Original Research Paper

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Knowledge, Awareness & Attitude regarding Teledentistry among post-graduate dental students of Rishikesh City, India:

Abstract:

Background: Teledentistry is an emerging branch of dentistry that integrates telecommunication technology with oral healthcare practice to improve accessibility, efficiency, and quality of dental services. It plays a significant role in overcoming barriers to dental care delivery, particularly in rural and underserved areas.

Aim: To evaluate the knowledge, awareness, and attitude regarding teledentistry among postgraduate dental students in Rishikesh City, India.

Materials and Methodology: A cross-sectional questionnaire-based study was conducted among 60 postgraduate dental students. A pre-validated close-ended questionnaire consisting of 20 questions was distributed using Google Forms. The collected data were compiled and analyzed using SPSS Version 17 software. Frequency distribution and chi-square tests were applied for statistical analysis.

Results: The study revealed that 97% of participants were aware of teledentistry. Approximately 96.6% understood that teledentistry involves the use of computers, internet services, and digital technologies for remote diagnosis and treatment planning. About 83.3% of respondents believed that teledentistry is beneficial in online dental education and in training general dental practitioners.

Conclusion: Teledentistry serves as an effective tool for consultation, diagnosis, treatment planning, and dental education beyond conventional clinical settings. The study findings indicate a positive level of knowledge and attitude toward teledentistry among postgraduate students. Increased awareness programs and incorporation of teledentistry into dental education curricula may further enhance its utilization in clinical practice.

Key-words: Teledentistry, Awareness, Dental Education, Questionnaire Study, Postgraduate Students, Telehealth, Survey

Introduction:

Telehealth refers to the delivery of healthcare and public health services through communication and information technology, enabling remote patient consultation, diagnosis, self-care, and treatment planning. Within telehealth, teledentistry specifically utilizes communication technologies to facilitate the provision of dental care from a distance. Teledentistry follows the same ethical, legal, and professional standards as conventional face-to-face dental practice. [1]

The term "telemedicine" is derived from the Greek word tele, meaning distance, and the Latin word mederi, meaning healing. Teledentistry, an evolving branch of telemedicine, integrates dentistry with telecommunication technology to improve access to oral healthcare services. [2]

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Teledentistry enables dental professionals to extend oral healthcare services to underserved and remote populations. It allows oral health screening through intraoral cameras and digital transmission of dental images to specialists for diagnosis and treatment planning.[3] This technology-based approach promotes efficient communication, management of

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dental records, patient education, and professional consultation. In addition, teledentistry serves as a valuable educational tool for dental students and practitioners. [4]

Teledentistry is a rapidly advancing field that combines dentistry with digital technology for the quick transfer of patient information over long distances. It enhances communication among healthcare professionals and improves diagnosis, consultation, treatment planning, and follow-up care. Current teledentistry applications mainly focus on dental education, consultation and referral services, remote supervision, and administrative support. [5]

The utilization of teledentistry increased significantly during the COVID-19 pandemic due to restrictions on routine dental procedures and the need for remote healthcare delivery. In oral medicine and radiology, teledentistry plays an important role in sharing radiographic images and clinical findings with specialists, thereby assisting in accurate diagnosis and treatment planning of complex cases. [6]

Teledentistry also helps bridge the gap between the increasing demand for oral healthcare services and the limited availability of healthcare resources.[7] The integration of telemedicine and information systems provides patients with easier access to professional advice and treatment recommendations, thereby improving the accessibility, cost-effectiveness, and quality of healthcare services.[8]

Considering the growing importance of teledentistry in modern dental practice and education, the present study was conducted to assess the knowledge, awareness, and attitude regarding teledentistry among postgraduate dental students in Rishikesh City, India.

Aim:

To assess the knowledge, awareness, and attitude regarding teledentistry among postgraduate dental students in Rishikesh City, India.

Materials and Methods:

A descriptive cross-sectional questionnaire-based study was conducted among postgraduate dental students in Rishikesh City, India, during March 2023. The study was carried out after obtaining approval from the Institutional Ethics Committeeand Institutional Review Board of the college.

A validated close-ended questionnaire comprising 20 questions was used for data collection. The questionnaire was adopted from a previously published study after obtaining permission from the original author. Additionally, six questions related to demographic details were included.

The questionnaire was divided into three parts. Part I included demographic and socioeconomic details of the participants. Part II assessed the knowledge of participants regarding teledentistry, while Part III evaluated their awareness and attitude toward teledentistry.

The study participants included postgraduate dental students who were willing to participate in the survey. Participants who could not be reached through social media platforms or were unwilling to participate were excluded from the study.

The questionnaire was distributed online using Google Forms by a single investigator to 60 postgraduate dental students. The collected data were systematically compiled and analyzed using SPSS software version 17. Frequency distribution and descriptive statistical analysis were performed.

Sample Size Estimation:

A convenience sample of 60 postgraduate dental students who fulfilled the inclusion criteria and consented to participate in the study was included.

Statistical Analysis:

The collected data were compiled and entered into Microsoft Excel and analyzed using SPSS software version 17. Descriptive statistics, including frequency and percentage distribution, were used for data analysis. The chi-square test was applied wherever applicable. A P value of <0.05 was considered statistically significant.

Results:

A total of 60 postgraduate dental students participated in the study. Among them, 43 (71.6%) were females and 17 (28.3%) were males (as depicted in Figure 1). The majority of participants belonged to the age group of 21–33 years.

The highest number of participants were from the Conservative Dentistry and Orthodontics departments (15 participants each), followed by the Prosthodontics department with 14 participants (as depicted in Figure 2).

The detailed distribution of responses regarding knowledge, awareness, and attitude toward teledentistry among postgraduate dental students is presented in Table 1.

Approximately 95% of respondents were aware of teledentistry (as depicted in Figure 3), while 93.3% had a clear understanding of the concept of teledentistry (as depicted in Figure 4). Nearly 98.3% of participants believed that teledentistry plays an important role in improving access to oral healthcare services (as depicted in Figure 5).

The study further revealed that 96% of respondents were aware that teledentistry involves the use of computers, internet services, and digital technology for remote diagnosis and treatment planning. Around 68.3% of participants believed that teledentistry could help reduce the cost of dental practice (as depicted in Figure 6).

The major barriers identified for the implementation of teledentistry in India included illiteracy, poverty, and inadequate infrastructure. Furthermore, 88.3% of participants expressed willingness to practice teledentistry in the future (as depicted in Figure 7), while 78.3% trusted the effectiveness of teledentistry equipment. However, only 50% of respondents believed that dental examinations performed using computers and intraoral cameras were as accurate as conventional clinical examinations.

Discussion:

Teledentistry is an emerging field that facilitates communication among dental professionals over long distances through the transmission of clinical information, radiographs, and photographs for consultation and treatment planning. It utilizes communication technology to improve oral healthcare delivery, consultation, diagnosis, and patient education, particularly in underserved and remote areas where access to dental care is limited. Teledentistry offers several advantages, including improved accessibility, cost-effectiveness, and enhanced delivery of oral healthcare services. Owing to its wide range of applications, teledentistry is increasingly gaining acceptance in modern dental practice.

The present study was conducted to assess the knowledge, awareness, and attitude regarding teledentistry among postgraduate dental students in Rishikesh City, India.

A previous study conducted by Mamatha Boringi et al.[5] in 2015 evaluated the knowledge, awareness, and attitude regarding teledentistry among dental professionals. Their study reported that only 7.23% of participants were aware of teledentistry, while 1.20% expressed willingness to practice teledentistry in the future. In contrast, the present study demonstrated considerably higher levels of awareness and positive attitudes toward teledentistry among postgraduate students.

Similarly, a study conducted by Devina Pradhan et al.[2] in 2019 among postgraduate dental students in Kanpur City revealed that 96.1% of participants had heard about teledentistry and possessed a clear understanding of the concept. Furthermore, 74.4% of the participants had knowledge regarding teledentistry, and 79.2% expressed willingness to practice teledentistry in the future. The findings of the present study are consistent with these observations, indicating a generally positive awareness and attitude toward teledentistry among postgraduate dental students.

According to a survey conducted by Nicolas Giraudeau et al.[8] in 2022, 57.1% of dentists in private practice reported little or no knowledge regarding teledentistry. Only a very small proportion of students had received formal training in telemedicine or teledentistry during their university education. Additionally, only a limited number of dentists involved in teledentistry activities expressed complete satisfaction with their practice. The study also reported that 65.7% of dentists who had never practiced teledentistry and 74.8% of those with prior experience were interested in continuing or initiating teledentistry practice in the future.

In a study conducted by Rootab Subhan et al. in 2021,[1] 65.8% of dentists expressed willingness to use teledentistry in the future, even beyond pandemic conditions. Interestingly, 62.5% of participants reported having no prior knowledge regarding teledentistry before the COVID-19 pandemic.

A related survey conducted by Balsaraf S. V.[7] in 2015 reported that the internet served as the primary source of information regarding teledentistry among dentists. The study further highlighted that teledentistry was considered particularly useful in oral medicine and radiology.

According to a study conducted by N. Sen et al.[10] in 2017, 69% of respondents considered teledentistry to be time-saving, whereas 38.5% believed it was not cost-effective. Furthermore, many participants expressed neutral opinions regarding the accuracy of dental treatment performed with the aid of computers and intraoral cameras. The findings of the present study similarly demonstrated that only 50% of respondents believed that dental examinations performed using computers and intraoral cameras were as accurate as conventional clinical examinations.

The present study had certain limitations, including limited accessibility to participants who were not reachable through social media platforms, a relatively small sample size, and restricted geographic coverage, as the study was limited to postgraduate dental students in Rishikesh City.

Further multicentric studies involving larger sample sizes across different regions of India are recommended to obtain a broader understanding of the knowledge, awareness, and attitude regarding teledentistry among dental professionals and students. Inclusion of additional questionnaire parameters may further improve understanding regarding the practical applications and future scope of teledentistry.

Overall, the present study demonstrated a high level of awareness and a positive attitude toward teledentistry among postgraduate dental students, which is comparatively higher than earlier studies reporting low awareness among dental professionals. However, certain

areas such as perceived diagnostic accuracy still show uncertainty, indicating the need for further training and exposure to strengthen confidence in teledentistry applications.

Conclusion:

The findings of the present study indicate that postgraduate dental students in Rishikesh City possess satisfactory knowle dge, awareness, and attitudes regarding teledentistry.

Teledentistry serves as an effective tool for consultation, diagnosis, treatment planning, and patient education beyond conventional clinical settings through the use of digital technologies and internet-based communication.

However, further improvement in awareness and practical application of teledentistry can be achieved through continuing dental education programs, workshops, and awareness campaigns. Incorporation of teledentistry into dental curricula may further enhance the professional development of dental students and improve future oral healthcare delivery.

Figure Legends:

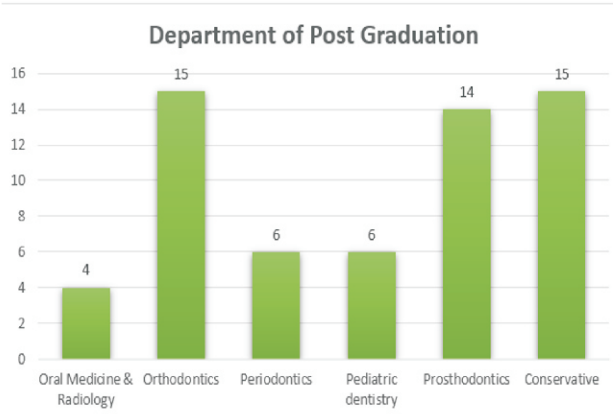

Figure 1: Distribution of study participants according to gender and age.

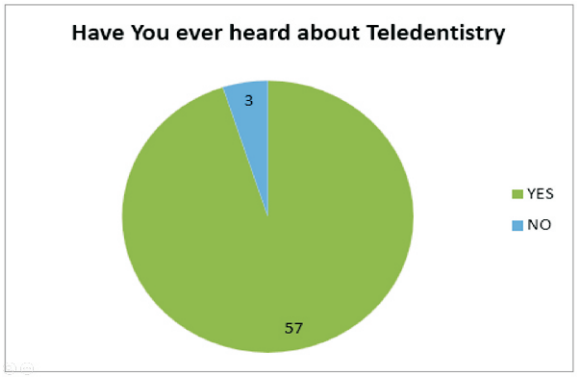

Figure 2: Distribution of study participants according to departments of postgraduation.

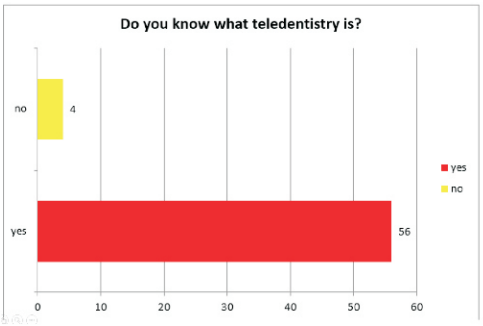

Figure 3: Awareness regarding teledentistry among postgraduate dental students.

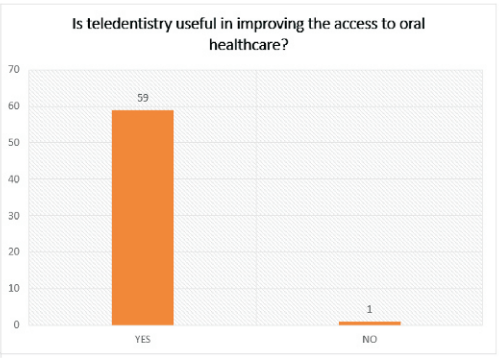

Figure 4: Knowledge regarding teledentistry among postgraduate dental students.

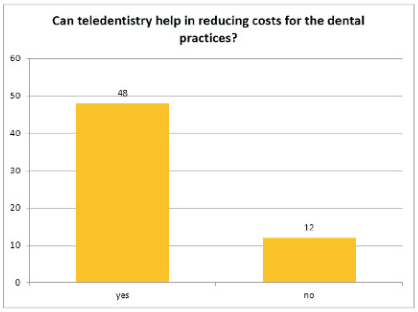

Figure 5: Knowledge regarding the role of teledentistry in improving access to oral healthcare.

Figure 6: Role of teledentistry in reducing the cost of dental practice.

Figure 7: Willingness of participants toward future practice of teledentistry

Table 1
Distribution of responses regarding knowledge, awareness, and attitude toward teledentistry among postgraduate dental students.

Questions	Yes (%)	No (%)
Have you heard about teledentistry?	57 (95)	3 (5)
Do you know what teledentistry is?	56(93.3)	4(6.7)
Is teledentistry about the practice of use of computers, Internet, and technologies to diagnosis and provide advice about treatment over a distance?	58(96.6)	2(3.4)
Does teledentistry helps to consult with an expert about specific patient's problem?	59(98.3)	1(1.7)
Do you think that teledentistry is good for dental education over Internet and for training primary health-care dentists?	50(83.3)	10(16.7)
Does teledentistry helps to monitor the patient's oral health?	44(73.3)	16(26.7)
Can teledentistry be applied in any branch of dentistry?	46(76.6)	14(23.7)
Is teledentistry useful in improving the access to oral healthcare?	59(98.3)	1(1.7)
Do you think that teledentistry is a good tool for oral hygiene training?	55(91.6)	6(8.4)
Can teledentistry will be able to monitor your patient's condition well?	48(80)	12(20)
Do you think that dental examinations are accurate via computers and intraoral camera as in the traditional office setting?	30(50)	30(50)
Do you think that teledentistry is a convenient form of oral health-care delivery that makes dental examination easier?	44(73.3)	16(26.7)
Teledentistry can be an addition to the regular care to which the dentists provide?	56(93.3)	4(6.7)
Does teledentistry can help in reducing costs for the dental practices?	41(68.3)	19(31.7)
Do you think that teledentistry saves time for the dentist?	48(80)	12(20)
Do you think that teledentistry can increase accessibility of the specialists to rural and underserved communities for their dental needs	57(95)	3(5)
In India, major challenges in teledentistry are illiterates, population below the poverty line, and lack of infrastructure?	54(90)	6(10)
Do you trust the teledentistry equipment to work?	47(78.3)	13(22.7)
Will you support a government initiative whereby patients could obtain advice on treatment need from a central facility such as PHC connected via teledentistry	57(95)	3(5)
In the future, will you practice teledentistry?	53(88.3)	7(11.7)

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