

Original Research Article

Knowledge and attitude towards tele-dentistry among undergraduate dental students in Davanagere city: a cross-sectional survey

Veeresh Dummi Jaisubash, Puja C. Yavagal*, Spandana D. Vijaykumar, Srinidhi Nayak Ullal, Vaibhavi R. Baliga, Varsha Chandrahas Shetty, Vidyashree Halamurthy

Department of Public Health Dentistry, Bapuji Dental College and Hospital, Davanagere, Karnataka, India

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*Correspondence:

Dr. Puja C. Yavagal,

E-mail: pujacyavagal@gmail.com

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ABSTRACT

Background: Knowledge and attitude of undergraduate students towards tele dentistry may influence the use of digital dentistry in the future. To assess the knowledge and attitude towards tele-dentistry among undergraduate dental students in Davanagere City.

Methods: A cross-sectional questionnaire survey was conducted in the dental college setting involving a sample of 210 dental undergraduate students in Davanagere city. A pre validated 29 items questionnaire (Cronbach's coefficient 0.86, Mean Content Validity Ratio (CVR) 0.89) was used to collect data with responses on 3-point Likert Scale

Results: The mean age of undergraduate students was 22.36 ± 1.12 years. Around 45.6% of the participants had good knowledge regarding the concept of tele-dentistry and its application in the health sector. The majority of the participants had a favourable attitude towards using tele-dentistry in the future and considered that tele-dentistry could increase the accessibility of the specialists to rural areas and could save time.

Conclusions: The undergraduate dental students in Davanagere City had fair knowledge about tele-dentistry and a favourable attitude towards tele-dentistry.

Keywords: Attitude, Knowledge, Oral hygiene practices, Tele-dentistry, Undergraduate dental students

INTRODUCTION

With the introduction of new technology and connectivity, the healthcare industry has been undergoing significant change. Thus, the terms "telemedicine," "telehealth," and "e-health" were born. The phrase "telemedicine" comes from the Latin word "mederi," which means to heal and the Greek word "tele," which means distance.¹⁻³ In a similar vein, the advent of tele-dentistry and the options it offers are also revolutionizing the dental field.

Combining dentistry and telecommunication is known as tele-dentistry.³ "The practice of using video conferencing technologies to diagnose and provide advice about treatment over a distance" is how Cook (1997) described

tele-dentistry. It makes use of computers, cameras, printers and the Internet to transmit health information, consultations, diagnoses and treatment plans outside of a dentist office setting.^{1,4} Professionals from various locations can speak with one another in the least amount of time and help one another with diagnosis, treatment and education by using tele-dentistry.

Moreover, tele-dentistry is advocated as one of the emergency measures for coping with the COVID-19 pandemic and studies have demonstrated that both dentists and patients feel more secure using tele-dentistry to minimize non-essential interaction during the pandemic.⁶ Around the world, tele-dentistry has been practiced in a number of developed nations. Its application in India is, nevertheless, very restricted.

Dental professionals may not be aware of its application in their regular work, which could be the cause of this.⁷ Similarly, dental students' attitudes and expertise can have a significant impact on how they use tele-dentistry in their future professions. Therefore, a study was designed to evaluate the undergraduate dental students in Davangere City's knowledge and attitudes regarding tele-dentistry.

METHODS

Study design and setting

The study was a descriptive, cross-sectional questionnaire survey conducted in a college setting. The objective of the study was to assess the knowledge and attitude towards tele-dentistry among dental students in Davangere City, using a questionnaire. Study subjects comprised undergraduate dental students (final year BDS and interns) studying in two dental colleges in Davangere city. The study was conducted at the dental college premises.

The study sample consisted of all the undergraduate final-year dental students and interns available on the day of data collection and fulfilled the eligibility criteria. The study was carried out between January 2024 to June 2024. Ethical clearance was obtained from the Institutional Review Board of Bapuji Dental College and Hospital, Davangere. Voluntary informed consent was obtained from the study participants prior to the start of the study after informing them about the research details through a participant information form.

Method of data collection

Data was collected using a structured proforma containing provisions to record demographic profiles (name, age, sex and year of study) and a pre-validated questionnaire to record knowledge and attitude towards tele-dentistry. Pre validated questionnaires (Cronbach's coefficient 0.86, Mean Content Validity Ratio (CVR) 0.89) were adopted from a study done by Alipour et al which contained 29 closed-ended questions, among which there were 12 questions assessing their knowledge and 17 questions that were attitude related. The responses labelled as 2- agree, 1- neutral and 0- disagree were on a 3-point Likert scale.

The objectives of the study were explained and informed consent was obtained from the participants by the investigator before the start of the study. The validated questionnaire was provided to the dental students in the respective classrooms and 10-20 minutes of time was given to them to complete the questionnaire. Participating dental students were instructed not to discuss among themselves while answering the questionnaire. Care was taken to prevent any influences. The completed questionnaire was collected back on the same day by checking its completeness.

Statistical analysis

Data obtained was compiled systematically in a Microsoft Excel spreadsheet and a master table was prepared and was analysed using SPSS software version 20. Descriptive statistics were generated in terms of frequency and percentages.

RESULTS

The study involved 210 undergraduate dental students in total. Students were 22.36 ± 1.12 years old on average. The average daily usage of a mobile phone is 5.38 ± 2.36 hours. Seventy percent of the participants were female and fifty-four percent were interns. The demographic information of research participants is displayed in table 1. Out of the 210 students, 100 (47.6%) were aware of the concept of tele-dentistry, its application in the medical field and its benefits. More than 50% of respondents said that tele-dentistry is not a face-to-face interview and that it would be beneficial to consult with an expert. They also agreed that tele-dentistry is the practice of using computers, the internet and intraoral camera technologies to diagnose and provide advice and treatment over distance.

Tele-dentistry is also good for primary care dentist training and dental education conducted online. About 50.5% of respondents believed that tele-dentistry was helpful for monitoring their patients' oral health and for educating novice dentists. Regarding whether tele-dentistry can be used in all areas of dentistry, 42.9% of respondents expressed no opinion. About 51.9% of respondents said that tele-dentistry may be included in their dental services and could help increase access to oral health care. Around 45.7% of respondents were in favor of tele dentistry's expanded career options for dental personnel, while 49% were neutral about its use. About 46.2% of respondents were neutral about the accuracy of dental exams conducted using computers and intraoral cameras in comparison to typical office settings and 47.6% were neutral about the function that tele-dentistry plays in understanding and monitoring patients' oral health issues over the internet. About 49.5% of respondents had the opinion that tele-dentistry would be a convenient method of providing oral health care and that parents and kids would be open to having dental exams conducted with computers and intraoral cameras.

About 51.9% of respondents responded that tele-dentistry might be used as a supplement to routine oral health care and as a way to cut down on medical travel and save dentists' time. Regarding the lower cost and greater accessibility of the specialist to underserved and rural regions through tele-dentistry, almost 46.7% of respondents expressed no view. About 59% of respondents agreed that tele-dentistry enhances diagnostic abilities and dentists' knowledge and they said that the primary obstacles to tele-dentistry were a lack of infrastructure and awareness.

Table 1: Demographic data of study participants.

Demographic data		Number	%
Gender	Male	63	30
	Female	147	70
Educational qualification	Final year	100	47.60
	Interns	110	52.40
Mean age in years		22.36±1.12	
Mean usage of mobile phones		5.38±2.36 hours per day	

Table 2: Responses to questions related to knowledge and attitude related to tele-dentistry among undergraduate dental students.

S. No	Questions	Agree	Neutral	Disagree
1	I am familiar with the concept of tele-dentistry	100 (47.6%)	82 (39%)	28 (13.3%)
2	I know about tele-dentistry in the health sector	96 (45.7%)	86 (41%)	28 (13.3%)
3	I know the advantages of tele-dentistry Technology	100 (47.6%)	77 (36.7%)	33 (15.7%)
4	Tele-dentistry is the practice of the use of computers, the internet and the intraoral camera technologies to diagnose and provides advice, treatment over distance	124 (59%)	72 (34.3%)	14 (6.7%)
5	Tele-dentistry is not a face to face interview	121 (57.6%)	61 (29%)	28 (13.3%)
6	Tele-dentistry will help to consult with an expert about a specific patient's problem.	105 (50%)	88 (41.9%)	17 (8.1%)
7	Tele-dentistry is good for dental education over the internet and for training primary care Dentists	108 (51.4%)	77 (36.7%)	25 (11.9%)
8	Tele-dentistry is useful for educational goals for inexperienced dentists.	87 (41.4%)	85 (40.5%)	38 (18.1%)
9	Tele-dentistry can help to monitor my patients oral health	106 (50.5%)	79 (37.6%)	25 (11.9%)
10	Tele-dentistry can be applied in every branch of dentistry	73 (34.8%)	90 (42.9%)	47 (22.4%)
11	Tele-dentistry can be useful in improving the access to oral health care	106 (50.5%)	83 (39.5%)	21 (10%)
12	Tele-dentistry has the potential to be integrated into our current dental services	109 (51.9%)	92 (43.8%)	9 (4.3%)
13	I want to use tele-dentistry	86 (41%)	103 (49%)	21 (10%)
14	The use of tele-dentistry increases the career opportunities of hospital dental staff	96 (45.7%)	89 (42.4%)	25 (11.9%)
15	Tele-dentistry can provide me a good understanding of the patient's oral health problem over the internet.	85 (40.5%)	100 (47.6%)	25 (11.9%)
16	Using tele-dentistry, I will be able to monitor my patient's condition well.	80 (38.1%)	96 (45.7%)	34 (16.2%)
17	I think dental examinations are accurate via computers and intraoral cameras as in the traditional office setting	83 (39.5%)	97 (46.2%)	30 (14.3%)
18	I think children and parents would be receptive to having a dental examination done via computes and intraoral cameras	88 (41.9%)	100 (47.6%)	22 (10.5%)
19	Tele-dentistry is a convenient form of oral health care delivery which makes dental examination easier.	78 (37.1%)	104 (49.5%)	28 (13.3%)
20	Tele-dentistry will be a standard way of oral health care delivery.	72 (34.3%)	94 (44.8%)	44 (21%)
21	Tele-dentistry can be addition to the regular care we (the dentists) provide.	109 (51.9%)	87 (41.4%)	14 (6.7%)
22	Tele-dentistry can reduce costs for dental practices.	78 (37.1%)	100 (47.6%)	32 (15.2%)
23	Tele-dentistry can be considered as a solution to reduce medical travel	107 (51%)	77 (36.7%)	26 (12.4%)
24	Tele-dentistry can save time for me.	102 (48.6%)	94 (44.8%)	14 (6.7%)
25	I think tele-dentistry can increase the accessibility of the specialists to rural and underserved communities for their dental needs	94 (44.8%)	98 (46.7%)	18 (8.6%)
26	Tele-dentistry can improve the shortage of dental professionals in medical centres	89 (42.4%)	99 (47.1%)	22 (10.5%)
27	Tele-dentistry provides the necessary information to make it easier to diagnose.	86 (41%)	103 (49%)	21 (10%)
28	Tele-dentistry can improve diagnosis skills and dentist's knowledge through continuous professional development.	97 (46.2%)	93 (44.3%)	20 (9.5%)
29	Lack of awareness and infrastructure are the main challenges of tele-dentistry.	124 (59%)	74 (35.2%)	12 (5.7%)

DISCUSSION

The present study attempted to assess the knowledge and attitude towards tele-dentistry among undergraduate dental students in Davangere City. According to the present study, less than 50% of the students were familiar with the concept of tele-dentistry and its use in the health sector. In a study by Ali et al 94.4% of the respondents had previously heard about tele-dentistry, while 92.4% were aware of what tele-dentistry is.¹

About 59% of the students in this study agreed that tele-dentistry could be used to diagnose and provide advice and treatment over a distance. This result was similar to the study done by Ali et al.¹ The majority of the students in this study think that tele-dentistry was good for dental education over the internet and for training primary care dentists. Similar results were seen in the studies done by Ali et al and Ramesh N et al.^{1,3} More than 50% of the students in this study believed that tele-dentistry had the potential to be integrated into their dental services and could be useful in improving the access to oral health care.

These results were in agreement with the study conducted by Ali et al.¹ In the current study, 49% of the students were neutral about using tele-dentistry in the future. This was in contrast to the study conducted by Sayed et al where about 68.3% of students agreed to practice tele-dentistry in the future.² In this study less than 50% of the students agreed that use of tele-dentistry increased the career opportunity of hospital dental staff. Similar results were found in the study by Alipour et al.⁵

In a study by Abdul et al 89.1% of undergraduates agreed to use tele-dentistry for understanding of the patient's oral health and monitoring, which contradicts the present study in which 47.6% of the participants showed a neutral attitude towards the same.² Around 46.2% of the participants thought that dental examinations were accurate by using computers and intraoral cameras, which was similar to the study conducted by Alipour et al.⁵ About 49.5% of the students in the present study were neutral about tele-dentistry being a standard way of oral health care delivery and making dental examinations easier, which was in line with a study by Ramesh et al.³

In a study by Sayed et al 79.5% of the participants agreed that tele-dentistry saves time, which was similar to the current study.² Around 47.6% of the participants in the current study were neutral about whether tele-dentistry could reduce costs for dental practices, while in a study by Pradhan et al 59.7% of the respondents agreed that tele-dentistry was cost-effective.⁴ In this study 46.7% of the participants think tele-dentistry could increase the accessibility of the specialists to rural and underserved communities for their dental needs. This report contradicts the study done by Ramesh et al.³ In the study conducted by Save et al 86.8% of respondents were of the opinion that tele-dentistry could lead to an improved

diagnosis, which disagrees with the current study.⁷ In the present, around 46.2% agreed that tele-dentistry could improve diagnosis skill and dentists' knowledge through continuous professional development, which was similar to the results of a study by Alipour et al.⁵

The study's findings cannot be applied to the entire dental community because it was conducted across a hospital as an academic program. Additional research should be conducted involving large sample in several universities and regions to get valuable insights. The possibility of response bias, which is a feature of cross-sectional survey designs cannot be ignored.

CONCLUSION

The undergraduate dental students in Davangere City had a fair understanding of tele-dentistry and showed a favourable attitude towards the use of tele-dentistry. They were aware of the benefits of tele-dentistry as well as its applications in dental practice. Majority believed that tele-dentistry was helpful for their patients' oral health monitoring and it might supplement traditional dental care. However they expressed concern about infrastructure and awareness regarding the same.

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