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Short Communication

Teledentistry in the Time of Conflict in Sudan

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Abstract

Background: The War in Sudan between the Sudanese armed forces and rapid support forces has left undeniable impacts on the healthcare system which is already compromised by decades of neglect. Hospitals were bombed or occupied by conflict parties. Healthcare providers were killed or assaulted, citizens were forced to displace, and access to healthcare was impaired in many cities. Teledentistry is a modern and promising way to provide dental consultations. It is an easy, safe, and affordable solution for both patients and dental personnel in times like war. This short communication aims to urge the need to implement teledentistry to facilitate access to dental services during the current conflict in Sudan.

Methods: This article discusses teledentistry, which according to the American Teledentistry Association (ADA) is the use of electronic information, imaging, and communication technologies, such as audio, video, and data communications for oral care delivery, diagnosis, consultation, treatment, and education. The healthcare system in Sudan is currently facing many challenges such as a lack of healthcare providers, economic crisis, inability to access dental health centers, and political instability. The application of teledentistry will facilitate access to oral healthcare and provide optimum solutions during the current conflict in Sudan.

Conclusion: Implementation of teledentistry during military conflicts is a golden solution for both patients and dental care providers as it is a time-saving, cost-effective, safe, and quick way to access oral healthcare services.

Keywords: teledentistry, conflict, oral health, dentists, war, Sudan

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1. Introduction

The current conflict in Sudan has affected the delivery of healthcare services. Civilians in Khartoum state have become trapped inside homes and isolated from access to vital needs. Additionally, problems of water and electricity worsen the situation [1]. The lack of supplies and personnel has resulted in about 90% of healthcare centers to stop functioning [2]. Approximately, 80% of the healthcare services are located in Khartoum State, therefore, a paralysis in the healthcare system in Khartoum means a general paralyzation in the whole healthcare system in Sudan [2]. According to the United Nations office in Sudan, some factors make access to healthcare centers very difficult such as lack of supplies, hospital occupation, and assaults on health providers [3].

Telemedicine is the use of smart electronic technologies to provide healthcare services. Telemedicine and teledentistry grant many benefits to society, specifically underserved communities. Moreover, it is time-saving, cost-effective, and applicable during armed conflict and environmental disasters. Teledentistry is an inventive way to connect patients with specialists and dental practitioners worldwide for the provision of oral healthcare services [4]. It is defined as using electronic information, imaging, and communication technologies, like interactive audio, video, and data communications to deliver dental care, diagnosis, consultation, treatment, transfer of dental information, and education [5]. Teledentistry is a practical option especially in isolated populations as a result of distance, lack of dental personnel, or absence of security due to the existence of wars and conflicts [6].

This short communication highlights the urgent need for implementing teledentistry during the current conflict in Sudan. It represents a summary of the experiences, requirements, and benefits of using teledentistry from previous studies.

2. Steps needed

Various steps and needs are required to implement teledentistry successfully. Dentists should meet the existing standards of practice and both ethical and legal obligations [7]. They should take informed consent to collect patient information and should bear in mind the later need for in-person treatment or clinical examination appointments [7, 8]. Teledentistry requires fast Internet and modern electronic and digital equipment to deliver healthcare services accurately [7, 9]. There are two forms of teledentistry: Real-time consultation, which is the immediate transfer of information, and "store and forward," where data is stored and forwarded later as needed [10]. The store-and-forward teledentistry is the system widely used and consisting of a computer with a hard drive memory, digital and intraoral camera, RAM, speedy processor, and Internet connection. In some situations, there may be a need for a fax machine, printer, and scanner. Live video conferencing is enabled through the standalone IP/ISDN video conferencing or PCI codec board installation into the system.

3. Advantages and Disadvantages of Teledentistry

As with any new system, teledentistry has several advantages as well as disadvantages as stated in Table 1 [11].

Table 1: Benefits and limitations of using teledentistry [11].

Benefits	Limitations
Time-saving	Need smart digital equipment
Cost-effective	Technology illiteracy
Inequalities in healthcare are minimized	Consent is needed
Reduction of unnecessary referrals	Difficulty in radiographic and clinical examination
Reduces patient's anxiety	It depends on the quality of technology available
Strengthens the communication between dentists	Availability of Internet access
Helps build a career through online learning	Decreases psychomotor skill training

4. Teledentistry in various fields of dentistry

Teledentistry can be implemented in various specialties to treat oral diseases, for example, in oral medicine it was found that distant diagnosis using images is very effective in the diagnosis of oral lesions [12].

In oral/maxillofacial surgery, teledentistry-aided diagnosis of impacted and semi-impacted third molars was equivalent to real-time clinical diagnosis. It also proved to be a cost-effective way of preoperative assessment of dentoalveolar fractures [13].

In orthodontics, teledentistry can solve minor emergencies at home, furthermore, reducing the time of visits to the dental facility [14].

Pediatric teledentistry constitutes an alternative to the visual oral examination in cases of childhood caries [15].

In endodontics, the success of the identification of root canal orifices and periapical lesions through digital images has been reported [16, 17].

In cases of oral rehabilitation, video consultations can be sufficient for planning treatment for cases that need prosthetic treatment [18].

In periodontics, teledentistry assists in the diagnosis of periodontal diseases and their early detection. Suture removal under teledentistry-aided supervision of periodontists was also reported as a success [19].

5. Recommendation

Numerous actions and steps are needed to make the provision of oral healthcare through teledentistry more effective.

Setting up online educational courses about teledentistry and the knowledge about using computers is recommended.

Oral healthcare providers must be licensed by the Sudanese Medical Council. Moreover, they must ensure the security and privacy of their systems to protect patients' confidentiality [21].

It is crucial to raise awareness among the Sudanese population about teledentistry, which can be done using social media to increase its acceptance.

Consultation fees should preferably be low, taking into account the conditions of war and the hardships of living.

6. Discussion

The current conflict has put an extra burden on the already fragile healthcare system of Sudan. Lack of healthcare providers, economic crisis, inability to access dental health centers, and political unrest

Table 2: Application of teledentistry in various fields of dentistry.

Diagnosis	Dental caries, traumatic dental injuries, periodontal diseases, discoloration, etc. [20].
Treatment	Prescriptions in oral medicine diseases, treatment planning for orthodontics and prosthodontics, etc. [20].
Follow-up	This includes all fields of dentistry [20].
Referral	Oral and maxillofacial surgery [20].
Emergency	Traumatic dental injuries, prosthodontics, and orthodontics [20].

are just a few of many intractable problems in Sudan [22].

The integration of teledentistry into both interpersonal and national levels can provide easy access to dental healthcare services and this new facet becomes popular worldwide [6, 23]. It can be used in Sudan to overcome the current challenges faced in the delivery of dental services, especially during these times of war.

Medical personnel have been exposed to many threats since the start of the war in April 2023; many healthcare personnel have been killed, injured, and arrested. Working in such difficult conditions where safety is absent threatens the lives of those who continue to work without even receiving their wages and salaries. Teledentistry applications (videoconferencing or emailed images) will ensure safe communication between dentists and patients because of the elimination of chair time and direct interaction, thus ensuring the safety of both patient and dentist far from the dangers of being assaulted or targeted [24].

Occupation of hospitals in Khartoum by Rapid Support Force is another problem raising alarm and causing excess disruption of healthcare services. As a result, many healthcare facilities have been subjected to shelling attacks that have led to knock them out of service. The available optimum solution is teledentistry, which will provide access to healthcare services in areas of conflict and also in some rural and distant places where specialist consultation is unavailable [25].

There was a preexisting shortage of dental equipment and materials in Sudan before the war. Teledentistry connects patients and dentists virtually to diagnose, follow-up, prescribe drugs, etc. with no need to utilize materials and supplies [6, 21].

Healthcare provider shortage is another obstacle in Sudan. So through tele-dentistry, the need for dental care providers is reduced because many patients can be managed in a shorter period and unnecessary appointments can be overcome [6, 21].

A lot of people have been displaced both internally and across borders. Being both timesaving and cost-effective, teledentistry grants many noteworthy benefits to those unsaved people who may have no physical and financial capabilities [26].

As a result of this ongoing war, many healthcare workers lost their jobs and their financial situation has worsened. Teledentistry represents an opportunity for them to restore their jobs, even partially, with fees for the consultations they provide [27] which could be paid by the government or the NGOs.

In cases that require therapeutic interventions (emergency and nonemergency conditions), teledentistry can help in their management through drug prescriptions, patient assurance, and infection control until they can receive clinical treatment [20, 21].

For many years, telemedicine has been used in medicine, yet it remains unpopular in dentistry. Many reasons could be behind this, such as re-compensation, legal sanction, confidentiality and security, interconnectivity of technology across systems, and cooperation between patients and dentists.

In Sudan, both patients and oral healthcare providers may face problems like electricity cuts for days and weak internet connection. Privacy issues and paying for the services could also be an obstacle to the integration of teledentistry. However, it is undeniable that teledentistry facilitates access to oral healthcare and provides optimum solutions during this conflict [28].

7. Conclusion

The application of teledentistry during military conflicts is a golden solution for both patients and dental care providers because it is an easy, affordable, safe, and quick way to communicate and utilize dental treatment and advice. Further studies are needed to navigate Tele-dentistry applications.

Declarations

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Ethical Considerations

The information provided in this manuscript is of the author's and coauthor's own opinion. The recommendations and summary discussed were extracted from peer-reviewed journals and pertinent literature and were cited accordingly.

Competing Interests

The authors declare no competing interests.

Availability of Data and Material

All relevant data were within the manuscript, in case of any queries, please contact the corresponding author, Reem Esam Siddig.

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Abbreviations and Symbols

RAM: Random-access memory

IP: Internet protocol

ISDN: Integrated services digital network

PCI: Peripheral component interconnect

NGOs: Non-governmental organization

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