



## COVID-19 PANDEMIC IMPACT ON MEDICAL EDUCATION: KNOWLEDGE, ATTITUDES AND PRACTICE REGARDING ELECTRONIC LEARNING AMONG MEDICAL STUDENTS

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### ABSTRACT

**Introduction:** The Corona-Virus Disease 2019 (COVID-19) Pandemic has had a tremendous disrupting effect on medical education. Due to shut down of universities across the world, online classes have become a key component in the continuity of medical education. The present study aimed to analyze the impact of the COVID-19 pandemic on online education. **Objective:** To determine the knowledge, attitudes, and practices pertaining to digital medical education among medical students. **Material and methods:** We conducted a cross-sectional survey which involves a questionnaire that was distributed in online version by means of email and social media among medical students. A total of 300 participants which included 200 of 2<sup>nd</sup> year MBBS students and 100 of allied health students were included. The questionnaire was self-administered with questions pertaining to e-learning knowledge, attitudes, and practices. Questionnaires with incomplete information or missing data were excluded from the analysis. **Results:** Among the respondents, 90% had some idea about e-learning and most of the students (83%) considered e-learning as being part of tele-education. Students attitudes toward e-learning were relatively good. Approximately 40% agreed that e-learning can replace traditional teaching methods while 60% disagreed. Many of them (46%) did not take any online courses; 60% had participated in online medical educational programs during the COVID-19 pandemic. However, 90% reported that they used the internet for medical education purposes. **Conclusion:** Extensive educational support should be provided to medical students, especially during the pandemic. Strategies could be implemented to engage students in continued online learning. However, these initiatives require institutional support and interactive learning, as medical students may be poorly motivated in online learning, and some students may encounter communication challenges.

**KEYWORDS :** COVID-19 pandemic, medical education, e-learning

### INTRODUCTION:

In December 2019, the Corona virus Disease 2019 (COVID-19) was first reported in Wuhan, Hubei Province, China. It is characterized by pneumonia-like symptoms. COVID-19 has caused unprecedented disruption to the medical education process and to healthcare systems worldwide.<sup>1,2</sup> The COVID-19 pandemic puts people at risk of developing life-threatening conditions, presenting substantial challenges for medical education, as instructors must deliver lectures safely, while also ensuring the integrity and continuity of the medical education process. Many medical schools have shifted to online education as an information delivery mechanism where the educator and learner are separated in space and potentially also in time.<sup>3</sup> When considering the current state of graduate medical education, it comes as no surprise that the status quo is dominated by traditional didactic learning.<sup>4</sup> This crisis has forced the universities to think of new and alternative strategies to engage students.<sup>5</sup> Many medical schools have shifted to online education to ensure continuity of teaching-learning processes.<sup>6</sup> Some of the most commonly proposed methods include scheduled live online video lectures. Educators must plan to continue to provide medical education and patient care during the pandemic, and these services should be conducted in accordance with ethical frameworks that are based on beneficence and the professional virtues of courage and self-sacrifice. We must assess whether online lectures are feasible and determine whether they are adequate in helping medical students continue their education.<sup>7,8</sup>

### OBJECTIVE:

To determine the knowledge, attitudes and practices pertaining to digital medical education among medical students.

### MATERIAL AND METHODS:

With the implementation of social distancing measures in March 2020, an emergency decision was made to limit all teaching-learning activities to virtual sessions. The IT department of the university conducted workshops to train faculty members in the use of open-source web conferencing platforms and were encouraged to give synchronous live streaming sessions. All the live sessions were also recorded, and all curricular content was made available through the university's learning management systems (LMS) for asynchronous learning. We conducted a cross-sectional survey from Jan to Feb 2021 which involves a questionnaire that was distributed by online version by means of email and social media. The questionnaire was reviewed and validated by the involved faculty members. A Google form

containing the study questionnaire was distributed among specific social media groups or personal emails comprising of medical students. A total of 300 participants which included 200 of 2<sup>nd</sup> year MBBS students and 100 of allied health students were included. Participation was voluntary and complete anonymity was ensured. The questionnaire was self-administered without intervention by the authors or any specific person, and it did not contain any identifying data of the participants to ensure confidentiality. Questionnaires with incomplete information or missing data were excluded from the analysis. The questionnaire consisted of multiple-choice questions, Likert scale questions (strongly disagree, disagree, neutral, agree, and strongly agree), and closed-ended questions. Data was compiled and analyzed.

### RESULTS:

Table 1 shows the students knowledge about e-learning. Among them 90.2% had some idea about e-learning, while 88.9% were aware of the services provided through e-learning. Most of the respondents (83.7%) considered e-learning as a type of tele-education.

Attitudes toward e-learning were assessed using 6 questions, as shown in Table 2. Students attitudes towards e-learning was relatively good. Among the respondents, most of the students agreed (35%) e-learning content should be sufficient for educational requirements with 37.3% downloadable e-learning content. There was a strong disagreement for e-learning with regards to clinical (19.9%) and practical aspect (27.7%) of medical education. Many were neutral (33.6%) for replacement of current traditional teaching methods. Most of the students found e-learning convenient and feasible (35.1%) than conventional learning. However, financial difficulty to gain access to e-learning was also evident in many students (35.8%).

Table 3 describes the participants' responses to e-learning practices. 53.9% took online courses; 60.8% had participated in online medical educational programs during the COVID-19 pandemic. However, 92.8% reported that they used the internet for medical education purposes. Specifically, 86.9% had shared medical educational materials with their friends or colleagues, while 77.8% reported using the internet for participating in problem based learning discussions. Moreover, 79.1% used computers for learning purposes, while 88.7% reported buying electronic device in order to have access to e-learning.

**Table 1: Knowledge of medical student Toward e-Learning**

SL no	Variables	True (%)	False (%)	I Don't Know (%)
1	E-Learning depends on digital electronic media displaying educational curriculum	90.2	2.5	7.3
2	E-learning is an interactive system that provides an opportunity for learning	88.9	3.3	7.8
3	E-learning in the medical field is not considered less expensive than conventional learning	57.5	19.1	23.5
4	E-learning provides a digital multimedia content (written test, audio, video and image)	88.2	3.3	8.5
5	Instant feedback from the instructor can be received during the live sessions	67.3	14.4	18.3
6	E-learning is considered a type of tele-education	83.7	5.8	10.5

**Table 2: Attitudes of medical student toward e-Learning**

SL no	Attitude	Strongly Disagree%	Disagree %	Neutral %	Agree %	Strongly Agree%
1	E-learning is a possible substitute for standard medical education	13.7	20.9	35.3	21.6	8.8
2	The E-learning content should be sufficient to satisfy educational requirements	10.5	17.1	27	30.9	14.5
3	Downloadable content is better than live sessions	11.8	12.4	22.2	37.3	16.3
4	E-learning can be used for clinical aspect of medical sciences	19.9	27.8	19.2	25.8	7.3
5	E-learning can cover the practical aspect of medical education curriculum	27.7	25.7	22.4	23.7	0.5
6	E-testing can replace the current traditional methods in medical faculties	15.8	19.1	33.6	23.7	7.9
7	E-learning is more convenient and flexible than conventional learning	12.8	11.9	27.8	35.1	12.6
8	Medical students have financial difficulty in gaining access to E-learning	9.3	11.3	34.4	35.8	9.3

**Table 3: Medical students practice evaluation of e-learning**

SL no	VARIABLES	YES (%)	NO (%)
1	Were you awarded certificates through online training courses related to the medical field?	53.9	46.1

2	Did you participate in any online medical education program during this period?	60.8	39.2
3	Did you use the internet to attend courses obtain medical information or understand medical concepts?	92.8	7.2
4	Do you download content related to you medical education in a periodic manner?	86.8	13.2
5	Did you use online applications and platforms for medical education purposes?	86.8	13.2
6	Do you share educational material with your fellow medical students at your institute?	86.9	13.1
7	Did you use the internet to attend a course in problem-based learning?	77.8	22.2
8	Do you utilize your personal computer in online studying?	79.1	20.9
9	Do you use the internet regularly in your studies?	79.1	20.9
10	Did you purchase an electronic device in order to have access to E-learning?	88.7	28.8

**DISCUSSION:**

Our study aimed to assess medical students' knowledge, attitudes, and practices regarding e-learning during the COVID-19 pandemic. A reasonable number of medical students responded to our survey during this healthcare crisis. The results revealed an acceptable level of knowledge, attitudes, and practices regarding e-learning, which evidences the usability of e-learning. The findings also highlight its potential to reach medical students and transform medical education training. However, a substantial percentage of respondents actually reported experiencing financial or technical difficulties when using e-learning platforms. Additionally, they were concerned about applicability of e-learning in clinical and practical aspect of medical education curriculum which is challenging.

Almost all the students reported that they owned a smartphone, while 88% had personal computers. These results support the need for smartphone applications that provide access to online learning and medical education lectures. Faculties and medical schools could support students by providing lectures as downloadable and easy-to-access resources. A recent study has revealed that medical students are interested in being part of the decision-making process relating to issues that may impact their education.<sup>9,10</sup>

Despite these challenges, the COVID-19 pandemic has had a positive impact on the faculty and students' acceptance of online education. Specifically, 67% of the medical students reported a positive impact of the pandemic on online learning.<sup>11-13</sup> Online delivery of courses has the potential to enhance student engagement, geographical accessibility, and synchronous/asynchronous learning and assessment.<sup>14-15</sup>

The pandemic has provided opportunities for staff to acquire skills in online pedagogy and digital media production while developing alternative modes of assessments and transferring principles of learning.<sup>16-17</sup> Medical educators should “learn from this experience and prioritize a forward-thinking and scholarly approach” to implement best practices and flexible approaches adopted in medical education around the world for an effective transition to online learning and assessment.<sup>18</sup>

We must remain optimistic as the medical education fraternity has accepted that “transition is inevitable” and has already started preparing to ensure that “transition can be smooth through resilient educational systems”.<sup>19</sup> In agreement with the other studies, our cohort reported several advantages, including the availability of all the recorded learning material on the intranet, saving commuting time, and the freedom to learn at their convenience and pace.<sup>20</sup>

Faculty and students had to adjust to the online environment. Other students were unhappy with the online learning experience. They wanted to return to conventional face-to-face education right after the pandemic. Most medical schools are preparing to transform the medical education from real classes to the virtual education to minimize the teaching and assessment disruption.<sup>21</sup> This is an opportunity for prospective doctors to review the curriculum, and in particular, to align themselves with the knowledge and abilities that they would use throughout their professions.

**Challenges:**

The study was based on a small sample of students who have anonymously provided feedback. Secondly, we had very short time to implement and hence a well-structured training program for faculty could not be done.<sup>22</sup> It has been established that the barriers to medical e-learning are due to time constraints, poor technical skills, poor infrastructure, lack of institutional strategies, and a general negative attitude towards the huge shift in education methods.<sup>23</sup>

Educators rely on audience interaction to guide content and topic emphasis based on apparent knowledge gaps. Motivated learners and educators will be tasked with providing technological support for those less savvy to overcome these barriers. Due to the focus on COVID-19 patients, this restricts the availability of bedside teaching opportunities for medical students.<sup>24</sup> Institutional adoption of e-learning ensures the alignment of new tools to the educational and economic context.<sup>25</sup>

#### Limitation-

The study may have limited generalizability. Despite these limitations, we believe the study provides relevant insights into the challenges facing online medical education in a time of healthcare crisis. Studies should be carried out with the planned online course content to evaluate the role of virtual medical training and the outcomes assessed.

#### CONCLUSION:

When used optimally and despite their inherent limitations, virtual tools can be used by both learners and educators to achieve a shared goal of providing effective and efficient medical education. This pandemic has provided educators with an unexpected opportunity towards innovations in medical education.

Implications for educators now include increased responsibility, a need to alter teaching style, curriculum planning, and assessment strategies; more meaningful and continuous communication; and better preparedness to learners of the digital age.

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