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Awareness and use of teledentistry among dental health care professionals at Alex Ekwueme Federal University Teaching Hospital (AEFUTH), Abakiliki, Nigeria

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ABSTRACT

Introduction
Teledentistry is an emerging model of practice with immense potential in clinical practice and public health delivery. It is the combination of telecommunications and dentistry, involving the exchange of clinical information and images over a distance for consultation, treatment planning, and treatment purpose.

Purpose
The purpose of this study was to evaluate the awareness and use of teledentistry among dental health professionals at Alex Ekwueme Federal University Teaching Hospital, Abakiliki (AEFUTHA), Ebonyi State, Nigeria.

Materials and methods
A self-structured 16-item questionnaire designed with four-point Likert scale ideals was duplicated and distributed among 60 dental health care professionals (42 male, 18 female) in the study context. The questionnaire bore relevant domains, which were designed to elicit accurate and honest responses from the professionals, including demographic data, knowledge of teledentistry, the usefulness of teledentistry for the patient, the usefulness of teledentistry in dental practice, and the potential of teledentistry to improve practice and existing concerns about the use of teledentistry.

Results
All the questionnaires distributed were returned (100% response rate). Results indicated that none of the DHCPs surveyed provided services using teledentistry (0.00%). 68.33% have never heard about teledentistry. The awareness of the respondents concerning the usefulness of teledentistry for the patient and dental practice was very low (Mean = 1.9).

Conclusion
Awareness of the use of teledentistry should be intensified among all dental health care professionals to promote optimal uptake of its services to the benefit of oral health consumers.

INTRODUCTION

Technology is making things possible that were unimaginable some decades ago. Teledentistry is a relatively new field that has emerged with the dawn of information technology and more importantly, with its universalization. The roots lie in telemedicine and provide a new horizon for the progress of dentistry. Teledentistry is

an emerging model of practice that promises immense potential in the fields of clinical practice as well as public health delivery (Nagarajappa, 2013).

The term teledentistry was first introduced by Cook in 1997 as the practice of using video conferencing technologies to diagnose and to provide advice about the treatment over a distance (Fricton & Chen, 2009). It is generally defined as the combination of telecommunication and dentistry involving the exchange of clinical information and images over a remote distance for consultation and treatment purposes (Yoshainag, 2001). The process of teledentistry incorporates consultation, continuing education, public awareness, diagnosis, and treatment planning away from a dental office setup through computers, cameras, printers, and Internet (Berndt et al., 2008). It comprises chiefly of two techniques - Real-time consultation and Technique of store and forward. Real-time consultation comprises video conferencing where the dentist and the patients communicate with each other using ultra-high bandwidth network connections. The technique of store and forward incorporate the exchange of clinical knowledge and images stored inside the telecommunication device (Park et al., 2012).

Bradley et al. (2010) successfully proved the use of teledentistry in oral medicine in a community dental service in Belfast, N. Ireland, using a prototype teledentistry system. Torres-Pereira et al. (2008) suggested that distant diagnosis is an effective alternative in the diagnosis of oral lesions using transmission of digital images by email. Summerfelt (2011) reported a teledentistry-assisted, affiliated practice and dental hygiene model developed by the Northern Arizona University Dental Hygiene Department. This model allows dental hygienists to provide oral healthcare to underserved populations by digitally linking up with a distant oral health team.

According to Heale (2018), Teledentistry has received more attention in the last decade in both medical and dental fields with the potential of an easy, fast, and safe way to deliver and share health information. This can be achieved using computers, telecommunication, technology, digital diagnostic imaging services, devices, and software for analysis and follow-up (Clark, 2000). Teledentistry is believed to improve dental care provided to patients as well as time management. It facilitates better referral systems based on patient's needs, reduces waiting lists and consultation time (Alabdullah & Daniel, 2018). Teledentistry can extend dental care to patients in rural areas at a reasonable cost and convenience, reducing the need for traveling and ensures proper channeling for referrals (Wheeler, 1999). In addition, teledentistry can be a useful tool for peer education and consultation, where dentists can share their experiences and run discussions and continuous education sessions online through webinars and other online channels.

The use of telemedical applications in the healthcare system has gone far like a wildfire to so many countries. The nature of teledentistry and the benefits behind its use or its adaptation/application in routine practice should be included in continuous education programmes. This survey was aimed at assessing the awareness level and use of teledentistry among dental health professionals in Alex Ekwueme Federal University Teaching Hospital Abakiliki (AEFUTHA), Ebonyi State, Nigeria.

MATERIALS AND METHODS

Research design

A cross-sectional survey research design was adopted to study awareness and use of teledentistry among dental health care professionals at Alex Ekwueme Federal University Teaching Hospital (AEFUTH), Abakiliki, Nigeria.

Sample Size and Sampling Technique

All the 60 dental health care professionals in the study context were used for this study.

Data Collection

A self-structured 16-item questionnaire designed with four-point Likert scale ideals was duplicated and distributed among 60 dental health care professionals (42 male, 18 female) in the study context. The questionnaire bore relevant domains, which were designed to elicit accurate and honest responses from the professionals, including demographic data, knowledge of teledentistry, the usefulness of teledentistry for the patient, the usefulness of teledentistry in dental practice, and the potential of teledentistry to improve practice and existing concerns about the use of teledentistry.

The questionnaires were distributed among the dental health care professionals and collected back immediately after they were filled.

Data Analysis

Data obtained from the survey were presented in tables as frequencies and were analysed using percentages and mean scores.

RESULTS

Results revealed that most of the respondents were female (70%), of the 20-30 years age group (66.67%), and the dental therapy specialty (58.33%) (Table 1).

None of the DHCPs surveyed provided services using teledentistry (0.00%).

Table 1:
Demographic Data

AGE	FREQUENCY	(%)
20 – 30	40	66.67
31 – 40	15	25.0
41 – 50	5	8.33
51 – 60	0	0.00
Gender		
Male	18	30.00
Female	42	70.00
SPECIALTY		
Dentist	4	6.67
Oral Surgeon	1	1.67
Dental Therapist	35	58.33
Dental Technologist	16	26.67
Dental Surgery Technician	4	6.67

The respondent's awareness about teledentistry is fairly high, with 68.33% of the respondents having heard about teledentistry while 31.67% were ignorant of the concept (Table 2).

Table 2:
Knowledge about teledentistry

Have you heard about Teledentistry?	FREQUENCY	(%)
Yes	41	68.33
No	19	31.67
TOTAL	**60**	**100**

The awareness of the respondents concerning the usefulness of teledentistry for the patient and dental practice was very low (**Mean** = 1.9) (Table 3).

Table 3:
The usefulness of teledentistry for the patient and the dental practice

s/n	Items	SA 5	A 4	SD 3	D 2	NS 1	Mean (X)	Decision
1	Teledentistry is the practice and use of computers, the internet, and tele-advice about treatment over a distance?	18	22	11	5	4	1.72	DA
2	Teledentistry enhances Guidelines, advice, and preventive dental measures using technology	9	29	13	8	1	2.03	DA
3	Teledentistry provides accurate diagnosis as seen in the clinical setting	6	20	6	17	11	1.12	DA
4	Teledentistry reduces costs for dental treatment, consultation, and travel	11	23	9	12	5	1.6	DA
5	Teledentistry would be convenient and well received by patients and society if introduced	10	22	9	13	6	1.6	DA
6	Teledentistry saves time compared to a physical appointment	11	30	4	5	10	2.0	DA
7	Teledentistry improves communication with a patient	10	39	5	1	5	2.9	A
8	Teledentistry would be helpful in monitoring and evaluating patient	4	34	6	11	5	2.4	DA
9	Teledentistry would improve access to oral health care in remote areas and underserved population	13	22	6	15	4	1.7	DA
10	Teledentistry would be too expensive to set up	23	7	13	12	5	1.6	DA
	TOTAL						**1.9**	**DA**

KEY A = Agree, DA = Disagree

Most of the respondents preferred to communicate with one another through social media (40%) (Table 4).

Table 4:
Preferred method of communication among dental health practitioners

Preferred method of communication among dental health practitioners	Frequency	(%)
Webinar	5	8.33
Social Media Handle	27	40.00
Video Conferencing	17	28.33
Email	9	15.00
Forum	2	3.33
TOTAL	**60**	**100**

The majority of the respondents felt that all specialties in dentistry could provide services through teledentistry (65%) (Table 5).

Table 5:
Preferred specialty for the application of teledentistry

Preferred Dental Specialty for application of Teledentistry	FREQUENCY	(%)
Dentist	5	8.33
Oral Surgeon	2	2.33
Dental Therapist	12	20.00
Dental Technologist	2	3.33
All Specialties	39	65.00
TOTAL	**60**	**100**

DISCUSSION

Teledentistry, a relatively new dental practice that has benefited from the advancement in technology, has shown, over the past few years, the ability to improve access to oral healthcare and oral healthcare delivery at a lower cost. It

also has the potential of eliminating the disparity between rural and urban communities concerning obtaining quality oral healthcare (Jampani et al., 2011).

In this present study, awareness, and usage of teledentistry amongst dental health care professionals at AEFUTHA, was evaluated. Out of the 60 respondents surveyed, 42 were of the female gender (70%). Moreover, most of the respondents were young (within the ages of 20 and 30 years) (66.67%), and of the dental therapy specialty (58.33%)

None of the DHCPs surveyed provided services using teledentistry (0.00%). This finding could be because telemedicine is a relatively new concept (Boringi et al., 2015).

68.33% of the respondents had heard about teledentistry while 31.67% were ignorant of the concept. Other published studies concerning teledentistry in other countries showed similar findings, where a majority of dentists stated the advantages gained by implementing teledentistry and how it benefited patients and the actual practice (Mandall et al., 2005; Estai et al., 2006).

The awareness of the respondents concerning the usefulness of teledentistry for the patient and dental practice was very low (**Mean** = 1.9). This may be due to the relatively low advancement in technology, cost, and limited access to the technology in the study area. Nagarajappa et al. (2013) worked on knowledge and attitudes towards teledentistry among dentists in Udaipur, Rajasthan, India, and reported an unbalanced knowledge of teledentistry among dentists, suggesting the need for awareness programmes to fill the knowledge gaps and instill positive attitudes.

Most of the respondents preferred to communicate with one another through social media (40%), which includes Facebook, LinkedIn, Instagram, and Twitter. This can be attributed to their age and level of exposure. The older professionals with working experience above 10 years chose video conferencing (28.33%) - A two-way communication method that improves communication between the patient and the clinician and requires feedback on each treatment plan or method chosen by the patient.

The majority of the respondents felt that all professionals in dentistry could provide services through teledentistry (65%). The excitement and the benefits of teledentistry span through the dental specialties. In particular, dentists through the tele-dental application, have been able to learn and sometimes perform more advanced procedures through tele-supervision (Wood et al., 2015).

According to Daniel & Kumar (2014), screening and consultation of patients employing teledentistry are considered feasible and accessible. A study performed in 2015 in Mamatha states that 50% of practicing dentists agree on the promotion and execution of health education by teledentistry (Boringi et al., 2015).

CONCLUSIONS

With the recent technological development taking place in the field of teledentistry, DHCPs in AEFUTHA seem to have little or no idea about the evolving world of teledentistry and its robust benefits to them and their patients. Awareness of the use of teledentistry should be intensified among all dental health care professionals to promote optimal uptake of its services to the benefit of oral health care consumers.

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Conflict of Interest: The authors declare no conflict of interest.

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