



**Research Article**

**A STUDY FOR THE ASSESSMENT OF KNOWLEDGE AND ATTITUDE OF DENTAL UNDERGRADUATE STUDENTS REGARDING E-LEARNING IN TIMES OF COVID-19**

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COVID-19, Dental Education, E-Learning, Pandemic, Traditional Learning.

**ABSTRACT**

**Aim:** The aim of the study was to assess the perceptions and preferences of the dental undergraduate students regarding e-learning during COVID-19 pandemic.

**Materials and Methods:** A 15-question validated survey was created and electronically circulated among all undergraduate students from first year through internship. The questions were related to their demographic data, knowledge, attitude and preference regarding e-learning. There were 274 responses from students who participated voluntarily. The data collected from their responses were statistically analyzed.

**Results:** Of the 274 respondents, 54 were males and 220 were females. A maximum response of 38.1% was recorded from fourth year students and minimum response of 5.8% from 1st year students. 59.9% of the students had good internet access. 56.6% of them preferred a combination of online and traditional learning. There was no difference in their perception on the basis of age, gender and clinical exposure.

**Conclusion:** The results indicate that the overall perception of students was in favor of e-learning with a preference for combination learning.

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**INTRODUCTION**

Corona virus disease 2019 (COVID-19) is an infectious disease caused by a novel virus also known as SARS-CoV-2. The virus originated from a seafood market place at Wuhan, China. The source of SARS-CoV-2 is unclear, but, previous analysis suggested bats as the main key reservoir. The main transmission pathways of coronaviruses are direct or indirect human contact, and viral droplets.<sup>1</sup> On March 11th 2020, the World Health Organization (WHO) declared the COVID-19 as a pandemic.<sup>2</sup>

The upsurge of COVID-19 has swiftly impacted the education system across the globe leading to the closure of educational institutions owing to public health measures like lockdown and social distancing implemented to prevent the transmission of the disease. To overcome the consequences of these measures, the institutions have made tremendous efforts to use the available technology to continue the education process by transitioning from face to face-traditional learning to distant online or e-learning.

The relevance of information technology's influence on our lives especially its utility in the education sector cannot be refuted.

It has particularly attained an important role in the academic forum considering the current persistent pandemic. The widespread use of smartphones, the internet and smart devices have also augmented e-learning among students. E-learning is defined as learning while "utilizing electronic technologies to access educational curriculum outside of a traditional classroom."<sup>3</sup> Students of this era are digitally literate, and highly interactive and thus e-learning would not be difficult to be imbibed in their educational courses.

Various reasons can be cited for the acceptability of e-learning like it saves time, reduces costs, allows students to learn anywhere at any time outside classroom, overcomes shortage of faculty, and has the aptitude to shift the learning process from passive teacher-centered learning to active learner-centered learning. Many universities worldwide are promoting it as a teaching method and is being widely appreciated by the learners.<sup>4,5</sup>

Since, e-learning is a fairly novel adaptation especially in developing countries, both the tutors as well as the students being accustomed to the traditional face-to-face teaching methods are not acquainted with the new virtual environment. The assessment of the students' analyses and perceptions of e-learning would be interesting to explore as well as to judge the effectiveness of e-learning. It also helps to contemplate on this experience to better prepare for Reemergence of COVID-19 or

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other crises compelling transition to Online teaching and learning.<sup>2,4,5</sup>

The aim of this study was to assess the perceptions and preferences of dental undergraduate students in our institution regarding e-learning during the COVID-19 pandemic.

**METHODOLOGY**

The study was conducted by the Oral medicine and Radiology department in our institution. This was an e-questionnaire based study. A total of 274 dental undergraduate students from the first year to internship voluntarily participated in this study.

**Research Questionnaire**

An online questionnaire was developed in Google form which was validated prior to the survey. The questions were compiled from similar researches obtained through literature search. The questionnaire comprised 15 closed- ended questions that included 9 Likert scale questions and 6 multiple choice questions. The first 3 questions were pertaining to the bio-demographic data which were limited to age, gender and year of study to preserve the anonymity of the participants. The next 9 questions were related to the perceptions of the students regarding e-learning that address the knowledge, attitudes and barriers faced by the students. The last set of questions was regarding the accessibility of internet, the time spent in e-learning and their learning preference.

The prepared e-forms were sent to all dental undergraduate students via a link created for the purpose and the estimated time to fill the survey form was less than 5 minutes. The participants were informed about the nature of the study and instructed to fill and send their responses online. The data collected from the responses were correlated and analyzed statistically.

**Statistical Analysis**

Chi Square Goodness of Fit test was used to compare the responses to the questions on perceptions of e-learning by the study participant. Mann Whitney Test was used to compare the mean scores for perceptions of e-learning based on gender and clinical exposure to students. Kruskal Wallis test followed by Mann Whitney post hoc test was used to compare the mean scores for perceptions of e-learning based on age and year of study. Chi Square Test was used to compare the responses to questions on internet facility, duration of E-learning & preference based on different age groups, gender and clinical exposure to students.

The level of significance was set at P<0.05.

**RESULTS**

The results show that of the 274 respondents, 54(19.7%) were males and 220(80.3%) were females with ages ranging from 18-26 years of which the number of students from first and second year were 16(5.8%) and 87(31.8%) with no clinical exposure. The number of students corresponding to third, fourth year and internship were 25(9.1%), 107(39.1%) and 39(14.2%) with clinical exposure. The study recorded a maximum response of 39.1%from fourth year students and minimum response of 5.8% from first year students.

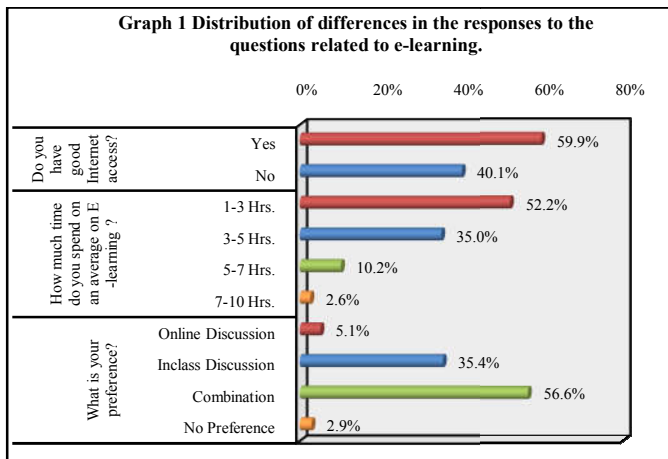
Table 1 reflects the responses to questions on the students' perceptions of e-learning. 54.7% of the students agreed with the fact that e-learning requires the students to be knowledgeable about the computers. 47.1% and 47.8% of them disagreed with the statement that e-learning leads to eye strain and more distraction correspondingly. Regarding the usefulness of procedural videos over traditional lectures, 32.1% were uncertain and 27.7% agreed with their usefulness.

**Table 1** Students' responses to questions on perceptions of e-learning.

**Table no. 1** Comparison of distribution of responses to the questions on perceptions of e-learning by the study participants using Chi Square Goodness of Fit test

Questions	Strongly Disagree		Disagree		Uncertain		Agree		Strongly Agree		χ <sup>2</sup> Value	P- Value
	n	%	n	%	n	%	n	%	n	%		
Do you think E-learning requires the students to be knowledgeable about computers?	6	2.2%	25	9.1%	51	18.6%	150	54.7%	42	15.3%	228.299	<0.001*
Do you think online learning leads to eye strain?	91	33.2%	129	47.1%	39	14.2%	10	3.6%	5	1.8%	210.818	<0.001*
Do you think students get more distracted during online lectures than traditional lectures ?	77	28.1%	131	47.8%	41	15.0%	19	6.9%	6	2.2%	185.27	<0.001*
Do you think the procedural videos are more helpful than live demonstrations?	14	5.1%	58	21.2%	88	32.1%	76	27.7%	38	13.9%	64.029	<0.001*
Do you think there is less student-teacher interaction ?	52	19.0%	139	50.7%	44	16.1%	31	11.3%	8	2.9%	181.949	<0.001*
Do you think the online assessment permits faster feedback on test performance than traditional paper-based testing ?	16	5.8%	101	36.9%	110	40.1%	34	12.4%	13	4.7%	161.803	<0.001*
Do you think online assessment can provide students with opportunity to cheat?	37	13.5%	118	43.1%	78	28.5%	29	10.6%	12	4.4%	134.066	<0.001*
Do you think the radical change to online learning can lead to loneliness, anxiety and even depression?	44	16.1%	113	41.2%	75	27.4%	30	10.9%	12	4.4%	116.036	<0.001*
Do you think in the present scenario with COVID -19 E-learning is the best mode of learning?	47	17.2%	130	47.4%	60	21.9%	25	9.1%	12	4.4%	154.431	<0.001*

50.7%, 43.1% and 41.2% students disagreed with the corresponding statements that e-learning leads to less teacher-student interaction, gives opportunity to cheat and leads to loneliness. 40.1% of them were uncertain if the online assessment feedback was faster than traditional testing. On the question whether e-learning is the best mode of learning in the present scenario with COVID-19, surprisingly 47.4% of the respondents did not concur with the statement. Overall, these results were majorly in favor of e-learning with statistical significance ( $p < 0.001^*$ ).



Graph 1 Responses to questions on internet access, time spent on e-learning and learning preference.

Graph 1 shows the responses to the last set of questions in which 164(59.9%) of the students assert that they have good internet access. About 143(52.2%) students spent 1-3 hours on an average on e-learning. With regard to the continuing education, 56.6% (155) of them preferred a combination learning modality over others. On statistically comparing the mean scores for the perception of e-learning, there were no significant differences on the basis of age, gender and clinical exposure of the students.

## DISCUSSION

Dental students these days are from the futuristic generation, are familiar with e-learning and online resources and are also adapting to new learning modules without hesitation. E-learning requires the students to have easy access to good internet services and knowledge about the computers and technical skills. Our study shows that 59.9% of the students had good internet access and 54.7% agreed that it is required of them to be knowledgeable about the online tools. The findings are lower than the findings of a study conducted in Saudi Arabia by Moshabab A. Asiry where 77.8% of the students had good internet access.<sup>4</sup> Alka Gupta *et al.* from Nepal reported that 68.8% of their students had good internet access.<sup>6</sup> These inconsistencies could be attributed to the quality of internet connection, speed of internet and internet traffic in different regions.

The student-teacher interactions seem to have a direct impact on the endorsement of the learning modality. Students like to take up their doubts and queries to their teachers for clarifications regardless of the mode of learning. E-learning provides the right platform to share ideas and increases the interaction between students and instructors. The present study exhibited that 69.7% (50.7%-disagree, 19%-strongly disagree) students opined that e-learning does not reduce the student-teacher interaction. This was in contrast with the study by

Rupandee *et al.* in which about 54.3% of students felt that e-learning has reduced their interaction with teachers.<sup>7</sup> Another study by SaharAbbasi *et al.* reported that 84% students perceived that it leads to less interaction.<sup>5</sup>

Following transition to e-learning, there is evidence of decrease in concentration span of students and the instructors find it difficult to keep the learners focused and engaged. According to a study by Fatemeh Amir Rad *et al.*, to gain the attention of the students and to make the online sessions more interesting, the instructors resorted to question and answer sessions, discussions and quizzes that encouraged collaborative learning.<sup>2</sup> Our study shows that 75.9% of the students disagreed that they get distracted during online lectures. The results are in contradiction with a study by Alka Gupta *et al.* who reported that 76.9% students believed the online learning leads to distraction.<sup>6</sup>

It has been noted that students are spending more time to access online tutorials on various platforms. In our study, it was noted that 52.2% of the students spent 1-3 hours and 35% spent 3-5 hours on an average daily on e-learning. Ilser Turkyilmaz *et al.* conducted their study during non-COVID times and observed that 40% of the students spent < 1 hour and just 25.9% spent 1-2 hours on e-learning.<sup>3</sup> Whereas, Alka Gupta *et al.* who conducted their study during the pandemic noted that 44% of their students spent 1-3 hours on an average daily on e-learning.<sup>6</sup> This highlights the fact that there is a gradual increase in the time spent for this purpose owing to the pandemic.

E-learning provides the students with access to procedural videos which enable them to practice their skills before executing on patients. Regarding their usefulness, our study shows that 41.6% (27.7%-agree, 13.9% strongly agree) respondents perceived that procedural videos are more useful than live demonstrations. These findings were in accordance with but significantly lower than those found by Maoshabab A. Asiry who reported that 64.8% (37%-agree, 27.8%-strongly agree) of the students were in agreement with the same.<sup>4</sup>

Digital screens can be harmful by radiating short high energy waves that cause damage to the retinal cells. As the duration of usage of devices is ever increasing, especially in young people, there is increased risk of eye fatigue or asthenopia which in turn can affect the attention and performance of students academically. According to a study by Huseyin Kaya, it was observed that the eye health of the university students was negatively affected by e-learning during pandemic.<sup>1</sup> However, in our study 47.1% of the students differed in this regard and did not agree that e-learning leads to eye strain.

According to ErenBilen and Alexander Matros, many universities reported widespread cheating during online examinations. It was noted that Google searches on keywords related to exam topics exactly correlated with the time of the examinations.<sup>8</sup> In our study, 58.6% (43.1%-disagree, 13.5%-strongly disagree) of the respondents disagreed that e-learning gives an opportunity to cheat.

The students have been affected by the pandemic, leading to isolation, lack of motivation and negative attitudes towards online learning. Mohammad H. Rajab *et al.* in their study analyzed and reported that 48% of the respondents exhibited pandemic related anxiety and stress.<sup>9</sup> Contrastingly, only 15.3% of our study participants agree that e-learning leads to

loneliness, anxiety and depression. On the other hand, a study was conducted by AidosK. Bolatov *et al.*, who noted that the mental health state of medical students actually improved during online learning, despite the severe conditions of the pandemic.<sup>10</sup>

Several studies have addressed the future learning preferences of students and found myriad results. Our study shows that 56.6% of the students prefer a combination of online and in-class discussions. The results are in congruence with studies conducted by S. Ramlogan<sup>11</sup> and Mohammad H. Rajab *et al.*<sup>9</sup> where 97% and 62.5% of the students correspondingly preferred blended learning. The results of our study were however in contrast with studies conducted by Sahar Abbasi *et al.* and Rupandeep *et al.* wherein 85% and 69.6% of the students correspondingly did not prefer online lectures.<sup>5,7</sup>

## CONCLUSION

Overall, there was evidence of a positive perception of the transition to e-learning among the dental undergraduates. The students support the use of e-learning to compliment the traditional methods. The pandemic has brought new challenges to the dental institutions. It has also given an opportunity to the institutions to incorporate newer strategies to be better prepared for any such occurrences in future ensuring seamless continuation of education. Considering the positive feedback on e-learning, it may be recommended to be included in the regular dental curriculum to enhance students' learning and to be contemporary.

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