

## ORIGINAL ARTICLE

## Perception of medical students regarding E-learning during lockdown in COVID–19 pandemic: A cross-sectional study in a medical college, North Kerala

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### Abstract

**Background:** The digital learning in this pandemic era of COVID-19 evolved out in a perplexed environment as a viable alternative to offline or traditional classes. The e-learning carries its own merits as well as demerits, but however, this happened to be the only possible solution in this dreaded situation. With respect to medicos, as they are prone to be exposed to environments connected with Covid infected patients, additional care including online classes turned to be the better option. **Aim and Objective:** To determine the perception of medical students regarding e-learning during lockdown in COVID-19 pandemic. **Settings and Design:** A cross-sectional study was conducted among medical students of all the batches in a private medical College, Kozhikode. **Methods and Material:** Primary data were collected using structured Google questionnaire. Stratified sampling method has been adopted and the sample size was 400. **Statistical analysis used:** Data analysed using SPSS 18 software. **Results:** Majority of the participants used Zoom as modality of learning and half of the total participants got adapted to the system over time. During e-learning sessions, most of the medicos expressed their concerns regarding lack of clinical exposure, in addition to their losses in social communication skills. Factors such as the legitimate requirements of clinical phase students, issues of poor internet connectivity and health problems were inclined to demand traditional learning, which were statistically significant. **Conclusion:** Even though they were subjected to both online and offline methods of education, majority of respondents preferred traditional learning.

### Keywords

Online Learning; E-Learning, COVID-19, Medical Students, Perception

### Introduction

The conventional educational system in India originally flowed from the teacher to the students through "Gurukulas"; later on it got developed to institutional framework such as schools and colleges, wherein the student community learns through books and regular classes. The deep onslaught of COVID -19 pandemic had created heavy footprints on the educational system, which paved the way to the practice of web-based learning or e-learning or online learning across the globe. The outbreak of this dangerous virus throughout the world has forced educational institutions to shut down as

a measure to control the wide spreading of this virus, which in turn made the teaching professionals think of alternative methods of teaching during lockdown. Concerning today's educational scenario, learning & teaching process has drastically changed and resorted into the digital world, where teaching professionals and students are now deemed virtually connected. As medical students are largely exposed to vulnerable proximities of patients in the pandemic era, the usage of e-learning turned to be the dire necessity. The abundant usage of modern electronic IT gadgets had contributed tremendously towards the fast development of e-learning.(1,2)

Although process of e-learning is in the hype as of now, there are merits as well as shortcomings, when compared with conventional or traditional or offline learning. E-learning is considered as more convenient in terms of time, space and comfort. Nevertheless, there are demerits such as lack of both student-teacher interaction and social communication skills. Another important disadvantage is the difficulty faced in clinical examinations and practical sessions. As there is a paucity of adequate studies, it may be appealing to introspect the perception of medical students with respect to this topic. It can be a learning paradigm in educational institutions to enhance the student's knowledge and skills through digital technologies.

**Aim & Objective**

To determine the perception of medical students regarding e-learning during lockdown in COVID-19 pandemic.

**Material & Methods**

A cross - sectional study was conducted from March 2021- August 2021 over a period of 6 months in a Medical College in Kozhikode district of North Kerala. The study included MBBS students of this college who attended online class during lockdown.

Sample size was calculated using the formula  $N = 4 pq / d^2$ , where p=prevalence, q=1-p, d is the allowable error. From the studies on perceptions of students regarding E-learning during COVID-19 at a private medical college in Pakistan, showed 77% students have negative perceptions towards e-learning (3) and another study on global perspective of E-Learning during lockdown of COVID-19 pandemic, 24% of the students were not in favour of e-learning.(4)

From these studies, Average of prevalence (p)  

$$= \frac{77+24}{2} = 50.5\%$$

$q = 100-50.5$   
 $= 49.5$   
 $d = 5\%$

i.e.  $N = 4 pq/d^2$   
 $= 4 \times 50.5 \times 49.5 / (0.05)^2$   
 $= 399.96$   
 $400$

Taking into consideration a non-response rate of 10%, the final sample size was 440.

A pilot study was conducted among 40 medical students, who were excluded from the main study. Stratified sampling method was followed for the study. Each of the four MBBS batches (1<sup>st</sup> year, 2<sup>nd</sup> year, 3<sup>rd</sup> year, 4<sup>th</sup> year) of the Medical College was considered as a strata; and from each strata, 110 representatives were selected by simple random sampling method. The class representatives were contacted, and contact details of students were collected. Prior to sending the questionnaire links, a consent form was sent after explaining the purpose of study. The Google questionnaire links were shared in the corresponding

academic whatsapp groups. Data were collected from 400 participants who have given consent, by structured Google questionnaire. Those students who did not respond the first time, were reminded individually once more via Whatsapp message. A period of 2 weeks was given to answer, at their convenience. The questionnaire consisted of two sections, which are demographic details & perception towards e-learning.

Data were entered into Microsoft excel and analyzed with SPSS 18 software. Results were expressed in terms of percentage and frequency. Chi-square test was done to find out the association of factors with respect to preference of offline and online learning. Results were considered statistically significant at  $p < 0.05$ .

**Ethical concerns:** The study protocol was approved by the Institutional Ethics Committee of the Medical College. Informed consent was taken from the participants. Participation was voluntary and care was taken to maintain confidentiality of study respondents.

**Results**

In this study, even though our education system entered into a new phase of teaching modality due to this pandemic, 90.5% (n=362) preferred traditional learning as a better modality of education. (Figure 1)

Out of 400 participants, 74% (n=296) were females and 26% (n=104) were males. Age range of the students was 18-26 years, of which 14.75%, 66.25%, 19% of them belonged to the age group of 18-20 years, 21-23 years, 24-26 years respectively. Out of the whole, 200 students belonged to non-clinical and para-clinical phases, and the other 200 from clinical phase. Gadgets used for online learning by students were laptops(55%), mobile phones(35%), tablets (8%) and desktop(2%). The percentage of members who used Zoom platform were the maximum, 75% (n=300), followed by other applications. (Figure 2).

Out of 400, 82.75% (n=331) reported difficulties in understanding concepts during the initial stage of e-learning. More than half of the students who participated in the study, 54.25% (n=217) got adapted to the system over time. However, 91% (n=365) pointed out that e-learning modality is not suitable to medical students. Three-fourth of the total, 75% (n=292) responded that there were no adequate arrangements for development of clinical skill via e-learning process. Most of the participants, about 82% (n=328) responded that they were not satisfied in E-learning modality because it required more concentration than traditional learning. When we come to perception of teaching commitment, 44% (n=176) responded that teaching commitments got reduced, 40%(n=160) responded it was same as before. A large number of participants, 77% (n=308) reported that there is considerable lack in student – teacher interaction. A great proportion, 69.3% (n=277) had apprehension of losing their social communication skills in between

students, and between themselves and patients; as a result of e-learning.

Just half of the participants (n=201) perceived potential misuse of e-learning platform. About 69.5% (n=278) were of the opinion that they had lost interest in studies due to e-learning platform.

In this study, 12% had difficulty attending online classes due to internet connectivity issues. Family distractions were reported by 16.5%. Concerns about safety lapses and privacy issues were reported by 17% of the students.([Table 1](#))

Majority of participants, about 83.8% (n=335) recorded that they had health issues like eye strain, headache, neck and back pain, related to persistent exposure to computer or mobile phone screens. ([Figure 3](#))

On a more positive note, a vast majority, 90.75% had opined that online learning helped in decreasing COVID-19 spread, and 88.5% felt it is better with regards to saving journey time, savings due to cutting down of journey expenses(67%), in addition to infrastructural expenses(75%). More than half, 69.25% (n=277) responded that they had the tendency to collect more information from different E-learning platforms. More than three-fourth (78%) of respondents reported that updation of information regarding global medical research developments can be availed through e-learning. ([Table 1](#))

A proportion of 50% (n= 200) deemed e-learning a future education method.

Those students in the clinical phase preferred traditional type of learning more, when compared to those in non-clinical and para-clinical phases, which was statistically significant (P = 0.017). Those who had poor internet strength had preferred traditional mode of learning(P < 0.0001). Those who had health issues preferred offline learning more, when compared to those who did not. (P<0.001). Factors such as the legitimate requirements of clinical phase students, issues of poor internet connectivity and health problems were inclined to demand traditional learning, which were statistically significant.([Table 2](#)). The subgroup analysis based on medical students belonging to clinical and pre/para-clinical phases is reflected in ([Table 3](#)). On comparing medical students belonging to clinical and pre/paraclinical phases, we found statistically significant differences in health issues, concentration aspect, inquisitiveness, and updation of information regarding medical researches globally. (P < 0.001)

## Discussion

The current study aimed to determine the insight of medical students regarding e-learning during lockdown in COVID-19 pandemic. It focused on 400 medical students from a medical college in North Kerala. The perception of medical students regarding e-learning was assessed by using structured Google questionnaire. Questionnaire

consisted of two sections, which were demographic details and perception towards e-learning. Almost 75% responded that they preferred zoom as platform for e-learning. Even though they entered to e-learning modality, 90.5% were more inclined to traditional learning.

In this study, Zoom app preference by majority of the students may be due to the enabling provision for live video classes with powerpoint presentation. It was also the most popular digital platform during the lockdown days, and appear to be more convenient. In addition to that, a large number of students could be accommodated, including interactive sessions. Whereas in Whatsapp, no live classes can be conducted for a large group of students. Moreover, in Google classroom, live classes cannot be conducted; instead pre-recorded audios and powerpoint can be given. In a study in Jordan conducted by Sindiani et al,(5) 63% of respondents preferred zoom as platform for study. But another study conducted by Abbasi MS et al.,(6) showed only 47% preferred zoom as platform for e-learning.

In the present study, although a large chunk of students had difficulties in understanding concepts during the initial period, however, they got adapted to the system over time.

Majority of participants (75%) responded that there were no adequate arrangements in development of clinical skill via e-learning modality. Those students in the clinical phase preferred traditional type of learning more, when compared to those in non-clinical and para-clinical phases, which was statistically significant (P = 0.017). E-learning is not ideal to medical students, as there exists a mandatory requirement to have a direct interaction with the patients, in order to ascertain bed-side clinical experience, such as inspection, palpation, percussion, and auscultation. It is also essential to have hands-on training with respect to practical sessions. In another study conducted in Saudi Arabia by Rehana Khalil et al,(7) showed that more preclinical students preferred e-learning in their future academic years. Whereas most of the clinical students preferred live lectures for further years, because missing element in online learning is clinical practices. When we come to a study conducted in Pakistan by Abbasi MS et al.,(6) it revealed more than half (60%) responded that clinical and practical skills are best learned in clinics and laboratory. Another study in UK by Dost et al,(8) showed 82.17% students felt the same.

More than three-fourths of the respondents, 77% (n=308) reported that there is considerable lack in student – teacher interaction, which could be due to the comparatively lesser scope for face-to-face view. Baczek et al study(9) submitted that 47% students felt the same. In contrast to our study findings, another study conducted in Sudan,(10) showed only 24% were concerned about students –students and students- teacher interaction.

Majority of the participants, 69.3% had the apprehension of losing their social communication skills between themselves, and also with patients, as they don't get to see each other, during this lockdown period in COVID-19 pandemic.

From the present research result, just half of the participants, about 50.25% perceived misuse of e-learning platform. As it is a virtual platform, potential misuse can occur because it lacks control over physical presence of the students.

About 69.5% students lost interest in studies, due to e-learning. It could be because they were not able to see their peer group learning and due to reduced student-teacher interaction, as perceived by most of them. In addition, the students may turn lethargic, as there exists a possibility in the system for recorded learning later, which they generally omit. Whereas, as opposed to this study findings, another research work conducted in Maharashtra by Sawarkar G and co-authors on Ayurveda students, 54% showed that there was increase in interest towards learning, by virtue of e-learning.(11)

Kerala is one of the states with highest internet penetration. However, 18% of students had complaints of internet connectivity issues, resulting in disruption in the continuity of online classes, which may subsequently cause lack of interest in learning. Those who had poor internet strength had preferred traditional mode of learning ( $P < 0.0001$ ). Abbasi MS et al study ( $> 60\%$ )(6) and Muflih S et al study (82.5%)(12) highlighted that networking issue was common impediment for E-learning. Whereas Dost et al(8) survey divulged that 21.53% experiencing the same difficulty.

Family distractions were reported by 16.5%. A higher proportion was observed in Dost et al study (26.76%)(8)

Safety concerns about security vulnerabilities of e-learning platforms were reported by 17%. Although various platforms are used including zoom app, there are problems of cyber security lapses.

Health issues like eye strain (40%), headache (21%), neck pain (12%) and backache (11%) were reported by 83.3% students, which creates large concerns. Similar findings were found by Desai et al.(13) In this study, those who had health issues preferred offline learning more, when compared to those who did not ( $P < 0.001$ ).

An enormous majority, 90.75% felt e-learning helped in reducing COVID 19 infection spread, indirectly due to social distancing and reduction in movements.

Around 88.5% felt it is better with regards to saving journey time, savings due to cutting down of journey expenses (67%), in addition to infrastructural expenses (75%). They could attend the classes side-by-side, by meeting their domestic requirements at home, thereby resulting in better utility of time during lockdown period. They could learn online by tapering the expenses, time and energy with respect to travel. E-learning can be

organized at anytime, anywhere, addressing a large gathering regardless of their location.

This study showed 69.25% of participants collected more information from different e-learning platforms to improve their clinical skill. It could be because during e-learning class sessions, the teachers often shared youtube videos, educational site links, for better understanding of the topic. Similar results were found by another study conducted in Libya,(14) which showed 66.8% studied alone & utilized different educational sources and 56.8% reported that they depend on courses provided by private educational institutions.

50% felt e-learning to be a future education method, may be because of the enlarging potential possibilities in this field. Especially at times of pandemic, the e-learning modality is highly encouraged. The main advantage of e-learning is that we can save time, space, journey and mass gatherings like CME, conferences etc, thereby avoiding the spread of the deadly virus. Another study conducted by Sindiani AM et al,(5) among medical students in Jordan showed 3/4th of students did not prefer e-learning method as future education process of learning.

In current study, 90.5% recommended traditional learning method is better than e-learning method. Similar results were found in studies conducted by Singh R et al(15) where 94.6% preferred in-person learning. Sahar Abbasi et al.,(3) and Nepal S et al(16) studies showed around 78% students had negative perceptions towards e-learning. Amir et al(17) and Saurabh MK et al(18) showed more than half of students preferred classroom learning. In contrast to our study findings, Singh A and KoMin AK study found that majority of the students accepted digital learning.(19)

## Conclusion

This study indicated that during initial stage of e-learning about 3/4th of the students faced difficulties in understanding concepts, however half of the total participants got adapted to the system over passage of time. During e-learning sessions, participants had no opportunities to attending clinical cases and developing social communication skills. A large number of participants showed decreased interest of learning after they entered to e-learning platform. Factors such as the legitimate requirements of clinical phase students, issues of poor internet connectivity and health problems were inclined to demand traditional learning, which were statistically significant.

Majority of medical students preferred traditional offline learning as a regular mode of education. The inference evolved from this study postulates that the e-learning system is definitely an alternative viable method, which could be sustainable during special circumstances like the grave onslaught of a pandemic like COVID-19. However, the importance of direct learning cannot be replaced in

total by the e-learning system, and it continues as everlasting.

### Recommendation

- Students' feedback should be collected periodically, aiming at rectification, for continual improvement.
- Measures to be taken for ensuring cyber security and avoid proxy attendance.
- Teachers and students shall be trained on e-learning techniques.
- Awareness sessions can be planned for updation of techniques and to let the students realise the pros and cons of e-learning system
- Clinical case discussions and practical sessions should be structured with physical control measures such as social distancing, temperature check-up, restriction for loitering, restricted number of students, proper ventilation, usage of PPE (Personal Protective Equipment) such as face mask, Face shield , Gloves.
- E-learning Platform and teaching process need to be constantly monitored
- Addressing the inadequacy of internet connectivity including speed problems and Wi-fi network, including the coverage of villages are required.
- Intermittent relaxation to the eyes for preventing eye strain, headache. Also, neck and back exercises are suggested.

### Limitation of the study

Since the sample population being established from a single college, the results cannot be generalised. As there were travel and exposure limitations in expanding and enlarging the scope of survey, in other medical colleges, due to the then prevalent COVID 19 pandemic, we were constrained to circumscribe the scope and potential within the parameters of the 400 medical students of our college.

### Relevance of the study

The overall perspective derived from this article would obviously enlighten the enthusiastic medical fraternity and the interested public at large regarding the role of E-learning and its scope, limitations, opportunity and applicability. It is to be emphasized that the usage of digital-learning platform had categorically contributed a vital role in digital tele-communication, as well as for conducting webinars at the international level.

### Acknowledgement

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**Tables**

**TABLE 1 PERCEPTION REGARDING E-LEARNING**

	Variables	Medical students (N= 400) Frequency	Percentage (%)
<b>Difficulties in understanding concepts initially</b>	Yes	331	82.75
	No	69	17.25
<b>Adapted over time</b>	Yes	217	54.25
	No	183	45.75
<b>Suitable to medical students</b>	Yes	35	9
	No	365	91
<b>Adequate arrangements in development of clinical skill</b>	Yes	108	25
	No	292	75
<b>More concentration required</b>	Yes	328	82
	No	72	18
<b>Teaching commitment</b>	Decreased	176	44
	Same as before	160	40
	Increased	64	16
<b>Student-teacher interaction</b>	Decreased	308	77
	Same as before	58	14.5
	Increased	34	8.5
<b>Apprehension of losing development of social communication skill</b>	Increased	277	69.3
	Same as before	82	20.5
	Decreased	41	10.2
<b>Misuse of e-learning platform</b>	Yes	201	50.25
	No	199	49.75
<b>Interest in studies</b>	Lost/reduced	278	69.5
	No change	91	22.75
	Increased	31	7.75
<b>Network connectivity issues</b>	Yes	72	18
	No	328	82
<b>Family distractions</b>	Yes	66	16.5
	No	334	83.5
<b>Concerns about safety lapses and privacy issues</b>	Yes	68	17
	No	332	83
<b>Helped in decreasing COVID-19 spread</b>	Yes	363	90.75
	No	37	9.25
<b>Better with regards to saving journey time</b>	Yes	354	88.5
	No	46	11.5
<b>Avoids journey expenses</b>	Yes	268	67
	No	132	33
<b>Avoids infrastructure expenses</b>	Yes	300	75
	No	100	25
<b>Tendency to collect more information from different e-learning platforms</b>	Yes	277	69.25
	No	123	30.75
<b>Updation of information regarding medical researches across the globe</b>	Yes	312	78
	No	88	22

**TABLE 2 RELATION BETWEEN MODE OF LEARNING AND CERTAIN SELECTED FACTORS**

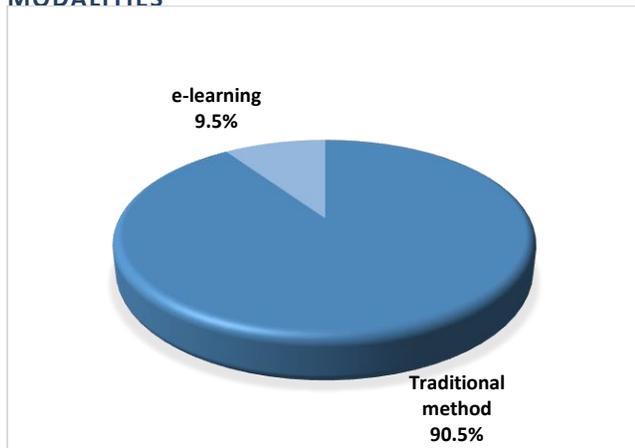
Characteristics		Total N=400	Traditional learning N(%)	Online learning N(%)	P value
Academic Phase	Clinical	200	188 (94%)	12 (6%)	0.017
	Non-clinical and Paraclinical	200	174 (87%)	26 (13%)	
Network connectivity issues	Present	72	56 (77.7%)	16 (22.2%)	<0.0001
	Absent	328	306 (93.3%)	22 (6.7%)	
Health issues	Present	335	310 (92.5%)	25(7.5%)	<0.001
	Absent	65	52 (80%)	13 (20%)	

**TABLE 3 SUBGROUP ANALYSIS - COMPARISON OF FACTORS BASED ON CLINICAL AND PRE/PARA-CLINICAL PHASES**

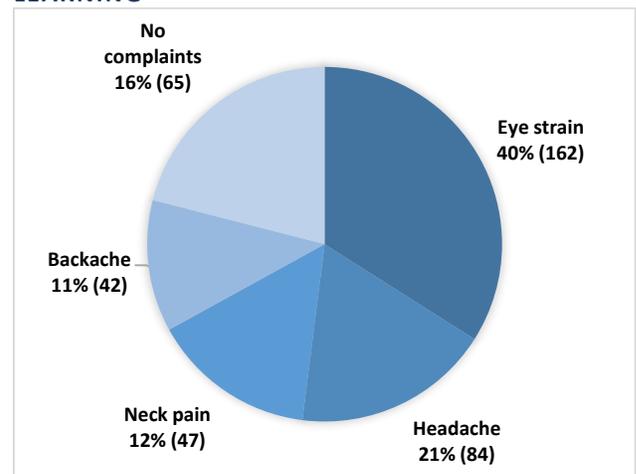
Characteristics		Total N=400	Clinical N(%)	Pre/Paraclinical N(%)	P value
Health issues	Present	335	152 (45.37%)	183 (54.62%)	< 0.0001
	Absent	65	48 (73.84%)	17 (26.15%)	
More concentration required to understand, in e-learning	Yes	328	143 (43.59%)	185(56.4%)	< 0.0001
	No	72	57 (79.16%)	15 (20.83%)	
Tendency to collect more information from different e-learning platforms	Yes	277	126 (45.48%)	151 (54.51%)	0.0068
	No	123	74 (60.16%)	49 (39.83%)	
Updation of information regarding medical researches across the globe	Yes	312	185 (59.29%)	127(40.7%)	<0.0001
	No	88	15 (17.04%)	73 (82.95%)	

**Figures**

**FIGURE 1 PREFERRED FUTURE EDUCATION MODALITIES**



**FIGURE 3 HEALTH ISSUES RELATED TO E-LEARNING**



**FIGURE 2 MODALITY USED DURING LOCKDOWN FOR LEARNING**

