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Original Research Article

Knowledge, attitudes and practices of medical students towards electronic learning in a tertiary care centre in central India: a cross-sectional study

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ABSTRACT

Background: Medical education is constantly growing at a rapid speed and to keep the upcoming doctors in par with the competitive world e-learning has become a necessary tool. In pandemic situations like COVID-19, instructors must deliver lectures safely as well as ensure the integrity and continuity of the medical education process. Online classes became a key component in the continuity of education. It is therefore important to determine the knowledge, attitudes, and practices of medical students regarding electronic medical education.
Methods: A cross sectional study was conducted among 325 undergraduate medical students and interns in a tertiary care centre in central India using probability proportional to size sampling. The study involved a KAP questionnaire towards e-learning that was distributed as Google form by means of social media.
Results: Study participants belonged to the age group of 18-30 years. 54% were male and 46% were female. 95.4% study participants used smart phones for medical education. 89.1% used online applications and platforms for medical education purposes. 84.6% used the internet regularly in your studies. 60.3% disagreed that e-learning can cover practical aspect of medical education.
Conclusions: Study results show that medical students had optimistic attitude, good knowledge and practice towards electronic learning. E-learning is a useful tool to ensure continuity of medical education as well as helpful in minimizing the effects of pandemics like COVID-19 on medical education and on the progression of training.

Keywords: E-learning, Medical education, Medical students

INTRODUCTION

Electronic learning is a method of teaching and learning using electronic media.[1] E-learning is also called Web-based learning, online learning, distributed learning, computer-assisted instruction and Internet-based learning.[2] Developing countries are growing in the use of computer and internet-based learning compared to their usage in the last decade.[3]

Pandemic situation like COVID-19 cause suspension of medical training through clinical rotations. Other challenges include a fear that medical students may contract the virus during their training and may transmit it to the community.[4] Additionally, students are required to stay at home and to abide by social distancing guidelines. Therefore, we must develop a medical education curriculum that provides students with opportunities for continuous learning, while also avoiding delays due to the pandemic.[5]

Some of the most commonly proposed methods include scheduled live online video lectures with interactive discussions and the utilization of several different programs or self-study online recorded lectures made available online for medical students in each university. Hence, online classes became a key component in the continuity of education.[6,7]

The biggest challenge faced by the growing countries is availability of computers and access to internet, financial support in terms of administration and faculty time and training.[1] Software skills in computer both rural and urban areas along with hesitation to accommodate newer methods in learning lay a setback in adapting e-learning.[8] It is therefore important to assess the usability of online learning methods as well as determine their feasibility and adequacy for medical students. Through this study we have aimed to provide an overview of medical student's knowledge, attitudes, and practices towards electronic learning.

Study objective

To study knowledge, attitudes, and practices of medical students towards electronic learning during covid pandemic in a tertiary care centre in central India. To give suitable recommendations based on the study findings.

METHODS

A cross sectional study was conducted in a tertiary care centre in central India from October 2021 to January 2022. Study participants were students pursuing MBBS course and MBBS interns. MBBS students and interns who gave consent for the study were included in the study.

Sample size

With reference to the study done by Alsoufi et al, 97.1% of the participants reported suspended lectures due to COVID-19 pandemic.[14]

Absolute precision = 2%

Desired confidence level (1-α) %= 95%

$$n = \frac{Z^2_{1-\frac{a}{2}} \times p \times (1-p)}{d^2}$$

Calculated sample size = 270

Considering 20% non-response rate, final sample size: 270+54=324.

Since there were 250 students each in 1st and 2nd year MBBS and 200 students in 3rd year, final year MBBS and MBBS interns, probability proportional to size (PPS) sampling was done as follows: 1st year MBBS= 74 students; 2nd year MBBS= 74 students; 3rd year MBBS= 59 students; final year MBBS= 59 students; MBBS interns= 59 students.

A total of 325 MBBS students and interns were taken as study participants. Data was collected using a preformed, semi structured questionnaire regarding the knowledge, attitude and practices towards e-learning that was distributed as Google form by means of social media (WhatsApp, email). Data was analysed using Microsoft excel 2007 and statistical software Epi Info 7. Approval from the Institutional Ethics Committee was sought.

RESULTS

Basic demographic characteristics

Figure 1 shows distribution of study participants according to their gender. 148 (46%) of the study subjects were female and 177 (54%) of the study participants were male. Age of the study participants ranged from 18-30 with mean age 21.55 (1.67) years. Figure 2 shows distribution of study participants according to their educational year. 240 (73.8%) study participants were hostellers while 85 (26.2%) were day scholars. 216 (66.5%) of the respondents resided in urban area and 109 (33.5%) resided in rural area.

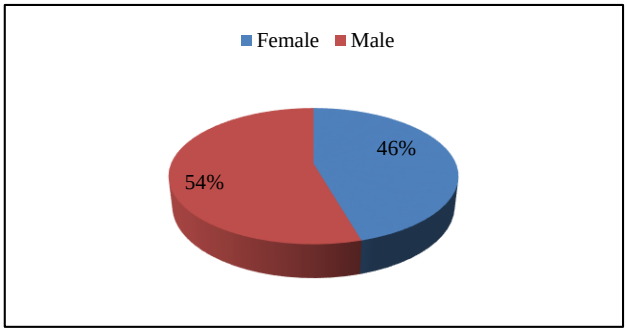

Figure 1: Distribution of study participants according to their gender.

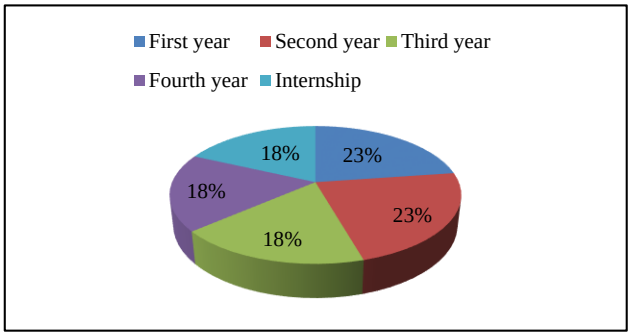

Figure 2: Distribution of study participants according to their educational year.

Study results shows that 46.2% had good and 19.4% had acceptable level of proficiency in using various electronic devices. 163 (52.2%) felt that the quality of available internet service is good. 310 (95.4%) personally owned and utilized smart phone for their medical education.

Education of the students mainly depended upon self-study utilizing various educational sources i.e 275 (84.6%). Main use of internet was for medical education and e-learning i.e. 294 (90.5%) and social media and E-mail i.e. 221 (68%).

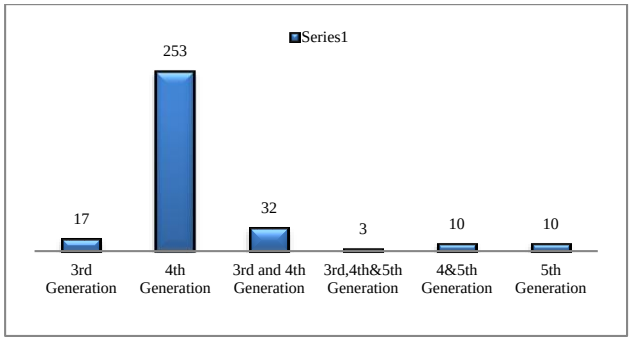

Figure 3: Type of internet service available.

Figure 3 shows that majority of the study participants (253) used 4th generation internet service.

Knowledge of medical students toward e-learning

Table 1 shows the respondent's understanding of e-leaning. Among the respondents, 80.9% had some idea about e-learning, while 90.2% were aware of the services provided through e e-learning. Most of the respondents (73.2%) considered e-learning as being part of tele-education. For further analyses, each response of "true," "false," or "I do not know" was scored quantitatively.

Table 1: Respondent's understanding of e-leaning.

Variables	True n (%)	False n (%)	I don't know n (%)
1. E-learning depends on a comprehensive digital electronic environment	263 (80.9)	23 (7.1)	39 (12)
2. E-learning is an interactive system that provides an opportunity for learning through information and telecommunication technology	260 (80)	37 (11.4)	28 (8.6)
3. E-learning in the medical field is not considered less expensive than conventional learning	138 (42.5)	105 (32.3)	82 (25.2)
4. E-learning provides a digital multimedia content (written text, audio, video and images)	293 (90.2)	10 (3.1)	22 (6.8)
5. One of the benefits of E-learning with live content is that the scholar receives instant feedback from the instructor	196 (60.3)	67 (20.6)	62 (19.1)
6. E-learning is considered a type of tele-education	238 (73.2)	20 (6.2)	67 (20.6)

Table 2: Attitudes of medical students toward e-learning.

Attitude	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
E-learning is a possible substitute for standard medical education	71 (21.8%)	93 (28.6%)	100 (30.8%)	48 (14.8%)	13 (04%)
E-learning can be easily applied in India	38 (11.7%)	101 (31.1%)	116 (35.7%)	64 (19.7%)	06 (1.8%)
The e-learning content should be sufficient to satisfy educational requirements	37 (11.4%)	106 (32.6%)	92 (28.3%)	79 (24.3%)	11 (3.4%)
Adherence of students to e-learning schedules should be similar to direct learning	30 (9.2%)	69 (21.2%)	116 (35.7%)	93 (23.6%)	17 (5.2%)
An interactive electronic content with discussions can be achieved through e-learning	19 (5.8%)	50 (15.4%)	122 (37.5%)	125 (38.5%)	09 (2.8%)
Most medical students can use live online learning content	19 (5.8%)	48 (14.8%)	109 (33.5%)	131 (40.3%)	18 (5.5%)
E-learning can be used for clinical aspects of medical sciences	63 (19.4%)	95 (29.2%)	87 (26.8%)	75 (23.1%)	05 (1.5%)
E-learning can cover the practical aspect of medical education curriculum	95 (29.2%)	101 (31.1%)	79 (24.3%)	43 (13.2%)	07 (2.2%)
E-testing can replace the current traditional testing methods in medical faculties	56 (17.2%)	91 (28%)	110 (33.8%)	57 (17.5%)	11 (3.5%)
E-learning is more convenient and flexible than conventional learning	33 (10.2%)	68 (20.9%)	106 (32.6%)	103 (31.7%)	15 (4.6%)
The quality of internet services in India can support e-learning	36 (11.1%)	73 (22.5%)	137 (42.2%)	68 (20.9%)	11 (3.4%)
It is possible to obtain medical educational material through the internet	19 (5.8%)	45 (13.8%)	106 (32.6%)	140 (43.1%)	15 (4.6%)
Interaction between students and lecturers is possible through e-learning	28 (8.6%)	63 (19.4%)	126 (38.8%)	97 (29.8%)	11 (3.4%)
The veracity of certificates attained through e-learning must be acknowledged	13 (4%)	34 (10.5%)	167 (51.4%)	95 (29.2%)	16 (4.9%)

A score of 1 was assigned to "true,", and a score of 0 was assigned to a "false" or "I do not know" response. Scores ranged from 6 (maximum) to 0 (minimum). A cutoff score of 5 was considered to indicate an adequate understanding, while <5 was considered to indicate a poor understanding. Among 325 participants, the mean (SD) score was 4.27 (0.084) with a variance of 2.33, while 169 (52%) had an adequate understanding and 156 (48%) had a poor understanding of e-learning.

Attitudes of medical students toward e-learning

Table 2 shows attitudes of medical students toward e-learning. It was assessed through questions based on the applicability and usability of e-learning in medical schools. Each response was scored using a Likert-type scale (strongly disagree, disagree, neutral, agree, and strongly agree). 48.6% disagreed that e-learning can be used for clinical aspects of medical sciences while 26.8% are neutral. 47.3% agreed that e-learning is more convenient and flexible than conventional learning while 32.6% had a neutral view for the same. 60.3% of the respondents disagreed that e-learning can cover the practical aspect of medical education curriculum.

Medical students' practice evaluation of e-learning

Table 3 describes the participant's responses to e-learning practices. Majority i.e. 193 (59.4%) of the students had participated in online medical education program. 275 (84.6%) used the internet regularly in their studies. 242 (74.5%) study participants used to download content related to your medical education in a periodic manner. 290 (89.2%) used online applications and platforms for medical education purposes.

Table 3: Medical students' practice evaluation of e-learning.

Variables	Yes n (%)	No n (%)
Were you awarded certificates through online training courses related to the medical fields?	254 (78.2)	71 (21.8)
Did you participate in any online medical education program during this period?	193 (59.4)	132 (40.6)
Did you use the internet to attend courses obtain medical information or understand medical concepts?	276 (84.9)	49 (15.1)
Do you download content related to your medical education in a periodic manner?	242 (74.5)	83 (25.5)
Did you use online applications and platforms for medical education purposes?	290 (89.2)	35 (10.8)
Do you share educational material with your fellow medical students at your faculty?	273 (84)	52 (16)
Did you use the internet to study with a friend or a group of friends through online meetings?	195 (60)	130 (40)
Do you utilize your personal computer in online studying?	180 (55.4)	145 (44.6)
Do you use the internet regularly in your studies?	275 (84.6)	50 (15.4)
Have you downloaded electronic content instead of purchasing the paper form of study materials in order to save money?	230 (70.83)	95 (29.2)
Did you purchase an electronic device in order to have access to e-learning opportunities?	177 (54.5)	148 (45.5)

For further analyses, each "yes" or "no" response was scored as 1 or 0, respectively. Scores ranged from 11 (maximum) to 0 (minimum). A cutoff score of 8 was considered to indicate an adequate level of practice, while <8 was considered to indicate an inadequate level. Among 325 participants, 167 (51.4%) exhibited an adequate level of practice, whereas 158 (48.6%) fell in the inadequate practice range.

DISCUSSION

This study focused to evaluate medical student's knowledge, attitudes, and practices regarding e-learning, as it was the only platform for providing medical education during the covid outbreak. The results revealed an acceptable level of knowledge, attitudes, and practices regarding e-learning, which evidences the usability of e-learning during the COVID-19 outbreak. The findings also highlight its potential to reach medical students and transform medical training.

In this study 148 (46%) of the study subjects were female and 177 (54%) of the study participants were male. Age of the study participants ranged from 18-30 with mean age 21.55 (1.67) years. The study findings show that majority of the students use social media 244 (75.1%) as a source of COVID-19 knowledge. Study results shows that 46.2% have good and 19.4% have acceptable level of proficiency in using various electronic devices. 163 (52.2%) feels that the quality of available internet service is good. 310 (95.4%) personally own and utilize smart phone in their medical education.

In a study by Alsoufi et al, in Libya, participants were predominately female; the sample included 2,390 females (71.4%) and 958 (28.6%) males.[14] The mean age was 21.87 years. Most participants (3,117; 93.1%) reported

owning a smartphone. Additionally, 3,039 (90.8%) and 2,603 participants (77.7%) reported that they used the internet for social media and medical education purposes, respectively similar to our study findings. While, study done by Dhahri et al, at Lahore Pakistan, 1753 (65.9%) were female while 908 (34.1%) male participants.[18]

In this study, 48.6% disagreed that e-learning can be used for clinical aspects of medical sciences. 47.3% agreed that e-learning is more convenient and flexible than conventional learning while 32.6% have a neutral view for the same. 60.3% of the respondents disagree that e-learning can cover the practical aspect of medical education curriculum.

Majority i.e. 193 (59.4%) of the students had participated in online medical education program. 275 (84.6%) used the internet regularly in your studies. 242 (74.5%) study participants used to download content related to your medical education in a periodic manner. 290 (89.2%) used online applications and platforms for medical education purposes.

Similarly, in the study by Alsoufi et al, in Libya, 49.7% of the respondents agreed that e-learning can cover practical lessons. Approximately 38.2% agreed that e-learning can replace traditional teaching methods, although 73.6% disagreed and they believed that the quality of the local internet was not good enough to facilitate e-learning platforms. 75.6% had some idea about e-learning, while 71.6% were aware of the services provided through e-learning. Most of the respondents (82.3%) considered e-learning as being part of tele-education. 86.1% reported that they used the internet for medical education purposes.

In a study done by Rajab et al, most respondents (76%) intended to integrate online expertise gained during the COVID-19 pandemic into their teaching/learning strategies.[17]

Most of the students (68.6%) felt that it is better to help out in hospitals during the pandemic. Similarly, in study done by Choi et al, in United States, majority respondents agreed that assisting in hospitals during the outbreak would be a valuable learning opportunity.

This study has few limitations. In this study, we observed that most medical students had access to electronic devices and were able to use them. We also found that medical students displayed acceptable levels of knowledge, attitudes, and practices regarding e-learning. However, our study was performed in Central India with specific settings. Therefore, the results may not be generalized and they must be validated by further studies and centers to obtain an overview of the utility of the online learning platform as a mode of teaching.

The lack of knowledge in computer skills along with poor technological infra structure and resource can be a challenge for implementation of e-learning in some regions.

CONCLUSION

The study results shows that e-learning is a useful tool to ensure continuity of medical education as well as helpful in minimizing the effects of pandemics like COVID-19 on medical education and on the progression of training.

There is a critical need for academic coaching programs that will help students engage in continued learning with supervision and follow-up by their teachers. This will prevent students from becoming less motivated, and will increase communication skills between learners and educators. Further studies should be done to understand and similarly find solution for continuation of medical education in future medical aspirants.

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Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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