

Review

Awareness of Oral Health in Diabetic Patients in Saudi Arabia

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Abstract

Diabetes mellitus (DM) consists of a clinically heterogeneous array of metabolic conditions hallmarked by hyperglycemia caused by defective insulin secretion, action, or both. DM can cause various oral complications such as salivary gland dysfunction, infections including candidiasis, delayed wound healing, increased caries susceptibility, gingival and periodontal diseases, lichen planus and burning mouth disorders. Inadequate oral public health awareness of the connection between diabetes and oro-dental health issues has been noted in many studies from across the globe. Based on the current literature, it is evident that oral health is not prioritized by the majority of diabetic patients in Saudi Arabia. Saudi diabetic patients with lesser education demonstrate lower awareness levels about oral health issues in general. Similarly, more older patients have been seen to possess less oral health awareness relative to their younger counterparts. Further, they have been found to be less compliant towards meeting dental appointment targets and adopting recommended oral hygiene practices as compared to other populations studied in the Western nations. Also, non-professional advice has been noted as the dominant outlet of dental health information in case of most Saudi patients with diabetes. It is vital to reinforce the need for routinely visits to dentists for education on oral health when patients visit their diabetic clinic. Organization of structured patient education programs targeting all age groups and different types of diabetes is necessary to improve oral health awareness. It is also vital that individuals are provided with the latest recommendations on methods to practice oral health related self-care techniques in order to minimize the risk of periodontal destruction and tooth loss, thereby reducing the burden of dental illnesses on the Saudi health infrastructure.

Keywords: diabetes mellitus, Saudi Arabia, oral health awareness, dental health awareness

Introduction

Diabetes mellitus (DM) consists of a clinically heterogeneous array of metabolic conditions hallmarked by hyperglycemia caused by defective insulin secretion, action, or both (1). The main types of DM are type 1 or immune-mediated DM, type 2 or insulin-resistant DM and gestational diabetes. Chronic hyperglycemia in diabetics is linked with lifelong damage and dysfunction of various tissues and organ systems respectively, and particularly affects eyes, nerves, kidneys, and vasculature (1). It is estimated that over 285 million people suffer from DM worldwide with predictions of this figure doubling by 2030 (2). DM can cause various oral complications such as salivary gland dysfunction, infections including candidiasis, delayed wound healing, increased caries susceptibility, gingival and periodontal diseases, lichen planus and burning mouth disorders. Periodontitis is well established as the sixth complication of diabetes (3). Research indicates that diabetics are two to three times more prone to being afflicted by periodontitis and suffer from a more aggressive course of disease (4). This heightened propensity is attributed to an alteration in host response, microflora alteration subgingival, vasculopathy and impaired collagen production (5). The microbial shift in the periodontal milieu causes a dominance of gram-negative aerobic bacteria which along with increased cytokine activity accelerates destruction (6). Inadequate oral public health awareness of the connection between diabetes and oral health issues has been noted in many studies from across the globe (7-9). Allen et al. observed that hardly 33% of DM patients in their study had awareness of the periodontal complications of DM as opposed to over 98% of them having awareness about ophthalmologic complications (8). Numerous studies have shown a bidirectional relationship between periodontitis and DM (10, 11). Poorly managed DM with low glycemic control is a predisposing factor for severe periodontal disease and related tooth loss (12). Contrariwise, unmanaged periodontitis plays a role in deterioration of glycemic control by causing a persistent inflammatory state that may result in further insulin resistance (13). DM causes increased predisposition to carious lesions as a result of periodontitis (14). Susceptibility to xerostomia is also greater in diabetics due to multifactorial etiology including reduced salivation, candida overgrowth, and heightened colonization by pathogens (15). The International Diabetes Federation recommends that general practitioners should evaluate diabetic patients for

a regimen of advised dental self-care practices and initial presentations of oro-dental health conditions, and also recommend measures to enhance self-care including dentist referrals were deemed necessary (16). Conversely, in case of some individuals, dental treatment may be the only contact with the healthcare system, which further emphasizes the necessity of incorporating DM risk assessment for the overall wellbeing of the individual and community.

Methodology

This study is based on a comprehensive literature search conducted on September 12, 2022, in the Medline and Cochrane databases, utilizing the medical topic headings (MeSH) and a combination of all available related terms, according to the database. To prevent missing any possible research, a manual search for publications was conducted through Google Scholar, using the reference lists of the previously listed papers as a starting point. We looked for valuable information in papers that discussed the information about oral health awareness in diabetic patients in Saudi Arabia. There were no restrictions on date, language, participant age, or type of publication.

Discussion

DM is one of the most prevalent endocrine disorders in Saudi Arabia (17). According to a World Health Organization report from 2014, Saudi Arabia ranks second among the Middle Eastern countries in terms of disease prevalence rate and seventh, globally (18). A positive association has been noted between the level of urbanization and disease prevalence in case of DM in Saudi Arabia (19). Saudi researchers studying the effect of the disease on quality of life have found that diabetic individuals suffer from lower health related quality of life (20). One study from Madinah assessing the prevalence of dental caries in young women found that diabetic females were more likely to have carious lesions (21). Similarly, a study from Hail noted that prevalence rates of plaque were higher in DM patients than those without DM (16). Yet another study conducted at a hospital's diabetes unit in Riyadh showed a positive correlation between DM and periodontal health via reporting of plaque index which concluded that Saudi patients with chronic, uncontrolled blood sugar levels were more likely to have higher amount of calculus deposits and higher susceptibility of periodontitis (22). A study conducted at a university hospital diabetes clinic in Jeddah found that majority of their DM afflicted subjects

(>80%) visited their doctor in the preceding year, but their compliance with dental appointments was low, with just 12.6% going for their recommended dental appointments punctually (23). The limited compliance with timely dentist appointments noted in this case reiterates findings of other studies held with Saudi women that observed only an 8% rate of diabetic females attending dental appointments consistently (23) similar to one such survey performed with Jordanian DM patients which noted that scarcely 10% of subjects visited their dentist regularly (7). Observations from Middle Eastern studies (39%) concerning dentist appointment compliance showed lower rates in general compared to other studies performed in the Western nations (43%) (8, 24).

Findings from one online survey assessing knowledge of adult diabetics from across Saudi Arabia regarding the implications of DM on oral health as well as recommended self-care measures showed that around 76% of the subjects were knowledgeable on these matters (25). This rate was noted to be much higher than the majority of reports from various regions globally ((7-9). This may be attributable to the fact that the population in the beforementioned survey consisted of Internet users, who could have had a greater extent of common health related knowledge. Further, nearly 50% of the responders in this survey had completed undergraduate or postgraduate programs (48.5%), which may mirror a greater degree of general knowledge and awareness (25). In contrast, majority of similar survey studies performed on DM patients at hospitals and outpatient departments found a smaller extent of oral health awareness (8, 22).

The study conducted in Hail in a cohort of dental patients at a university hospital clinic showed that the majority of the patients has general awareness of the dental problems associated with DM (16). But the bulk of these participants had failed to convey to the attending dental practitioner their diabetes status thereby showing a lack of awareness regarding the importance of reporting their diabetes history to the dental professionals for effective management of their condition. This shows the existence of communication issues between the clinician and the patients and highlights the requirement for awareness programs for public so that they get more knowledge regarding the link between oral health and DM.

The observations from the above-mentioned Jeddah-based study involving a university associated diabetes clinic also found that scarcely 22.2% of the subjects performed toothbrushing two times per day, hardly 65.4% once per day, and the bulk of subjects (73.6%)

reported to never having performed dental flossing for interdental cleaning indicating that dental hygiene practices were not practiced regularly in this cohort (22). Hence, motivation for observing appropriate dental hygiene practices along with knowledge regarding their utilization must be provided to improve periodontal wellbeing and avoid gingival problems in this highly predisposed population. Comparable results showing improper dental health in DM patients have been observed by other Middle Eastern investigators (7, 26, 27).

Another observation from this study showed that no subjects in this study had ever been recommended to brush their teeth by their provider and hardly 5.2% had been advised from a general practitioner to schedule dental visits routinely indicating a large undervaluing by primary care doctors of the significance of dental care for DM patients (22). Dental practitioners, general practitioners, and allied health practitioners need to impart precise and effortlessly comprehensible knowledge to individuals diagnosed with DM regarding the link between DM and dental health and must motivate them to have dental health assessments regularly. Diabetics need to be educated regarding their potential for avoiding or limiting periodontal destruction as well as improving long term health outcomes by adoption of dental health practices.

Based on the above data regarding the study participants dental visits, it is clear that oral health is not prioritized by the majority of DM patients in Saudi Arabia. Further, they have been found to be less compliant towards meeting dental appointment targets and adopting recommended oral hygiene practices as compared to other populations studied in the Western nations (22). It is vital to reinforce the need for routinely visits to dentists for education on oral health when patients visit their diabetic clinic. These patients must also be provided knowledge regarding the dental and systemic effects of DM. The studies showed a gradient in oral health knowledge with participants from urban areas being more aware of the relation between DM and general health. However, in comparison to general health aspects, when assessed specifically for their awareness about the influence of uncontrolled blood sugar levels on gingival and periodontal health, only 68% of the subjects showed awareness on these particular repercussions (22). The same research study studied the main sources of knowledge of oral health implications among Saudi DM patients and found that friends and family (~52%) were the most beneficial in raising awareness. This highlights

that even today, the most impact on oral health awareness among the diabetic population in Saudi Arabia is from a non-academic origin. Therefore, there is a pressing need for easily comprehensible oral health educational materials and programs in diabetic clinics that provide adequate, accurate knowledge. The number of dental visits made by the diabetic participants in this study showed positive correlation with the extent of awareness on periodontal effects of chronic hyperglycemia. This emphasizes the positive role of contact with medical professionals. Moreover, it was also noted that participants who attended dental appointments regularly had more insight into the association between DM and oro-dental health (22). The other abovementioned pan-Saudi study conducted online had only 44% respondents report about receiving dental health related recommendations from healthcare professionals (25). Among these, only 23% participants reported to receiving this information from dental care providers including dentists as well as allied dental health professionals. However, the researchers speculated the possibility of this finding arising due to only 15.1% respondents having regular exposure to dental health professionals, especially as these respondents reported visiting dental offices more for emergencies than for routine dental examinations. Interestingly, as opposed to the study conducted at the university diabetes clinic in Jeddah, the bulk of these online respondents hailing from across Saudi Arabia reported to obtaining their information about oral health implications of DM from media (31%) firstly, and the second most common source of information was reported as dental care providers (25). This reiterates the findings from other study noting the lack of professional advice as the dominant outlet of dental health information for Saudi patients with DM. The online survey also noted the relation between level of education and oro-dental health awareness. It was noted that participants with lesser education had lower awareness. Similarly, more older participants were reported to have less oral health awareness than younger respondents. The researchers suspected that accessibility and use of internet may be responsible for these patterns with people with more education using internet more and for purposes of obtaining health related information. Currently, there are only a few Saudi studies assessing the role of diabetes related education in relation to glycemic control mainly (28-30). This is important as it highlights the necessity of conducting more research to detect hinderances to raising knowledge and compliance rates of DM patients. The findings from the above studies also indicate the

need for the public and private healthcare bodies and insurance providers to unite for creation of a system for aiding diabetic patients to attend routine dental appointments as was initially implemented in the United States via the National Institutes of Healthy People Initiative in 2010 (31).

Conclusion

The significance of the maintenance of dental hygiene and oral health need to be stressed further among individuals suffering from DM because of the periodontal complications associated with chronic hyperglycemia. The growing incidence of DM is a cause for concern and the need for increasing their oro-dental health knowledge and awareness as is evident from the studies discussed above necessitates the creation of structured patient education programs targeting all age groups and different types of diabetes. It is also vital that these individuals are provided with latest recommendations on methods to practice oral health related self-care techniques in order to minimize the risk of dental caries, gingivitis, periodontitis, and tooth loss and thereby reducing the burden of dental illnesses on the Saudi health infrastructure. Both medical and dental care providers as well as DM patients need to be trained and advised regarding the significance of sustaining adequate dental hygiene.

Disclosure

Conflict of interest

There is no conflict of interest

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Ethical consideration

Non applicable

Data availability

Data that support the findings of this study are embedded within the manuscript.

Author contribution

All authors contributed to conceptualizing, data drafting, collection and final writing of the manuscript.

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