

Dental Communication

Perception, Awareness and Knowledge of Dental Professionals About Teledentistry in Saudi Arabia - A Literature Review

Mohammad AlShaya,^{*1,2} Deema Farsi,¹ Nada Farsi³ and Najat Farsi¹

¹Pediatric Dentistry Department, Faculty of Dentistry, King Abdulaziz University, Jeddah Saudi Arabia

²Ministry of Health, Jeddah Saudi Arabia

³Dental Public Health Department, Faculty of Dentistry, King Abdulaziz University, Jeddah, Saudi Arabia

ABSTRACT

Access to dental care in Saudi Arabia is a challenge due to the lack of proper distribution of the dental workforce. Teledentistry is the field of dentistry that helps to receive and provide dental service remotely using digital platforms. It can facilitate access to dental care, especially in underserved regions. The implication of teledentistry needs to address the concerns of dental professionals to ensure effective teledentistry application in dental practice. This review aimed to explore the literature about the perception, awareness, and knowledge of dental professionals about teledentistry in Saudi Arabia. Peer-reviewed literature was searched in databases including Web of Science, Scopus, PubMed, and Google Scholar with no time limits using the keywords: “Teledentistry”, “Dental Telemedicine”, “Saudi Arabia”, “Perception”, “Knowledge”, “Awareness”. We identified 7 relevant studies. All of them were after the breakthrough of the COVID-19 pandemic. Two studies targeted all dental professionals while another two studies investigated the dentists. Undergraduate dental students were investigated by one study as well as postgraduates. One study focused on both undergraduate and postgraduate dental students. Our review found that the perception, knowledge, awareness, and attitude of Saudi dental professionals are positive. Many studies pointed out that the dental professionals in Saudi Arabia are practicing teledentistry and are open to learn and get more knowledge about it. Teledentistry got more attention during the post-COVID19 time by Saudi dental professionals. Structured and sustainable models and education programs are recommended to utilize the benefits of teledentistry in Saudi Arabia.

KEY WORDS: TELEDENTISTRY, SAUDI ARABIA, PERCEPTION, KNOWLEDGE, AWARENESS REVIEW.

INTRODUCTION

Lack of access to dental care and regular oral health surveillance are the most common barriers to have dental health (Morgano et al., 2010) (Almutlaqah et al., 2018). Access to dental care is highly affected by the presence of dental professionals who are lacking especially in rural and disadvantaged areas (AlShammery, 2016) (Alabdullah et al., 2020). The problem of difficult access to dental care has been aggravated during the COVID-19 pandemic due to the shutdown of dental clinics and the protocols of the physical distancing (Falahchai et al., 2020).

Jannadi et al. (2008) reported that the healthcare system in Saudi Arabia has workforce distribution challenges (Jannadi et al., 2008). Recently, the Saudi healthcare system has

undergone rapid expansion. But providing high-quality services is faced by range of complex challenges such as workforce planning, sustainability, healthcare professionals training, changing demographic and disease patterns. Moreover, in the past decade, Saudi Arabia has shown a boom in dental education. The number of dental schools has grown from four dental schools in 2005 to 24 dental schools in 2015.

However, there is a skewed distribution of the dental workforce because of the vast geographic extent of the country, which makes the proper distribution and utilization of dental labor critical (AlBaker et al., 2017). The increasing population of the country and shortage of local dentists justify the need for this increased workforce need and necessitate looking for alternative ways to overcome the shortage of dental professionals that are associated with the increased demand for dental care. Due to the lack of dental specialists and consultants in the rural and border areas, this workforce must be utilized most effectively and efficiently possible.

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Wancheck and Rephann assessed the effect of the presence of a dental school in a rural area on the access to dental care by people living there. They found that the initiation of a new dental school in every rural area is not cost-effective and recommended more effective alternatives. They suggested the inclusion of virtual dental clinics to improve oral health in rural areas (Wancheck and Rephann, 2013).

Teledentistry is the field of dentistry that helps to receive and provide dental service remotely using digital platforms. Its development began with the US Army which conducted the first study at Fort Gordon, Georgia in July 1994 (Rocca et al., 1999). The introduction of teledentistry to the dental practice was suggested to help the utilization of the time and efforts of the specialists and consultants (AlShammery, 2016) (AlBaker et al., 2017). (Eraso et al., 1996). It showed a useful alternative cost-effective approach to increase access to dental services. Irving et al. in 2017 found that the teledentistry framework has a positive effect on the delivery and sustainability of dental care (Irving et al., 2018).

Moreover, Torres-Pereira et al. examined the feasibility of emailing the clinical images to diagnose oral diseases remotely. They found this process helped the primary healthcare providers in rural areas where specialists are not available (Torres-Pereira et al., 2008) (Torres-Pereira et al., 2013). Based on the increase in cloud services, Estai et al. (2016) established a cloud-based teledentistry system that helps to increase access to dental care (Estai et al., 2016). In Saudi Arabia, although teledentistry is practiced daily, especially with the spread of COVID-19, via different approaches however the literature showed no established projects dedicated to teledentistry applications (Alawwad et al., 2019) (Aboalshamat, 2020).

Dental professionals can provide these tele-dental services from different situations such as undergraduates, postgraduates, board residents, general dentists, and consultants. Therefore, it is important to know the current state regarding the perception and knowledge of all these dental professionals about teledentistry application before attempting to establish teledentistry projects. Different studies investigated awareness, perception, and knowledge of teledentistry, and each was with a different type of dental professional. Therefore, there is a need to collect the whole picture of all different dental professionals. This review aimed to explore the literature about the perception, awareness, and knowledge of all dental professionals about teledentistry in Saudi Arabia.

METHODS

Peer-reviewed literature was searched in databases including Web of Science, Scopus, PubMed, and Google Scholar with no time limits using the keywords: “Teledentistry”, “dental telemedicine”, “Saudi Arabia”, “Perception”, “Knowledge”, “Awareness”.

RESULTS AND DISCUSSION

There were seven relevant studies published between 2019

and 2021. Two studies targeted all dental professionals while another two studies investigated the dentists. Undergraduate dental students were investigated by one study as well as postgraduates. One study focused on both undergraduate and postgraduate dental students (Table 1).

Perception, awareness of teledentistry among dentists:

Alawwad et al. (2019) conducted a cross-sectional study among dentists in Abha, Saudi Arabia to assess their knowledge and awareness regarding teledentistry. They found that 66% of them were not familiar with teledentistry. Interestingly, more than half of the participants were willing to practice teledentistry after it has been explained to them. Moreover, around 48% of the dental professionals answered; yes, when they were asked if they thought teledentistry would help in health education. The study concluded that the level of knowledge among the participants was low while attitude towards it was good which in accordance with dental professionals perception and knowledge from Rwanda and Pakistan (Latif et al., 2016) (Murererehe et al., 2017) (Alawwad et al., 2019) (Abbas et al., 2020).

Al-Kalifah and AlSheikh asked the Saudi dental professionals regarding their beliefs about the usefulness of teledentistry for the patients as well as the dental practice. They also explored their perception of the potential and any concerns about teledentistry. The authors found that 70% of the participants are strongly believing that teledentistry would improve dental practice. Therefore, they concluded that the Saudi dental professionals are ready to participate in teledentistry projects which are different from the Brazilian dentists who showed inadequate preparedness to implement teledentistry (Al-Khalifa and AlSheikh, 2020) (Raucci-Neto et al., 2021)

Another cross-sectional study examined the perception of teledentistry among a convenient sample of Saudi dentists between January and December 2017 (Alsharif and Al-harbi, 2020). They used the Teledentistry Survey which is a questionnaire developed by Mandall et al. (2005) for assessing dental practitioners' self-perceptions of teledentistry. It measures the teledentistry perception by asking about efficiency in patient care, cost reduction, capabilities for improving practice, and security and confidentiality (Mandall et al., 2005). Results of Alsharif and Al-harbi showed that 65% agreed that it could shorten waiting lists. Moreover, half of the participants could see teledentistry reducing the potential cost of dental care (Alsharif and Al-harbi, 2020). This contrasts with the perception of dentists from the UK who questioned the effect of teledentistry in terms of the dental care cost and the time of dental visits (Benson, 2005).

More recently, Almazrooa and her colleagues explored the benefits and concerns of Saudi dentists regarding teledentistry. Through a validated 40-item questionnaire, they investigated 148 dentists from different specialties. Remarkably, eighty percent were confident about the positive impact of teledentistry on their daily dental practice. They found that half of the participants had a previous clinical experience with teledentistry. Of those

who practiced teledentistry before, around 74 % were using their smartphones to take clinical photographs (Almazrooa et al., 2021).

On the other hand, Zahara et al. found that 80% of their Pakistani dentists' sample never used teledentistry although

they were believing in its benefits and applicability especially during the COVID-19 pandemic (Zahra et al., 2020). Almazrooa and her team recommended that a nationwide educational program be implemented to enhance the awareness about teledentistry among Saudi dental practitioners since teledentistry has the potential to improve the diagnostic dental service (Almazrooa et al., 2021).

Table 1. Perception, Awareness, and Knowledge of Dental Professionals About Teledentistry in Saudi Arabia

Author, Year	Participants	Outcomes	Results	Recommendations
Alawwad et al 2019	Dental Professionals	Knowledge	Low	1- Structured education programs and courses. 2- Central government legislation of teledentistry.
Al-Khalifa and AlSheikh 2020	Dental Professionals	Perception of usefulness of the teledentistry Perception of the capability of the teledentistry to improve practice	70% agree or strongly agree 60 % uncertain with technical reliability, privacy, and diagnostic accuracy.	1- Further investigation of the teledentistry models is needed to understand more. 2- Educate dentists and the public on teledentistry and its potential.
Alsharif and Al-harbi 2020	Dentists	Attitude	Good	1- make evidence-based policy decisions. 2- Further research to examine patients' acceptance of teledentistry.
Almazrooa et al. 2020	Dentists	Experience Attitude Experience	50% of the participants had experience 83% believe it can improve daily dental practice 70.5% never used teledentistry before the COVID-19 pandemic	Development of national programs to educate the public and promote teledentistry among dental practitioners are warranted.
Nishath et al 2020	Undergraduates and Postgraduate Dental Students	Knowledge Attitude	33.3 % were aware that teledentistry is practiced in Saudi Arabia Above 75% have interest in teledentistry training	Implement of teledentistry-related continuous dental education programs and workshops in the dental schools of Saudi Arabia
Khalid T. Aboalshamat 2020	Undergraduates	Knowledge	Low	1- Greater efforts are needed to educate dental students on teledentistry 2- There are barriers to teledentistry that need to be addressed
AlAssad et al. 2021	Dental Students Postgraduate Dental Students	Attitude Awareness Experience	Acceptable 69% were aware of teledentistry 70.5% never used teledentistry before the COVID-19 pandemic	1-Further awareness among postgraduate dental students in Saudi Arabia should be encouraged. 2- Conducting continuous dental education programs and awareness campaigns.

Perception, awareness of teledentistry among dental students: At the time of the COVID-19 pandemic, Aboalshamat et al. investigated, through a validated self-reported questionnaire, the knowledge, attitudes, practices, and barriers to teledentistry use among dental students. Only 17% of the participants were familiar with the term “teledentistry”. However, when it was explained to them, more than 65% stated that they would like to practice teledentistry and about 70% thought that the adoption of teledentistry is compatible with the national Saudi Vision 2030 (Council of Economic and Development Affairs, 2016). The perception of these students is similar to what George et al found where younger Indian dental professionals are more positive about teledentistry than older dentists (George et al., 2021). Aboalshamat et al. pointed out that patient satisfaction and privacy issues were the main concerns of the participants about teledentistry (Aboalshamat, 2020).

Moreover, Nishath et al. in 2020 assessed the knowledge, awareness, and attitude of teledentistry among undergraduate, graduate, and postgraduate dental students in Riyadh City through a structured, self-administered, and close-ended questionnaire. They found that out of 240 dental students who completed the survey around one-third of dental students knew about teledentistry. Significantly, most of the students (postgraduates and graduates) were willing to have teledentistry training. The authors concluded that postgraduate and graduate dental students have enough knowledge, awareness, and attitudes towards teledentistry particularly after the COVID-19 experience (Nishath Abdullah et al., 2020).

This impact of COVID-19 on the perception, knowledge, and attitude of Saudi dental students towards teledentistry is similar to that of Colombian one (Plaza-Ruiz et al., 2021). Recently, AlAssad et al. carried out a cross-sectional study to measure the knowledge, awareness, and attitude of teledentistry among 102 postgraduate dental students. Sixty-nine percent of the participants were aware of teledentistry. However, interestingly, seventy percent of the participants practiced teledentistry only after the COVID-19 pandemic (AlAssad et al., 2021). The authors pointed out that there was no age or gender statistical difference with regard to teledentistry questions which is opposite to the findings of George et al. (George et al., 2021). This can be explained as the sample of AlAssad was confined to postgraduate students who are most likely similar in their age.

CONCLUSION

The perception, awareness, knowledge, and attitude of dental students and dental professionals in Saudi Arabia about teledentistry are similar to those of their colleagues worldwide. When compared to other different countries, dental students and professionals in Saudi Arabia have a more positive attitude which could be due to the young age of majority of Saudi people. Sustainable and structured teledentistry models and formal education programs are recommended to utilize the benefits of teledentistry.

Data Availability Statement: The database generated and /or analysed during the current study are not publicly available due to privacy, but are available from the corresponding author on reasonable request.

Conflict of Interest: Authors declare no conflict of interests to disclose.

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