

# Perception and Knowledge about Digital Dentistry among Dental Students – A Cross-Sectional Study in Chennai, Tamil Nadu

Niveda Balakrishnan<sup>1</sup>, V Samuel Santha Kumar<sup>1</sup>, R Ganesh<sup>2</sup>

<sup>1</sup>Intern, Department of Public Health Dentistry, Priyadarshini Dental College and Hospital, Thiruvallur, Tamil Nadu, India, <sup>2</sup>Professor, Department of Public Health Dentistry, Priyadarshini Dental College and Hospital, Thiruvallur, Tamil Nadu, India

## ABSTRACT

**Background:** Technology today is promoting a better interprofessional communications which can help doctors, patients and the masses as a whole. When these technological advancements have been put to a good use, major milestone in medicine and dentistry can be achieved. Teledentistry is a combination of telecommunication technology and dental practice which shows a potential to enhance diagnosis and related treatment. This study investigates the current knowledge about technology and learning methods using the internet among dental students.

**Purpose:** The purpose of the study was to determine the willingness of undergraduate dental students to use digital and electronic technologies in the field of dentistry.

**Materials and Methods:** A cross-sectional survey was conducted among 356 dental students in Chennai, India. A questionnaire was prepared to assess the knowledge about digital dentistry and was circulated among students in dental colleges. The data thus collected were statistically analyzed and results obtained.

**Result:** A total of 356 students responded to the questionnaire. Among them 46% were males and 56% were females. 93% of the students agreed that the use of Internet and other technologies were popular, among dental students and 45% of students knew that teledentistry allows interactive programs and live consultations with the help of videoconferencing.

**Conclusion:** According to this study, there is an unbalanced knowledge about digital dentistry among dental students. Hence, there is a need of awareness programs to instill positive attitudes.

**Key words:** Dental students, Digital dentistry, E-books, Technology, Teledentistry

## INTRODUCTION

Health care has changed dramatically with the era of computers and telecommunication.<sup>1</sup> The rapid development in computer technology and the wide availability of personal computers together with the internet, email, and various medical literature retrieval application have changed both study and the practice environments in dentistry as in other disciplines. Electronic learning allows students to work at their own time and pace.<sup>2</sup>

Computer-assisted learning (CAL) in dental education first emerged in 1971 with its introduction at the University of Kentucky. CAL has been used along with other advances in information and communication technology.<sup>2</sup> This prevalence of

technology plays a keen role in introducing digitally published lectures and course material which helps students to be updated with the current trends in dentistry.

There is also an increasing interest in “teledentistry” in recent times.

Teledentistry is a fast advancing branch which is an effective combination of telecommunication and dentistry involving the exchange of clinical information and images over remote distances.<sup>3</sup> Cook in 1997 defined “teledentistry” as the practice of using videoconferencing technologies to diagnose and provide treatment over a distance.<sup>1</sup> It can be greatly utilized with rural communities or those of underserved populations. Teledentistry would increase the accessibility of specialists,

### CORRESPONDING AUTHOR:

Dr. Niveda Balakrishnan,  
No. 213, Sri Sai Illam, Meenakshi Nagar, Bagalur Road, Hosur, Krishnagiri - 635 103, Tamil Nadu, India.  
E-mail: nive28jya@gmail.com

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besides decreasing time and cost associated with specialty consultations. It can be used in every branch of dentistry and is successful in helping treat children with special needs.

To inculcate the knowledge and practice of teledentistry in the future generation of dentists, it is important to assess the awareness of these dental students toward technology. Hence, this study was conducted among dental students in Chennai to know the knowledge and awareness levels regarding information technology and teledentistry.

## MATERIALS AND METHODS

A cross-sectional study was conducted among dental students of Chennai, India, in the month of January 2016. There are about 15 dental colleges in Chennai (approved by Dental Council of India) out of which four colleges were randomly selected for this study.

The study was approved by the institutional review board, and the permission to conduct the study was obtained from the Ethical Committee of Priyadarshini Dental College and Hospital.

The estimated sample size for the study was 356 determined by "G" power statistical software based on 80% power with an alpha error of 0.05.

An official permission was obtained from the principals of respective dental colleges for data collection. Undergraduate dental students from the 1<sup>st</sup> to 5<sup>th</sup> year were selected as the subjects of this study. A self-administered structured questionnaire consisting 15 closed-ended questions was developed, and a pilot survey was conducted with a convenient sample of 10 dental students. They were interviewed to gain feedback on the overall acceptability of the questionnaire. Based on their feedback the questionnaire did not require any correction. The items in the questionnaire concerned computer access, computer skills and training, internet access, and activities involving teledentistry. The questionnaires were distributed to the students after their lecture class and retrieved immediately in 15 min.

Participation in this study was voluntary and information on gender, age, and year of study was requested in the questionnaire. They were asked to fill out the questionnaires based on their own experience and insights.

A total of 356 completed questionnaires were returned, and seven questionnaires were incomplete which was not subject to analysis. Completed questionnaires were coded using windows excel and were subjected to statistical analysis using Statistical Package for the Social Science Software version 21 (IBM SPS Statistics) and descriptive statistics like number, percentage were calculated for the collected data. Mann-Whitney test, a nonparametric test was used to find out the significant difference between gender and access the perception and knowledge about information technology and teledentistry among dental students.

## RESULTS

An overall response rate of 80% (356 out of 370) was obtained. Among them 163 (46%) were males and 193 (54%) were females. Individual response rates for the 1<sup>st</sup> to 5<sup>th</sup> year were 77 (22%), 68 (19%), 59 (17%), and 84 (24%). The age group of

the participants ranged from 18 to 24 years. Figure 1, shows the frequency of usage of internet for academic purposes. Figure 2, shows the features of computer used by the study subjects. Figure 3, shows the benefits of using E-textbooks. Table 1, shows the knowledge about teledentistry among the study subjects.

## DISCUSSION

This study surveyed the current knowledge and opinions of dental students in Chennai with respect to information technology and teledentistry.

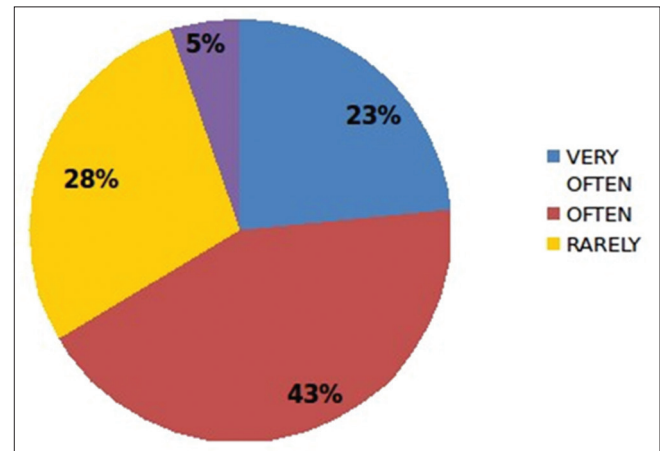


Figure 1: Frequency of usage of internet for academic purposes

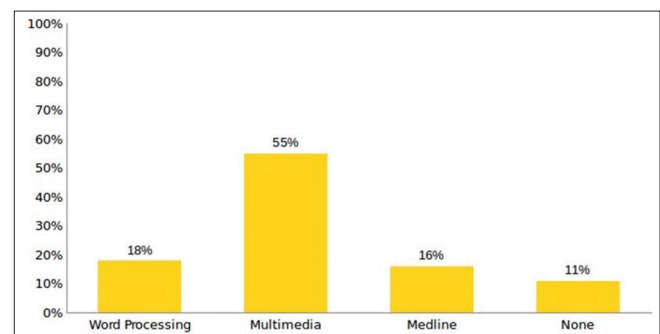


Figure 2: Various features of computers used by the study subjects

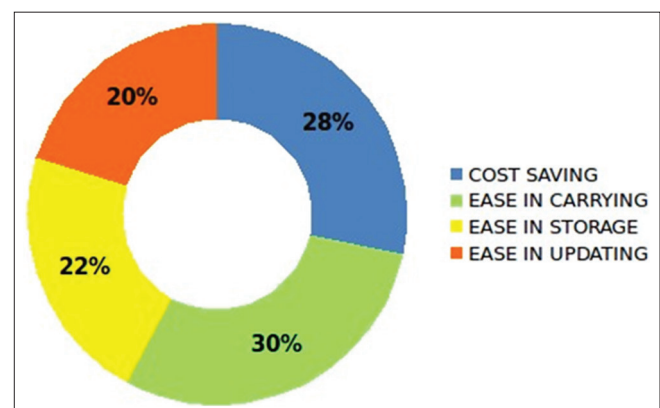


Figure 3: Benefits of using E-textbooks

**Table 1:** Knowledge about teledentistry among dental students

Variables	Frequency n=356 (%)
"Teledentistry" allows interactive programs and live consultations with the help of videoconferencing	
a) Agree	160 (45)
b) Disagree	67 (19)
c) Not sure	126 (35)
What do you think about the information and technology skills of dentists to practice teledentistry?	
a) They require basic training	204 (57)
b) They have to do special courses	89 (25)
c) No, they don't require training	50 (14)
Lack of face-to-face interview with the patient is an obstacle for teledentistry?	
a) Yes	180 (51)
b) No	79 (22)
c) May be	94 (27)
In India, major challenges for teledentistry are lack of knowledge toward technology?	
a) Agree	197 (56)
b) Neutral	119 (33)
c) Disagree	36 (10)

Information technology is a fundamental change which is taking place in the current generation. It has not only revolutionized man's way of working but also his very own existence. The introduction of technology into health care has been playing a significant role in helping doctors and other health-care workers. Internet sites containing clinical, histopathological and radiographic data create an environment for students to study at their own pace.<sup>4</sup> It is also an essential ingredient for state of the art patient care. Dentists must stay current with this rapidly developing field to make appropriate choices in their use of technology.<sup>5</sup>

The use of internet in dental education and their potential use as an educational tool was selected as a study, to acknowledge the computer skills of dental students.

In the survey reported here, the respondents felt that digital and electronic technologies were useful for most aspects of dental practice. About 93% of dental students agreed to the fact that the use of Internet and other technologies were popular, among dental students in Chennai which is less when compared with Rajab and Baqain<sup>2</sup> study among dental students of Jordan (100%). The reason for a lesser percentage is that the students of Jordan were provided with E-readers. 46% of students in this study were fairly confident with regard to the accuracy of information given in the internet.

Usage of E-textbooks and other online lectures was not so popular as 36% of students were not sure if it would support their learning better than a traditional printed textbook and 47% of them preferred a PowerPoint presentation during theory classes, where as 37% of students wanted both an extempo and a PowerPoint presentation. In this study, the most common technical advancement the students have come across was digital radiography (32%) and digital photography (23%), which is less when compared to Flores *et al.*<sup>6</sup> study among Canadian

students. This shows that the Canadian dental students were provided with a better technological equipment's and were frequently allowed to use than the students of this study.

Using emerging innovations in technology "telemedicine" is providing the tools to deliver health care at a distance regardless of the location of the patient and their providers, enabling access to the right care, at the right place, and at the right time.<sup>7</sup>

This cross-sectional questionnaire study has also covered teledentistry which is a dynamic technology evolved from telemedicine. The first entity to put teledentistry into practice was the Army, which in 1994, successfully undertook consultations between dentists and service personnel located more than 100 miles apart.<sup>8</sup> It allows collaboration by multiple practitioners and also supports videoconferencing, through e-data.<sup>1</sup> Teledentistry harnesses the real-time capability of modern telecommunications to allow offsite dentists of any specialty to assist their colleagues in providing care.<sup>9</sup> General dentists will send multimedia patient records to dental specialists, often enabling the specialist to make a diagnosis and develop a treatment plan without having to see the patient in person.<sup>10</sup> It also requires gadgets like smart phones and smart media which is apparently, used more by the younger generation. 51% of students felt that teledentistry must be introduced to rural areas in India where there are no proper dental clinics, 23% of students were not sure about introducing teledentistry in rural areas and this is less when compared with Ramesh *et al.*<sup>1</sup> study about teledentistry among dental students in Udaipur. This might be due to the fact that the students were aware that rural areas in Udaipur needed mobile dental clinics along which would help in introducing teledentistry.

The obstacles that impede the acceptance of digital and electronic technologies in India include cost, lack of comfort with technology, software incompatibility, and unclear guidelines. Dentists are sensitive to some of these potential obstacles, but the future generation of dentists is willing to meet these challenges and incorporate these new approaches of technology into their dental practices.<sup>2</sup>

## Recommendations

In the view of findings from this study, the following ideas can be recommended. Online Medical Library or lectures can be made available in the colleges which can help the students to be updated with the new trends in dentistry.

Mobile dental clinics can be set up in rural areas so that introducing any dental care service with technology will be helpful.

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