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Attitude and perception of dental students towards computer-mediated learning during COVID-19 pandemic in Central India

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Abstract---Context: Due to emergence of COVID-19 pandemic, educational institutions were ordered to be closed to protect students from viral exposure. The mode of teaching had to be shifted from face-to-face to digital learning to complete the prescribed syllabi in a stipulated time period. Aim: This study aimed to assess the attitude and perception of undergraduate dental students towards computer-mediated teaching during COVID-19 pandemic. Settings and Design: After obtaining informed consent, a questionnaire study was conducted online using Google Forms among undergraduate students of dental colleges in Central India. Methods and Material: A standard pre-tested questionnaire in English was used, which consisted of 3

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parts. The first part recorded demographic data, second part evaluated learning and third part assessed the attitude of the students to computer-mediated learning. Statistical analysis used: 1045 students participated in the study. Learning and Attitude Score was calculated and mean score was compared between groups using ANOVA. Results: Most of the students (above 80%) believed the modern education is inconceivable without computer technology. However, only about 30% believed that such teaching can substitute traditional way of learning. Those with advanced skills in computers reported to have better experience with computer-mediated learning ($p<0.05$). Conclusions: Dental education involves both theoretical and practical training. Due to pandemic situation, theoretical training was continued using computer technology. The practical training was severely disturbed. It is important to understand how students coped with teaching during the pandemic. Further studies are required to make recommendation and develop methods so the students are trained well during such a crisis situation that may happen in future.

Keywords---COVID-19, dental education, computer-mediated learning.

Introduction

The entire world came to a standstill with the emergence of coronavirus disease (COVID-19) in Wuhan, China in December 2019. On 30 January 2020, the WHO declared the COVID-19 outbreak as the sixth public health emergency of international concern. Therefore, health workers, governments and the public needed to cooperate globally to limit its spread[1]. The mode of transmission may be either direct contact or airborne droplets, particularly higher in crowded places such as educational institutions. Strict recommendations were imposed by the United Nations Educational, Scientific and Cultural Organization (UNESCO), Office of the United Nations High Commissioner for Human Rights (OHCHR), the International Federation of the Red Cross and Red Crescent Societies (IFRC) and WHO[2,3]. This enforced closure of all educational institutions in India which impacted students drastically. A nation-wide lockdown was imposed by the Union Government for 21 days from 25th March 2020, which was later extended for 19 more days. It was a challenge for the dental colleges to continue the academic curriculum in the middle of lockdown and social distancing measures. A holistic approach towards the academic realm was endorsed which included the main motto of distant online learning and various education delivery policies. Therefore, computer-mediated learning was adopted abruptly as a means for continuing the dental teaching.

Dentistry is an amalgamation of three fundamental components: theory, laboratory and clinical practice. This traditional triage limits the implementation of e-learning strategies in dental education[4]. A blended system of education would be most appropriate for the undergraduates of the dental academic realm as computer-mediated learning cannot be an ideal medium for learning practical skills in dentistry[5]. However, in crisis period, theoretical learning could still be

continued with online teaching. The most important aspect is the perception of dental undergraduates to know how efficient they feel after perceiving the knowledge through such a medium of learning, especially in Indian scenario where technical constraints like suitability of devices and bandwidth availability poses a serious challenge. Several studies have been conducted to evaluate the attitude and perception of dental students towards online teaching in normal situations, but assessment of the same during period of crisis is new for the world as such situations may be associated with anxiety and depression due to compulsory social restrictions. This questionnaire-based survey was therefore conducted to assess the attitude and perception of undergraduate dental students towards computer-mediated teaching during COVID-19 pandemic outbreak in Central India.

Subjects and Methods

Study Design

A questionnaire-based online survey was conducted using Google Forms among undergraduate students of dental colleges in Central India. Students were informed about the purpose of the study in the welcome screen and those giving consent completed the questionnaire.

Design of the questionnaire

A standard pre-tested questionnaire in English was used, which consisted of 3 parts. The first part recorded the demographic data, the second part evaluated the learning and the third part assessed the attitude of the students to computer-mediated learning.

Sample Size

Indore is a city in Central India which has 5 dental colleges. Representatives from each college circulated the google form link among the students of dentistry via WhatsApp since all students were using the same for joining class. Thus, convenience sampling was employed. A total of 1045 students participated in the study.

Statistical Analysis

Response to each question was represented as frequency and percentage. The mean learning and attitude score was calculated by adding the positive responses. The mean learning and attitude score was compared between the groups using Analysis of Variance (ANOVA). The alpha error was set at 5% and p value less than 0.05 was considered statistically significant. SPSS for windows version 24.0 was used for analysis.

Results

Although 825(81.1%) students reported that modern education is inconceivable without computer technology, only 328 (31.9%) believed that CML can substitute

for traditional ways of learning (Table 1a). 643 (63.0%) found group discussion and assignments useful, while 833(82.2%) found websites helpful for learning. 905 (87.7%) reported to have daily internet connection and 704 (70.0%) thought the institutional support was adequate for CML. 629(62.4%) reported adapting well from traditional to CML and 919 (89.6%) agreed to combining both methods for better education (Table 1b). There was no difference between males and females with respect to Learning and Attitude Scores (p=0.165 and p = 0.598 respectively) (Table 2). There were statistically significant differences in the mean learning and attitude scores with minimum for 1st year BDS students and maximum for Final year BDS students (p = 0.039 and p = 0.024 respectively). Although there was no statistical difference in the learning score between students with different levels of skill in computer (p=0.122), there was a statistically significant difference in the attitude score (p = 0.047).

Table 1a

Questions related to Learning Evaluation	Response	Percentage
Do you think computer-mediated learning methods achieved the expected learning objective	496	48.2%
Do you think that computer-mediated learning can substitute for traditional ways of learning	328	31.9%
Watching videos during class makes me feel sleepy	578	56.6%
Online tutorials helped me to get involved in and understanding computer-mediated learning	774	76.0%
Modern education is inconceivable without computer technology	825	81.1%
Computer-mediated learning provides the possibility of easier communication with my lecturers and colleagues	586	57.5%
Group discussion and assignments in the e classrooms make me think more about the topics	643	63.0%
Websites help my learning	833	82.2%

Table 1b

Questions Related to Attitude towards Learning	Response	Percentage
I have internet and daily internet access	905	87.7%
Social media helped me during computer-mediated learning	708	69.4%
Virtual communication with my colleagues and professors through Google classrooms and other platforms is boring. I would like to communicate with them in person	298	29.1%
The lectures that have been given during e-courses were more useful than traditional lectures	313	30.6%
It is better to combine computer-mediated learning and traditional learning in the education process	919	89.6%
Online lectures need further improvement to support the learning process	919	90.0%
I believe that the institutional technical support is	704	70.0%

adequate for me to adopt computer-mediated learning		
I access the internet on a daily basis to check updates and announcements	928	91.4%
I have been adapting well to the shift from traditional learning to computer-mediated learning	629	62.4%

Table 2

			Learning Score			Attitude Score		
		n	Mean	SD	ANOVA Test p Value	Mean	SD	ANOVA Test p Value
Gender	Female	771	4.90	2.23	p = 0.165 Not Sig	6.07	1.79	p = 0.598 Not Sig
	Male	274	4.68	2.33		6.00	2.03	
Year of study	1st Year	246	4.70	2.34	p = 0.039 Sig	5.94	1.90	p = 0.024 Sig
	2nd Year	265	4.66	2.25		5.85	1.79	
	3rd Year	285	4.86	2.18		6.13	1.76	
	Final Year	243	5.18	2.23		6.31	1.92	
How would you describe your skills in using the computer?	Basic	325	4.73	2.42	p = 0.122 Not Sig	5.88	2.00	p = 0.047 Sig
	Intermediate	592	4.85	2.17		6.13	1.73	
	Advanced	122	5.22	2.13		6.31	1.75	
	Fair Experience	815	4.90	2.16		6.10	1.73	
	Advanced Experience	73	5.68	2.50		6.86	1.88	

Discussion

Due to the emergence of an unexpected pandemic COVID -19, all educational institutions across the globe were ordered to be closed to check the transmission of virus particularly in crowded places like educational institutes. The mode of teaching had to be suddenly shifted from traditional classroom teaching to computer-mediated learning. It was a challenge for the dental colleges as the shift was abrupt and the institutes did not have time to design and adopt the course contents for online mode. Also, teachers were not trained in application of virtual strategies which they hadn't used before. Thus, it is very important to consider the attitude and perceptions of learners while designing the online classes to make the learning experience easy, effective and productive. Thus, this questionnaire study was done to evaluate the different aspects of computer-mediated learning among the dental students during the COVID-19 outbreak.

The present study showed that almost 80% students believed that modern education is inconceivable without computer technology. However, less than half of the students felt that computer-mediated learning achieved the expected learning objective. Also, only 31% students felt that computer-mediated learning can substitute for traditional classroom method. This is in agreement with previous study conducted among dental students in 3 Iraqi universities during COVID-19 outbreak[6].This can be attributed to the fear and anxiety due to the

pandemic and the technological constraints they faced during the online classes. The negative experience of more than half the students can be attributed to the fact that online classes could only cater to theoretical part of the learning with the practical exposure completely missing.

The role of gender in relation to the positivity and acceptance towards computer-mediated learning was not found to be significant in the present study. This is in agreement with previous studies done among dental students[5,7]. However, it runs contrary to the study done among dental students of 3 Iraqi universities[6]. Furthermore, this study showed that the students of final year showed significantly higher acceptance and satisfaction towards online teaching compared to the first-year students. This is in concordance with a previous study where a higher year of study positively influenced the e-learning[6]. This can be attributed to the fact that students in higher year of study benefit from their past knowledge and experience and have overcome the initial barriers of discomfort in using technology. Also, students in higher year of study have become increasingly aware over years that technology can be beneficial in acquiring specific clinical knowledge and skills[7,8].

Attitude towards computer-mediated learning was significantly more positive for students having higher level of computer skills. This is in line with previous studies and can be due to the fact that advanced computer skills enhance their dexterity in using different platforms and applications[6,7]. In the present study, although more than half of the students felt that they have adapted well to the shift from traditional classroom learning to computer-mediated learning. More than 90% of the students felt that there is a need for further improvement of online lectures to compensate for the lack of physical presence and face-to-face interaction of classroom teaching . Furthermore, 90 % of them agreed that the best approach towards effective learning is to combine computer-mediated learning and traditional learning. The results are in agreement with previous studies where students have supported integrated learning method[5-9].

Almost 90% of the students had daily access to internet and felt that use of social media helped them during computer-mediated learning. More than half of the students felt that website, online tutorials and live group discussions are factors that significantly helped them in understanding computer-mediated learning better. However, watching videos alone was not beneficial. This is in agreement with the previous studies[6,7]. There were certain limitations of this present study. The sample used was convenient sample with different gender distribution from undergraduate students of dental colleges of Central India. Also, in the present study, only dental undergraduate students were assessed. Further study can be done among postgraduate students to assess their attitude and perception towards computer-mediated learning.

Conclusion

The present study concluded that students do not have the same learning styles and attitude towards e- learning. Integrated learning is more likely to be effective and accepted by dental students than either traditional classroom teaching or e-learning alone. The present study has highlighted the need for improving the

computer knowledge and skills among the dental students and teaching faculty to make the learning easy, effective and productive. It will also prepare them for any such future crisis situation.

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