



Teledentistry : Knowledge, Attitude and Practices in North India

Ankita Gupta^{1*}, Anshul², Ankita Chandak³ and Pankhuri Priya⁴

¹Post graduate, Department of Pediatric and Preventive Dentistry, Institute of Dental Sciences, Bareilly, U.P, India

²Professor, Department of Pediatric and Preventive Dentistry, Institute of Dental Sciences. Bareilly, U.P, India

³Senior Lecturer, Department of Pediatric and Preventive Dentistry, Dr Hegdewar Smruti Rugna Seva Mandals Dental College and Hospital, Hingoli, Maharashtra, India

⁴Post graduate, Department of Pediatric and Preventive Dentistry, Institute of Dental Sciences, Bareilly, U.P, India

*Corresponding Author: Ankita Gupta, Postgraduate, Department of Pediatric and Preventive Dentistry, Institute of Dental Science, Barilly, UP, India.

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Abstract

The present study was aimed at assessing the knowledge, attitude and dental practises of teledentistry in north india.

Material methods: In the present cross-sectional study consist of electronic questionnaire survey, distributed amongst the dentists (BDS and MDS). The study's design was divided into two sections, the first contains information about age, gender, educational institution and qualification, and the second section contains closed-ended questionnaires. Statistical analysis was performed using SPSS- 22. ANNOVA test as used to assess the effect of independent variables over dependent variables. P value of ≤ 0.05 was taken as statistically significant.

Results: The information was gathered and submitted using google form. A total of 160 dentist (BDS and MDS) participated in the survey. More than 80% of the participants showed decent response regarding there knowledge and attitude towards teledentistry and think that teledentistry can improvise the clinical care and can reduce the clinical time and is cost effective. They also responded well regarding practice with teledentistry while few ($\leq 50\%$) also disseminated their concern about patient's privacy.

Conclusion: The questionnaire revealed that in a state of crisis caused by pandemic and also to improvise the improvise the dental care system, teledentistry is a boon to the population, and dentists are putting forth their best efforts to adopt teledentistry to serve the population.

Keywords: Teledentistry; Attitude; Knowledge; Practices; North India

Introduction

The COVID-19 epidemic has put existing healthcare systems around the world to the test, as it spreads by droplet, fomite and contact transmission, posing danger of transmission. Dental professionals are especially prone to viral infection because their work often includes close inspection, examination and therapeutic treatments in the nasopharyngeal area [1]. In reaction to the outbreak, the Indian government issued a state-wide lockdown on March 24, 2020, with restrictions on travel and social gatherings [2]. To address this, innovative consultation models requiring minimum contact between dentists and patients were needed to encourage. Thanks to the high-speed internet which made teledentistry feasible to perform and providing basic dental care over long distances [3]. Teledentistry is a hybrid of telecommunications and dentistry that involves the transmission of clinical data and photo-

graphs over long distances for dental consultation and treatment planning. Cook invented the term "teledentistry" in 1997, defining it as "the profession of diagnosing and providing treatment guidance over a distance utilising video-conferencing technologies" [4].

In the 1970s, NASA and the US military initially pioneered teledentistry, which is similar to telemedicine. As part of the paradigm for dental informatics, an early notion of teledentistry was established in 1989. The US army's Total Dental Access (TDA) programme, which began in 1994 and allowed dentists in the US military to have a specialised consultation about their patients at a medical centre, was at the cutting edge of teledentistry. As technology advances, new opportunities for teledentistry have emerged which are driving changes in the dynamics of dental care delivery [5].

In the fields of dentistry, it can take two different forms: (i) real-time consultation (ii) Store and forward.

Real-time consultation, videoconference in which dental specialists and patients may see, hear and communicate with each other from different locations using telecommunication equipment and high-speed internet connections [6,7]. Store and forward does not, however, include the transfer of clinical data and static pictures acquired and stored on telecommunications devices. All essential clinical and radiological data is obtained from the patient by the dentist. Following that, the information is sent to an expert for consultation and treatment planning. As a result, therapy is administered in a far more timely, focused, and cost-effective manner [7]. It has implications not only in an urban, but also in rural areas where money is a major concern for people living in remote areas and distance is a significant barrier to receiving dental care. Furthermore, people in rural areas face a problem of limited or non-existent treatment options, creating a perfect illustration of “inverse care law” [8]. Based on the present increasing trend of COVID-19 cases, this pandemic does not look to be ending anytime soon. The key goal in today’s COVID-19 pandemic, with an increased likelihood of it becoming endemic, is to avoid person-to-person contact [9]. One of the function teledentistry is to bridge the gap between rising public demand for better oral health care and available financial resources [10].

This was designed with the aim of analysing dentists’ knowledge, attitudes, and practises about teledentistry.

Material and Methods

Study setting and ethical consideration

A cross-sectional questionnaire study was conducted among North Indian cities. Ethical approval was taken from the institutional ethical committee of B.I.U university. The sample size was calculated by open Epi software. The total sample size were 150 dental professionals.

Questionnaire design and distribution

The validated questionnaires were adopted from the previous reliable articles with their author’s permission. The questionnaire was distributed via social media apps (whatsapp, facebook, emails). The study was conducted in different cities of north India. It is divided into two sections: the first contains information about

age, gender, involvement in educational institutions, and qualification, and the second contains the closed-ended questionnaires. There were seven questions on knowledge and attitude each, and eight questions on practice. The received forms were complete with prior consent which has been taken considered. The information was gathered and submitted using a google form.

Statistical analysis

The Statistical Package for Social Sciences (SPSS) version 22 was used for statistical analysis. Descriptive statistics were performed for frequency, percentage and mean. It showed significant positive responses towards knowledge, attitude, and practice (with level of significance fixed at $P \leq 0.05$) in teledentistry. ANNOVA test as used to assess the effect of independent variables (age, gender, qualifications) over dependent variables (domains of teledentistry). P value of ≤ 0.05 was taken as statistically significant.

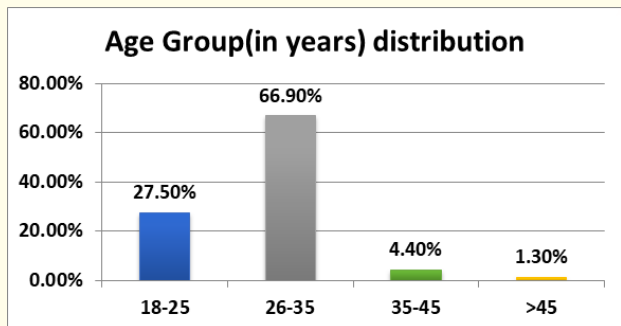
Results

A total of 160 dentists were contacted. Their mean age was approximately 27 years old (Graph 1). The gender distribution of the sample was 59.38% male and 40.63% female (Figure 1). Among the practising dentists, 63 were BDS and 97 were MDS (Figure 2), among whom 123 were involved with some educational institution (Figure 3). In the knowledge questionnaire, overall, 137 (85%) dentists have heard about teledentistry. The Internet was recorded as the most common source of obtaining information about teledentistry. 137 (85%) believe that teledentistry is the practise of using computers, the internet, telecommunication services, video conferencing, and intraoral camera technologies to diagnose and provide advice about treatment over a distance. 130 (81.25%) dentists think that teledentistry has the potential to be integrated into our current dental services (Table 1, Graph 2).

In an attitude questionnaire, 118 (73.75%) dental professionals believe that teledentistry increases accessibility of specialists to rural and underserved communities for their dental needs.

Teledentistry, according to the majority of dentists (96%), gives a thorough understanding of the patient’s oral health condition through the internet and is a convenient type of oral health care delivery that makes dental inspection simpler. In India, illiterates, people living in poverty, and a lack of infrastructure are all major challenges in teledentistry, according to 144 (90%) of dentists. (Table 2, Graph 3).

In practise questionnaires, 111 (69.38%) responded that it is easier to contact patients using teledentistry. 115 (71.88%) dentists are able to consult an expert using teledentistry. 77 (48.13%) think that teledentistry can violate the patient’s privacy, the rest don’t agree. (Table 3, Graph 4).



Graph 1: Age distribution.

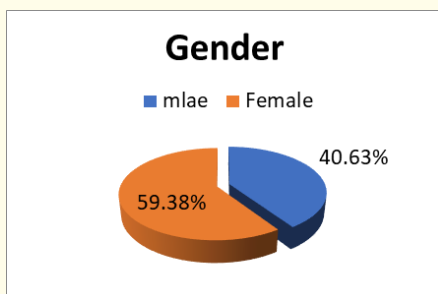


Figure 1: Gender Distribution.

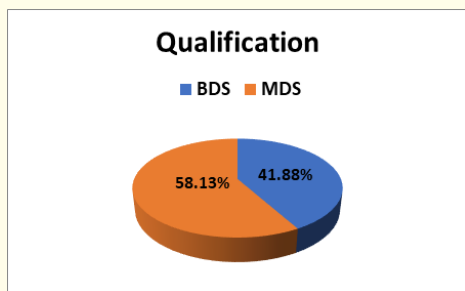


Figure 2: Qualificatin Distribuion.

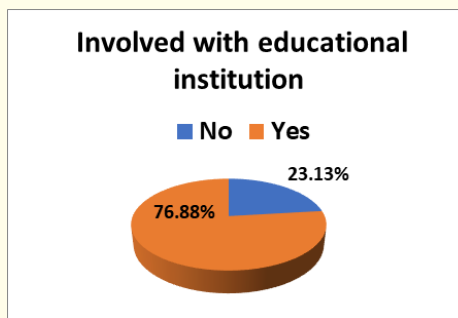
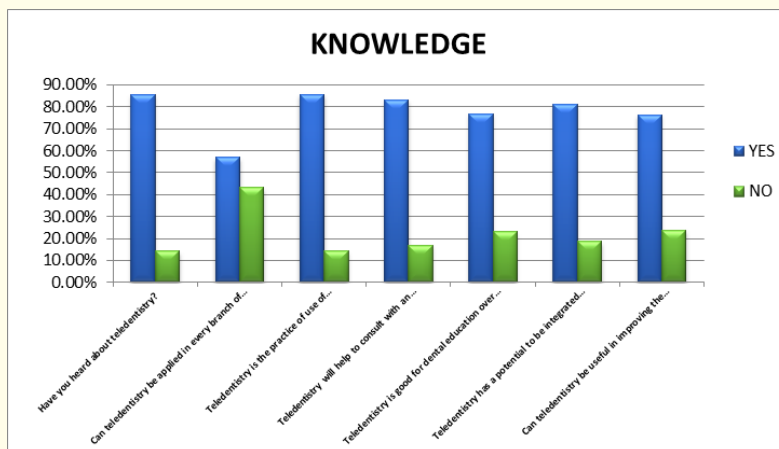


Figure 3: Qualificatin Distribuion.

Knowledge	I don't know	No	Yes
Have you heard about teledentistry?	3 (1.88%)	20 (12.5%)	137 (85.63%)
Can teledentistry be applied in every branch of dentistry?	16 (10%)	53 (33.13%)	91 (56.88%)
Teledentistry is the practice of use of computers, internet ,telecommunication services, video conferencing and intraoral camera technologies to diagnosis and provide advice about treatment over a distance?	9 (5.63%)	14 (8.75%)	137 (85.63%)
Teledentistry will help to consult with an expert about specific patient’s problem.	7 (4.38%)	20 (12.5%)	133 (83.13%)
Teledentistry is good for dental education over internet and for training primary care dentists.	7 (4.38%)	30 (18.75%)	123 (76.88%)
Teledentistry has a potential to be integrated into our current dental services.	10 (6.25%)	20 (12.5%)	130 (81.25%)
Can teledentistry be useful in improving the access to oral health care?	14 (8.75%)	24 (15%)	122 (76.25%)

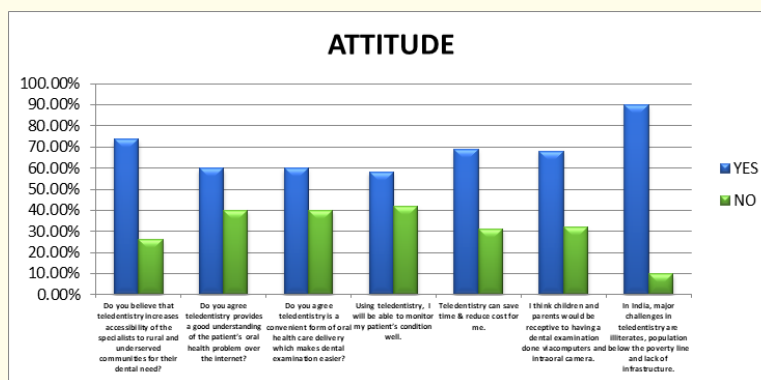
Table 1: Knowledge.



Graph 2: Knowledge.

Attitude	I don't know	No	Yes
Do you believe that teledentistry increases accessibility of the specialists to rural and underserved communities for their dental need?	11 (6.88%)	31 (19.38%)	118 (73.75%)
Do you agree teledentistry provides a good understanding of the patient's oral health problem over the internet?	10 (6.25%)	54 (33.75%)	96 (60%)
Do you agree teledentistry is a convenient form of oral health care delivery which makes dental examination easier?	13 (8.13%)	51 (31.88%)	96 (60%)
Using teledentistry, I will be able to monitor my patient's condition well.	13 (8.13%)	54 (33.75%)	93 (58.13%)
Teledentistry can save time & reduce cost for me.	12 (7.5%)	38 (23.75%)	110 (68.75%)
I think children and parents would be receptive to having a dental examination done via computers and intraoral camera.	17 (10.63%)	34 (21.25%)	109 (68.13%)
In India, major challenges in teledentistry are illiterates, population below the poverty line and lack of infrastructure.	6 (3.75%)	10 (6.25%)	144 (90%)

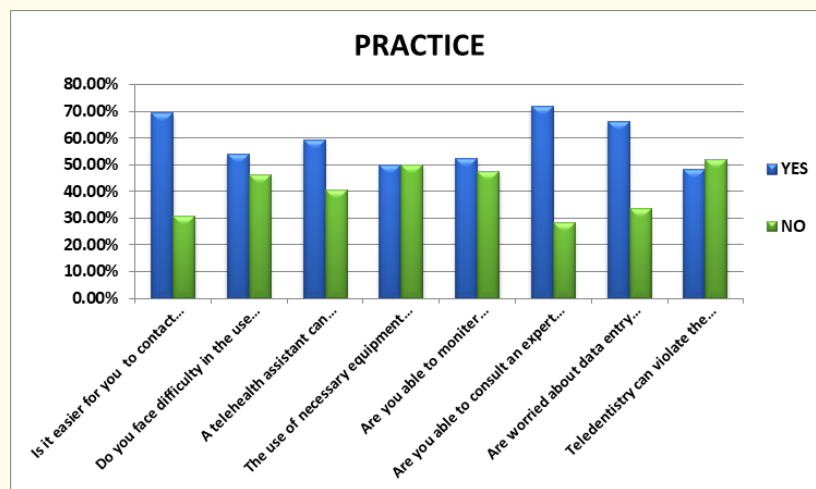
Table 2: Attitude.



Graph 3: Attitude.

Practice	I don't know	No	Yes
Is it easier for you to contact patient using teledentistry?	13 (8.13%)	36 (22.5%)	111 (69.38%)
Do you face difficulty in the use of necessary equipment of internet?	10 (6.25%)	64 (40%)	86 (53.75%)
A telehealth assistant can provide me a good understanding of the patient's oral health problem over the Internet.	19 (11.88%)	46 (28.75%)	95 (59.38%)
The use of necessary equipment seems difficult to me.	17 (10.63%)	63 (39.38%)	80 (50%)
Are you able to monitor patient's condition well by using teledentistry?	18 (11.25%)	58 (36.25%)	84 (52.5%)
Are you able to consult an expert using teledentistry?	16 (10%)	29 (18.13%)	115 (71.88%)
Are worried about data entry mistakes?	13 (8.13%)	41 (25.63%)	106 (66.25%)
Teledentistry can violate the patient's privacy?	23 (14.38%)	60 (37.5%)	77 (48.13%)

Table 3: Practice.



Graph 4: Practice.

Discussion

India is a developing country with the majority of its people hailing from rural areas where they lack some basic necessities of everyday life such primary health services. Teledentistry has the potential to influence the Indian population and enhance their knowledge and awareness. Students and teachers from all levels of schools and colleges, as well as social workers from village panchayats, can be educated and instructed on the importance and functionality of telehealth with access to higher centres and specialists [11].

According to the findings of the study, many dental practitioners are aware of the benefits and applications of teledentistry.

Telemedicine is a new subfield of health informatics that has been quickly grown during the pandemic scenario. Dental healthcare workers are classified as having a very high exposure risk category by the Occupational Safety and Health Administration (OSHA), because they work in close contact with the patient's mouth cavity [12].

Written or voice messages for diagnostic doubts as well as therapeutic ideas, video messages for a better evaluation of a patient's needs, and descriptions of difficulties in their own words can all be exchanged via online dialogues [13].

Challenges related to acceptance of teledentistry by dentists include the lack of acceptance of teledentistry by dentists, which can be attributed to the fact that they may find it complex and may be resistant to new skills [14].

Emerging teledentistry has a number of benefits, including low costs, simple infrastructure, accessibility to rural populations, preliminary emergency management, assisting with expert consultations, and the ability to avoid follow-up visits, but virtual examinations such as percussion and palpation are not possible. Clinical visits are required for therapy. Also results seen in a study done by Aziz and Ziccardi, which stated that advances and availability of smart phone technology have contributed to the feasibility and availability of telemedicine in oral surgery [15].

Various studies by Ignatius E., *et al.* and Eaton KA., *et al.* have shown the success of the teledentistry programme as a tool for providing continuing education to dentists and dental students and for dental consultation [16].

In the study, 110 (68.75%) dentists think that teledentistry is time-saving, and in a similar study by Ramesh n., *et al.* and N Vijaykumar., *et al.*, the majority of dentists confirm the same about teledentistry [17].

Research by N Vijaykumar., *et al.* found that 52.5% of dentists were able to effectively monitor their patients' conditions utilising teledentistry. The workers of the Hokkaido, rural health centre in Japan used videoconferencing for more than a year (1998 to 1999). According to the findings of the study, teledentistry greatly improved health care knowledge and computer abilities [18].

When questioned about the future of teledentistry in India, the majority of them said it would be useful in all areas of dentistry. When asked about the applications of teledentistry, the majority of dentists stated that technology is beneficial in all aspects of diagnosis, consultation, treatment, and training.

Conclusion

Dentistry is a crucial component of our healthcare system, which has been seriously harmed by the current COVID-19 pandemic. The current study revealed that practising dentists have a reasonable understanding of how teledentistry is done, as well as the benefits and drawbacks of teledentistry. The present study was able to examine dentist's knowledge, attitudes, and ways of deliv-

ering awareness through their practises through teledentistry. The study, its uses, benefits, and drawbacks like how teledentistry can be improvise for the rural population for which further more studies should be done and majors should be taken by government of India.

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