 2721 medical students in the UK, and found that students did not find online teaching to be engaging or enjoyable, with limited opportunities to ask questions, and not as effective as face-to-face teaching, and most of them opined that online teaching cannot replace clinical teaching, since they cannot learn practical clinical skills through online teaching.<sup>[13]</sup>

Similar findings were reported by a study in Republic of Korea, where students in the clinical clerkship program preferred a hospital setting for training over those in the pre-clerkship program, asserting that a clinical clerkship could not be replaced by an online class during the COVID-19 pandemic.<sup>[8]</sup> In a US-based study, where clinical rotation for most students was cut short or canceled due to the pandemic, students felt guilty for not being able to help patients and colleagues.<sup>[14]</sup> Sharma et al. highlighted that although classroom teaching, demonstrations, and bedside learning have largely been replaced by online platforms, the benefits of direct teacher-student contact and real-time two-way feedback are difficult to replicate at online forums.<sup>[15]</sup>

We found that there were no differences in the mode of delivering clinical training with the course year of medical students, and the COVID-19 caseload in their respective states, while a significantly higher number of students from private colleges received both in-person and online clinical training, as compared to those studying in government institutions. This could be due to the ready availability of resources at private institutions, and of course, lesser caseload to deal with, in contrast to the government institutions.

Though majority of the developed countries have adequate resources to handle the rise in critical health care and medical education demands, the lower- and middle-income developing countries, are the ones facing plenty of challenges.<sup>[16]</sup> Given the huge burden of COVID-19 cases, and the exhausted healthcare resources, the residents were the prime working force in the hospitals, and the undergraduate clinical training took a backseat, be it online or in-person. Thus, the total time available for clinical learning reduced significantly, and so did their interaction with the patients and residents. In spite of being at home during COVID-19 lockdown, the students reported less time for self-study. There can be multiple reasons for the same, including fear and anxiety about the pandemic, engaging into leisure activities and distractions while attending online classes, loss of schedule and motivation to study and difficulty in establishing a clear boundary between home and college.<sup>[14,15,16,17,18]</sup>

We found that even those students who were provided in-person clinical training during COVID-19 lockdown, found their pre-lockdown clinical training experience better. The differences in clinical training before and during the lockdown goes beyond the online mode of clinical teaching. The involvement of faculty and the staff in medical colleges in COVID-19 management, and the shortened exposure to patients during COVID-19 pandemic to protect medical students from being infected, made clinical training during lockdown a challenging experience.

Due to the proximity of the sample collection time to the professional exams in medical colleges, it wasn't possible to conduct a pilot study to validate the questionnaire. Also being an online survey, we could not do random sampling and so the external validity is limited. We tried to increase external validity by increasing the sample size. We could not gather information from the faculty of medical colleges, which could have given a better perspective of the situation.

## Conclusion

The learning experiences of clinical training during COVID-19 lockdown were perceived as inferior than that before COVID-19 lockdown by the medical undergraduate students, irrespective of the mode of teaching. The availability and optimization of existing resources is crucial in order to deliver quality education to the future doctors, and hence for the delivery of quality healthcare services. Innovative strategies need to be devised to improve the simulation of the real time clinical scenarios, and newer mechanism to continue clinical training in medical institutions during lockdown, should be worked out in the future. While in-person training offers a significant advantage over online clinical clerkships, lack of resources in the form of PPE kits, manpower, Postgraduate residents and risk of being infected still are the major challenges to it.

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