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The need for a smart phone application to facilitate communication between deaf-mute and hearing-impaired patients and dentists.

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Objective: This study aims to determine the difficulty of communication between deaf-mute and hearing-impaired individuals, and their dentists and the need for an application to facilitate communication. Materials and methods: This is a cross-sectional study. A self-reported questionnaire was distributed among individuals with hearing disability. We measured demographic data, deaf-mute and hearing-impaired patients experience at the dental office, their interest and ability to use modern means of communication, and their willingness to use smartphones, tablets or computers to communicate with their dentists. Fisher's Exact test was used to determine association between different variables with cut-off point ($P < 0.05$). Results: 58.5% of individuals with deafness or hearing impairment have visited dental offices. 51% of individuals reported they could not understand their dentists during visits. 45.3% stated that their complaints were understood. 30.2% of the information given by dentists were clear to them and only 24.5% of individuals were given all necessary information. 73.58% of all individuals are willing to use mobile applications to facilitate communication if recommended by their dentists. Conclusions: Many individuals with hearing disability are facing difficulties in communication in the dental office. The majority of them are willing to use a mobile application to help them communicate better with their dentists.

Introduction

Speech and hearing-impaired individuals face serious problems when it comes to communication with healthcare providers. Communication barriers should be addressed to ensure a better access for dental care.[1] Efficient communication is a crucial element for the delivery of care. The healthcare provider might not be aware that ineffective communication can affect the quality of presented care.[2] Speech and hearing-impaired individuals have poor oral health and poor oral hygiene in addition to the fear of miscommunication that may decrease the utilization of dental care.[3] One study has shown that the presence of an intervenor has helped hearing-impaired individuals to feel safer and more satisfied towards provided service, however, during emergency visits the intervenor might not be there, which will further complicate the situation.[4] Despite the existence of sign language that compensates for verbal language, communication between hearing-impaired individuals and normal people is still difficult.[5]

According to the general authority of statistics in Saudi Arabia, the number of Saudi citizens who use sign language are more than 27,748 individuals (Disability Survey, General Authority of Statistics, Saudi Arabia, 2017). A survey conducted in the United Kingdom concluded that 50% of hearing-impaired patients preferred communicating via sign language interpreters, 43% preferred communicating directly to a signing doctor.[6] Almost half of the hearing-impaired individuals in the United States have insufficient health literacy.[7]

Treatment of hearing-impaired individuals should be designed based on specific needs for each individual.[8] Communication is key in providing dental care, as lack of communication can hinder diagnosis and treatment efficacy.[1],[9] Deaf people have more severe dental and oral problems compared to healthy individuals.[10] It is recommended to initiate oral health promotion programs for the deaf to improve their access to dental services.[11]

Nowadays, mobile phones, and internet-based technologies play an important role in daily life, they reduce isolation, increase independence, and provide educational, financial, and social opportunities for users.[12] The aim of this study is to determine the difficulty of communication between deaf-mute and hearing-impaired individuals, and their healthcare providers and the need for a mobile phone application to facilitate communication.

Materials and Methods

This is a cross-sectional study that is registered at the research centre at.with registration number:.... And IRB number:.... (removed for the purpose of blinded review)

In this study, we developed a questionnaire that measures demographics, practice of participants in the dental office, and their interest in using modern communication tools in the dental office. The validity of the questionnaire was tested by having one expert in the field reviewing the questionnaire and giving feedback. The reliability of the questionnaire was determined by distributing the questionnaire to 20 participants twice, one week apart and then comparing their responses.

This self-reported questionnaire was distributed electronically via social media (WhatsApp, and Twitter), in addition to distributing it to deaf-mute and hearing-impaired individuals through the Saudi Society for Sign Language Interpreters. The target population was deaf-mute and hearing-impaired individuals living in Riyadh, Saudi Arabia.

Statistical analysis

Fisher's exact test was used to determine the association between the difficulties in communication and the need for a mobile application that aids in communication. A cut-off point of ($P < 0.05$) was set as significant. (IBM, SPSS v26.0, Armonk, NY) was used for the purpose of statistical analysis. The approval was obtained on 20-02-2020 with number: FUGRP/2020/148/91/93.

Results

52 deaf-mute and hearing-impaired individuals responded to the questionnaire. The sample included 32 males (60.32%) aged (mean = 31.6 years, SD = 13.42) and 20 females (39.62%) aged (mean = 34.35 years, SD = 14.87). 41.51% reported that they don't need hearing aid, while 58.49% reported that they need hearing aid. The distribution of the sample in terms of education level is shown in [Table 1].{Table 1}

Fischer Exact test was used to measure the relationship between the type of the disability and the socio-demographic characteristics of participants. Based on the results, it was found that age group in years ($P = 0.781$), gender ($P = 0.263$) and educational status ($P = 0.262$) were having no significant relationship toward the need of hearing aid [Table 2].{Table 2}

When measuring what factors are associated with the need of hearing aid among the patient-dentist communication, it can be seen that, those patients who stated that their dentist was supportive to feelings and experiences were significantly less being associated to the need of hearing aid ($P = 0.008$) while other patient-dentist communication parameters did not differ significantly to the need of hearing ($P > 0.05$) [Table 3] and [Table 4].{Table 3}{Table 4}

Discussion

As dental practice is an essential part of primary care clinics, practitioners often interact with deaf-mute and hearing-impaired patients seeking treatment in primary care centres. It is usually difficult for practitioners to communicate efficiently with those patients and this might compromise the service provided and sometimes cause harm to patients or failure to address their concerns.

The present study underlines the importance of a smartphone application to facilitate communication between deaf-mute and hearing-impaired patients and dentists. It evaluates the difficulties in communications faced by deaf-mute and hearing-impaired individuals and their dentists, and the willingness to use smartphones among patients with hearing and speech disability in facilitating communication with the dentists.

In this study, the most commonly used smartphones were the iPhone (71.7%) and android phone (15.09%). Since most of individuals with disabilities were having a hard time communicating with their physician, this group of people inclined to use other means of communication including social networks, email, or websites. In our study, the most frequently cited method of communication was social media networks (35.85%), followed by mobile apps (30.19%) and video conference (26.42%) while the website was the least commonly used. Although, in this study we didn't consider the use of computer in facilitating communication with the dentist. However, an earlier report indicated that computer use was less utilized by deaf-mute and hearing-impaired.[13]

Moreover, we noticed that majority of the patients (73.85%) were using their smartphones or tablets to obtain health information and those who were using smartphones or tablets were slightly higher for the patients who were in need of hearing aid. However, this did not differ significantly in both groups ($P = 0.362$). This result seems identical when asked if they would accept if the doctor can use mobile/tablet for health-related information or instruction as most of them (75%) would allow their doctor to use their gadget to provide information or instruction related to their health condition but the comparison between those who are in need and those who are not in need of hearing aid were not statistically significant ($P = 1.000$). The study suggests that communication with impaired patients is challenging especially with deaf patients.

This supports the findings of our study as most of the patients had poor communication outcome when they communicated with their dentist. For instance, only 22.6% of the patients reported that they clearly understood the explanation of the dentist which was perceived to be poor. Their understanding about the benefits or side-effects of the treatment was also poor as only 33.9% understood the explanation of their dentist related to it. Although, below half of them (45.3%) expressed that their complaint was clearly understood by their dentist.

However, the overall information given by the dentist was not clearly absorbed as only 24.5% reported that they got all necessary information. While 32% of the patients accounted that their dentist consulted them when choosing a treatment option; only 30%

reported that their dentist had given them a chance to express their fears. Despite the fact that there were limited studies that reported difficulties in communicating with deaf patients in the dental clinic, however, one study published in Brazil documented that more than a half of the dentists (56.2%) reported difficulties in communicating with deaf patients, and 97.8% desired interpreters stationed in the unit which did not seem to disagree with our results.

Whereas in Thailand, it has been reported that deaf patients often fail to obtain needed care because of communication difficulties experienced in the treatment situation which is also in line with our results.[14] However, patient-dentist communication had poor outcome, we noticed in our study that more patients were able to use both sign and spoken language which could be beneficial to them as they could use each of them alternately whenever applicable to better deliver what they are trying to emphasize during the patient-dentist communication. Although review of the literature was limited in this study, a report published in the United Kingdom, documented that the preference for communication in clinics from deaf people was spoken language (70%), followed by both sign and spoken language (17%) and the least was sign language (11%). Furthermore, it has been reported that in a clinical setting, 50% patients who use sign language prefer to communicate through an interpreter, while 43% prefer to be seen by a healthcare provider who knows sign language. However, 7% of sign language users accepted to communicate in speech by lip-reading.

Within a clinic setting, 50% of the sign language users preferred to have a consultation via a sign language interpreter and 43% indicated they would prefer to only have a consultation directly with a signing health professional; 7% would accept a consultation in speech as long as there was good deaf awareness from the health professional, indicated by a knowledge of lip-reading/speech-reading.[6] These results were not consistent with our report, as in our study, mixed language was the most commonly used by the impaired patients. We also evaluated whether patients who were in need of hearing aid had any difference related to patient-dentist communication. Based on our estimates, those patients who stated that their dentist was supportive to feelings and experiences were significantly less associated with the need of hearing aid. This indicates that patients with disabilities were not inclined to use the hearing aid once they realized that their dentist had sympathized to their feelings and experiences.

In this study, the prevalence of patients with hearing impairment who visited dental clinics was 58.5% which was lower than the study.[14] Based on that study, the prevalence of patients with hearing impairment who visited the dental care was 87% although, there were only 34.8% who needed hearing aid as a method of communication with the dentist as they used other means of communication such as lip-reading, sign language and by writing. On the other hand, in Brazil, the prevalence of patients with hearing disability who visited dental public services was lower than our result since 36.8% were identified with hearing disability.[15] Considering that their sample size was bigger than our study population which is important in establishing substantial outcome.

In summary, patients with hearing disability face difficulty in communicating with their healthcare providers who cannot use sign language. The introduction of advanced technologies and the wide use of smartphones among patients with hearing disability can give a chance for them to have better tools to communicate with their healthcare providers. Moreover, many patients with hearing disability did not mind using technological means to communicate with their healthcare providers as long as it facilitates communication and makes it easier to relay their concerns. It is evident that patients with hearing disability are not being cared to an acceptable standard, their concerns are not being understood and their expectations are not being met. Having more efficient tools for communication can upgrade the standard of care and improve overall patient experience.

The clinical significance of this study is to understand hearing-impaired individuals demand for more efficient communication methods with their dentists via smart phone application that is specially designed.

Conclusion

*Many individuals with hearing disability are facing difficulties in communication in the dental office. *Most patients with hearing disability are willing to use a mobile application to help them in communicating better with their dentist.

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Conflicts of interest

There are no conflicts of interest.

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