

Knowledge, awareness and attitude among dentist and dental students about teledentistry.

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Abstract

Background: Practicing teledentistry in the age of telemedicine is of utmost importance and all the possible arenas of teledentistry should be explored. Teledentistry is beneficial for the population residing in remote, rural and inaccessible areas in a country. The study was designed with the aim that it will generate useful data regarding teledentistry which can be used further to interpreted and evaluated by the dental and medical fraternity.

Material and Methods: This cross sectional knowledge, attitude and practice study was conducted in a private dental college in Bhavnagar, Gujarat and Hingoli, Maharashtra using a self-administered questionnaire. The study population was faculty and students. Bar diagrams, pie charts and frequency distribution tables were used to present the data. Chi-square test was applied. *P* value was set at 0.05%. **Results:** Among the total sample there were 95 BDS and 57 were MDS. The mean age of BDS participants was 22 years and of MDS was 35 years. **Conclusion:** Future advances in technology will enable teledentistry to be used in many more ways, including advances seen in medicine such as clinical decision support, quality and safety assessment, consumer home use, medication e-prescribing, and simulation training.

Key words: Teledentistry, telecommunication, knowledge, attitude, population.

Introduction

Teledentistry is a subset of Telemedicine. "Tele" means at a distance and teledentistry means practicing dentistry at a distance especially in remote and rural places. It is difficult to find a specialist in remote places in emergency. So a dentist who sits in a teledentistry set up can discuss and sought treatment for a patient

by exchanging his X-rays and reports and case history. Teledentistry is a developing area of dentistry that integrates electronic health records, telecommunications technology, digital imaging and the internet to link dental providers and their patients. The foundations of teledentistry lie in telehealth and telemedicine technologies that have been practiced since the 1950.¹

Teleconsultation through teledentistry can take place in either of the following ways “Real-Time Consultation” and “Store-and-Forward Method”. Real-Time Consultation involves a videoconference in which dental professionals and their patients, at different locations, may see, hear, and communicate with one another. Store-and-Forward Method involves the exchange of clinical information and static images collected and stored by the dental practitioner, who forwards them for consultation and treatment planning.² The birth of teledentistry as a subspecialist field of telemedicine can be linked to 1994 and a military project of the United States Army (U.S. Army's Total Dental Access Project), aiming to improve patient care, dental education, and effectuation of the communication between dentists and dental laboratories.³

As compared to India teledentistry in other countries is widely used. The potentials of teledentistry need to be explored in India as 75% of the population lives in rural places and these regions need more attention in reference to dental diseases. There are many barriers for the rural population to access specialty dental care, such as geographic remoteness, poor or no public transportation, and poverty, leading to a compromise on quality health care, resulting in complications.⁴ This study

was conducted amongst practicing dentists and interns of a private college of Hingoli, Maharashtra and Bhavnagar, Gujarat with the aim to assess knowledge, awareness and attitude about teledentistry. Almost no studies have been conducted in this region regarding teledentistry. The study will thus generate useful data regarding teledentistry which can be used further to interpret and evaluate by the dental and medical fraternity.

Material and methods

This study was conducted in a private dental college in Bhavnagar, Gujarat and Hingoli, Maharashtra using a self-administered questionnaire which contained four domains, sociodemographic details, knowledge, awareness and attitude questions. It was a close ended questionnaire. The study was conducted on 152 participants to assess the feasibility of study. Questions which were posing difficulty to understand were either changed or omitted. The study population was faculty and interns of the dental college. The study was conducted from January 2017 to June 2017 at Hingoli, Maharashtra and December 2018 to April 2019 at Bhavnagar, Gujarat. To calculate the sample size response rate reported was 80%. The estimated variance was taken as 0.5 and precision taken was 0.05 and confidence level of 95%. Sample size was

derived using the formula: The dentists were met in person, and the questionnaire was submitted and collected after 2-3 days. The data were subjected to statistical analysis by means of Statistical package for social sciences version 17. Bar diagrams, pie charts and frequency distribution tables were used to present the data. Chi-square test was applied. *P* value was set at 0.05 %.

Results

Total participants contacted at Hingoli, Maharashtra, India and at Bhavnagar, Gujarat, India were 152 (109:43 = female:Male). Among the total sample there were 95 BDS and 57 were MDS. The mean age of BDS participants was 22 years and of MDS was 35 years. Education and gender distribution of participants of the Dental Colleges is shown in Figure1. When asked about the source from where they heard about teledentistry, internet was the most common reply. Almost all of the dentists replied that there are no teledentistry projects in India run by Government. Majority of the BDS interns knew that teledentistry is practiced through internet, videoconferencing. And the results were statistically significant. ($p < 0.000$). The responses to this question are shown in Figure 2. Almost 80% of the participants responded positively about the future of teledentistry i.e it will be useful in the field of

dentistry. Overall response for the question about the field in which teledentistry will be useful was for general dental practitioners. 95% of dentists said that teledentistry will be useful in teleconsultation, diagnosis, treatment, distance education and training (Table1).

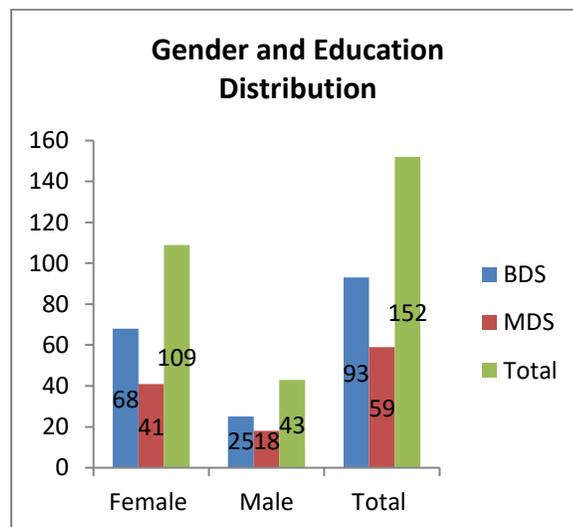


Figure1: Education and gender distribution of the participants.

Discussion

Several areas in dentistry that are particularly appropriate for teledentistry are remote consultations for orofacial disorders, collaborative hygienists, and visit in remote area, and continuing education. Future uses of teledentistry in medicine, such as clinical decision support, consumer home use, medication e- prescribing and simulation

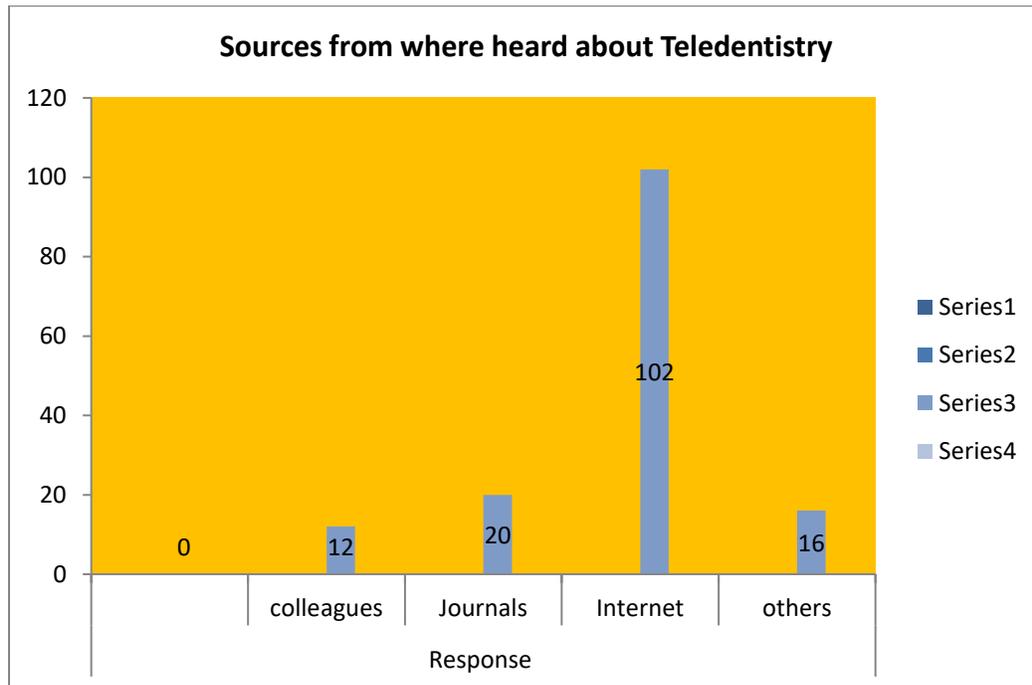


Figure 2: Sources from where heard about teledentistry

Table 1: Response to the question about the usefulness of teledentistry

Sr. No.	Questions	Number of dentists	
		M.D.S	B.D.S
1.	Teleconsultation	11	10
2.	Diagnosis	3	22
3.	Treatment	12	18
4.	Training	10	27
5.	Distance education	15	16
6.	All of the above	59	93

Table 2: Response to the question about future of teledentistry in India

Sr. No.	Response	M.D.S	B.D.S
1.	Useful in all fields of dentistry.	20	33
2.	Unacceptable to the rural people.	13	10
3.	Will not bring much change in the dental health scenario.	7	22
4.	Needs attention from the government	19	28
	Total	59	93

training will expand as the technology and applications for dentists increase. Remote consultations for care for Orofacial Disorders include oral cancer, temporomandibular disorders, oral mucosal disease, salivary gland disorders, orofacial pain disorders, oral neurosensory disturbances, orofacial dystonias and dyskinesias, bruxism, burning mouth, dental sleep disorders, malodor and dental phobias. With a collective prevalence of more than 40% of the population (Table 1), the need for treatment of temporomandibular disorders alone is comparable to back pain, dental caries, and periodontal disease.⁵

Most general dentists and dental specialists feel inadequately trained to recognize and manage these problems, for several reasons, including inadequate clinical and didactic training in dental school, lack of knowledge about appropriate medical billing procedures and codes, and the different

office protocols that require more time. The complexity and difficulty of managing orofacial disorders usually results in a consultation with or referral to a specialist. Teledentistry can bring the specialist in orofacial or oral medicine to the rural dentist or dental hygienist through remote teleconsultations. These common conditions require intense patient care and can be reimbursed by medical insurance. Teledentistry allows these patients to see a specialist in a city or university without driving for hours to the appointment. Overall response for the question about the field in which teledentistry will be useful was for general dental practitioners. The teledentistry videoconferencing system can be used to help train dentists, dental students, assistants and other office support staff at remote sites in the clinical management of orofacial disorders and other conditions.⁶

Teledentistry can also provide multipoint interactive continuing education courses, multicentre treatment planning conferences and inter-residency case reviews with community dentists at remote sites. Teledentistry can also facilitate patient education about self care for the problem, allow e-mail follow up on the status of the problem, and improve doctor-patient communication.⁷

According to a 1999 U.S. Army study, teledentistry can be a very good tool for teaching postgraduate students and even for providing continuing education for dentists. Although a complete evaluation of interactive videoconferencing has not been performed, studies have shown positive reactions from both the educator and student. Although teledentistry looks promising within the realm of dental education, users need to understand its limitations and certain critical factors. Legal issues exist, including licensure, malpractice, privacy, security and ethics. Educational technique issues relate to protocol design, sustainability, standards, uniform charting, and use of diagnostic codes and selection of instructors.⁸

When asked about the usefulness of teledentistry out of all MDS dentists 15 said it is useful in distance education and 16 BDS participants said the same. (Table 1)

Mistak et al and Baker et al compared the radiological interpretation of periapical lesions when analysed by a conventional method or teledentistry and found no significant differences between these two methods. Jacobs et al. also studied the diagnosis of maxillofacial fractures using conventional radiology and digital radiology; they reported the usefulness of the electronic system and emphasized that clinical information was of crucial importance.⁹

Indian Space Research Organization Telemedicine Project: Telemedicine Programme is an innovative process of synergizing benefits of Satellite communication technology and information technology with Biomedical Engineering and Medical Sciences to deliver the health care services to the remote, distant and under served regions of the country. Providing healthcare to India's over one billion population of which about 75 percent live in villages, is a formidable task. Indian Space Research Organization telemedicine pilot project was started in the year 2001 with the aim of introducing the telemedicine facility to the grass root level population as a part of proof of concept technology demonstration. The telemedicine facility connects the remote District Hospitals/Health Centres with Super Specialty Hospitals in cities, through the INSAT Satellites for providing

expert consultation to the needy and underserved population.

Conclusion

Telehealth and teledentistry are on the verge of exciting new growth and opportunity. Care providers will soon be able to take advantage of remote resources and define new business models and patient care synergies. Alliances to provide teledentistry services are already beginning to take shape. Technologies will continue to provide practitioners benefits and savings. But above all else, it is the patient that will benefit the most from better care, more accessible care, and more affordable care. Many issues still need to be resolved, however, before teledentistry will realize its enormous potential. These issues include: interstate dental licensure, malpractice liability, jurisdiction, data security, ethical question, inadequate telecommunications infrastructure, and inadequate reimbursement fees for teledentistry consultations.

Teledentistry allows the specialist located many miles away to make a diagnosis and recommend treatment options and referral for patients who otherwise would find it difficult to see them. Future advances in technology will enable teledentistry to be used in many more ways, including advances seen in medicine such

as clinical decision support, quality and safety assessment, consumer home use, medication e-prescribing, and simulation training.

Financial support and sponsorship

Nil.

Conflicts of Interest

There are no conflicts of interest.

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