

# Oral Hygiene; Knowledge, Attitude, and Practices among Diabetic Patients: An Overview

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## Abstract

Diabetic patients are at greater risk for several oral health complications, particularly periodontal disease. Periodontal disease has an impact on diabetes control. Good oral hygiene knowledge and practices are recommended to prevent and manage oral health problems.

Diabetic patients have limited knowledge about the risk of diabetes on their oral health, lack compliance with recommended oral hygiene behavior. Knowledge and oral hygiene practices levels are better among patients with controlled diabetes. It is therefore essential to educate patients about their increased risk for oral complications and motivate them for good oral hygiene practice, facilitate access to dental care, and advise them to have regular dental checkups.

**Keywords:** Oral hygiene; Diabetes Mellitus; Oral hygiene Knowledge; Attitude; Practices

## Diabetes Mellitus (DM)

Diabetes Mellitus (DM) is a chronic, progressive, metabolic disease that is characterized by high levels of glucose in the blood. It results from an absolute or relative deficiency in insulin secretion from pancreatic beta cells or an increased cellular resistance to the action of insulin (American Diabetes Association, 2017).

According to the International Diabetes Federation, there are currently 415 million individuals worldwide with type 2 diabetes mellitus, and this number is expected to rise to 541 million adults by 2030. (IDF,2021).

In Palestine, DM is becoming an epidemic. Diabetes and its possible consequences have substantial morbidity and mortality rates, which have significant health care costs for people, families, and society (Imam, 2019).

The political and economic fragility of Palestine means that, despite the rising incidence and prevalence of diabetes, only few researches have examined the disease prevalence and management. The prevalence of type 2 diabetes (T2DM) in Palestine is underreported. The annual incidence rate of T2DM ranged from 150 to 220 per 100,000 people in the Palestinian national population-based survey (Khader, et al. 2013)). According to the Palestinian Ministry of Health, diabetes-related death was the fourth largest cause of death in 2014, accounting for 8.9% of all deaths. Diabetes has a 9.1 percent prevalence among Palestinians aged 20-79 (Imam, 2019).

The World Health Organization has classified diabetes mellitus as a pandemic disease because of its high incidence and increasing prevalence (Standl, et al., 2019). The 2013 International Diabetes Federation Diabetes Atlas estimates that 387 million people around the world have diabetes, and that figure is expected to reach 592 million by 2035. (Guariguata, et al., 2014). Systemic and oral problems are common in diabetics with uncontrolled blood glucose levels (Zeitler, et al. 2014). Macrovascular and microvascular disorders are the most frequent chronic DM consequences. Adult patients with severe periodontitis had a higher prevalence of macrovascular and kidney issues than diabetic adults with mild periodontitis and gingivitis, suggesting that periodontitis is linked to the characteristic DM consequence (Gupta, et al, 2017). Xerostomia (dry mouth) causes an increased risk of oral fungal infections (oral candidiasis), dental caries, poor wound healing, taste impairment, burning mouth syndrome, and periodontal disease in those with diabetes (Yuen, 2016). Periodontitis may be more severe and aggressive in people with DM as a result of their weakened immune system and healing abilities. This condition may also affect glycemic control, as it has been established that DM management improves after the treatment of periodontitis (Poudel, et al., 2018). In order to prevent and treat periodontal/oral disease as well as manage DM, DM patients should be educated on the two-way relationship between oral health and DM (Albert, 2016).

### ***DM and Periodontal Disease***

Many medical problems including diabetes increase the risk of periodontal disease which has become more severe and progressive (Guzman et al., 2013). As a result, the dental health of diabetes patients has been examined extensively in the recent past, there is significant evidence to show that diabetes mellitus affects the incidence and severity of periodontitis (Sogi and Bhaskar, 2015). When diabetes is poorly treated, people with diabetes are more likely to develop gum disease. Those with diabetes have a higher risk of developing periodontitis than those without diabetes (Loe, 2014).

Periodontal disease is the sixth most prevalent consequence of diabetes mellitus, according to research (Löe, 1993). In comparison to other systemic disorders like hypertension, diabetes mellitus is the biggest risk factor for periodontal disease (Lalla and Lamster, 2012).

Glycemic control and diabetic complication severity are greatly reduced by periodontal infection with Gram-negative organisms (Nazir, et al., 2017). A self-reinforcing catabolic process that includes inflammation, tissue death, and insulin resistance occurs when diabetes and periodontal disease are concurrently present (Tsai, et al., 2016).

Public health is concerned about oral illnesses because of their high prevalence and the negative impact they have on quality of life. These oral disorders may be caused by genetic predispositions, developmental issues, poor oral hygiene, and traumatic events (Simpson, et al., 2015). According to a wide range of characteristics, patients are more likely to adhere to oral health care regimens if they are educated and encouraged. Lack of information is the main reason behind why people don't practice good dental hygiene. Also important to oral health behavior is the person attitude and ideas about oral health (Cheng, et al., 2018). The dental expert and the patient must work together to maintain a healthy mouth. The view of a population on their dentition is one of the most critical elements in determining their dental health (Martin, et al., 2017).

Approximately 90-95 percent of diabetics have type 2 diabetes, which is the most prevalent kind (Ogurtsova, et al., 2017). When untreated, chronic hyperglycemia associated with type 2 diabetes (T2DM) can result in serious short- and long-term adverse events affecting both general and oral health (for example, diabetic nephropathy, neuropathy, retinopathy, atherosclerosis, peripheral artery disease/amputation, cardiomyopathy) as well as general and oral health (for example, periodontitis, dental caries, xerostomia, edentu-

lous, soft tissue lesions) (Shrivastava, et al., 2018). Medical problems of type 2 diabetes are widely known, but the impact of the disease on dental health are less well understood (Verhulst, 2019).

“Oral health,” according to the World Health Organization (WHO), is “a state of being free from mouth and facial pain, throat and oral cancer, tooth loss, tooth decay, oral infection, and sores, periodontal (gum) disease, and other disorders that limit an individual’s capacity in biting, chewing, smiling, speaking, and psychological well-being” (Furuta & Yamashita, 2013).

“Changing the paradigm from a narrow focus on disease to a more comprehensive view that takes into account one’s self-perception of the impact of dental conditions on individual wellbeing, as well as the valuation of the impact of oral health on physical, psychological, and social quality of life, is necessary for improved oral health outcomes (de Pinho, et al., 2012).

Periodontal disease is an infection in the mouth, but recent studies have shown that the inflammatory pathways in the mouth are linked to the overall health of the body. The high incidence of periodontal disease is a serious public health concern because of the relationship between periodontal disease and overall health (Seymour et al., 2007). The disease’s educational value extends beyond the individual’s health to the well-being of society and the economy, necessitating more study.

Periodontal disease is an infection in the mouth, but recent studies have shown that the inflammatory pathways in the mouth are linked to the overall health of the body. The high incidence of periodontal disease is a serious public health concern because of the relationship between periodontal disease and overall health (Seymour et al., 2007). More studies are needed because of how much of an impact the disease has on society as a whole, not simply the health of individuals.

Periodontal disease is mostly caused by poor dental hygiene on a regular basis. Gingival inflammation is a symptom of periodontal disease, which is triggered by the breakdown of the supporting components of the periodontium. There are specialized tissues in the mouth known as the periodontium, which help to support and keep teeth in the jaw and skull. The gingiva (gum), cementum, alveolar bone, and the periodontal ligament make up the periodontium. Tooth decay or loss occurs if the periodontium and its components are not preserved or restored by adequate oral care.

Gingivitis is a typical precursor of periodontitis, a disease that affects the tissues of the gums. Periodontal disease known as gingivitis is characterized by redness and swelling of the gingiva, the gum tissue that covers the teeth’s roots (National Institute of Dental and Craniofacial Research, 2013). Poor dental hygiene is the most prevalent cause of gingivitis. Gingivitis can be prevented during the earliest stages of inflammation, when no bone loss has occurred, by practicing good dental hygiene (Goldstein, 2014). Plaque is the major cause of gingivitis in around 75% of persons in the United States (Albandar et al., 1999).

### ***Patients’ awareness and attitudes towards Oral Health Protocol***

Many studies were conducted using study participants that were assessed on their degree of awareness of the dangers of oral health problems related to diabetes, the necessity of effective diabetic management, and preventative oral health habits (brushing, flossing and frequent dental visits) that can minimize the risk of oral health problems. Studies showed that more than half of diabetics are not aware of the connection between their condition and their dental health, particularly the higher risk of developing periodontal disease (Yuen, et al., 2009; Orlando, et al., 2010; Arunkumar, et al., 2015; Sahril, et al., 2014). According to a few research, individuals with type 1 and type 2 diabetes were aware of the relationship between dental health and diabetes and obtained this information mostly through dentists, doctors, and the media (Al Amassi, & Al Dakheel, 2017; Ummadisetty, et al., 2016).

At least two times daily brushing, once daily flossing, and twice-yearly dental appointments were all linked to good oral health knowledge in a study performed in the United States by Yuen et al., 2009 ( $p = 0.01$ ). Similarly, a high level of education ( $p = 0.05$ ) and having received oral health information ( $p = 0.008$ ) were also substantially linked with appropriate oral health knowledge (Al Amassi, & Al Dakheel, 2017).

Relevant attitudes included perceptions of oral health's importance, self-rating of oral health status, agreement/disagreement on the relationship between diabetes and oral health, and reasons for delaying or denying dental referrals. Patients with diabetes were less likely than those without diabetes to assess their overall dental health as bad (Kejriwal, et al., 2014). Study participants from high-income countries rated their oral health status higher than those from low-income countries (Poudel, et al., 2018). When it comes to dental health, over half of participants (49 percent) said it's just as essential as maintaining a healthy body, but just a third (33 percent) thought plaque or tartar buildup was an issue (Orlando, et al., 2010). A few of the interviewees were also skeptical that there was a relationship between diabetes and dental health (Bangash, et al., 2011).

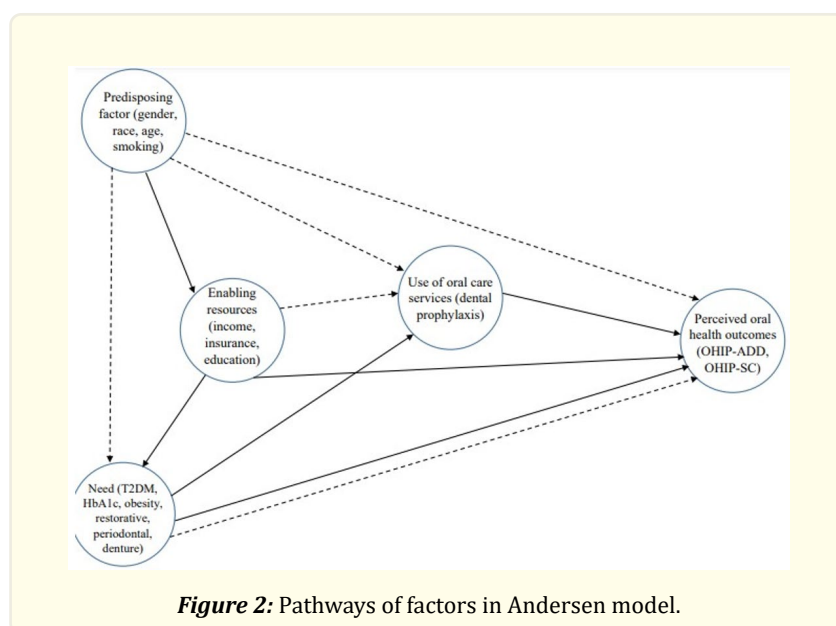
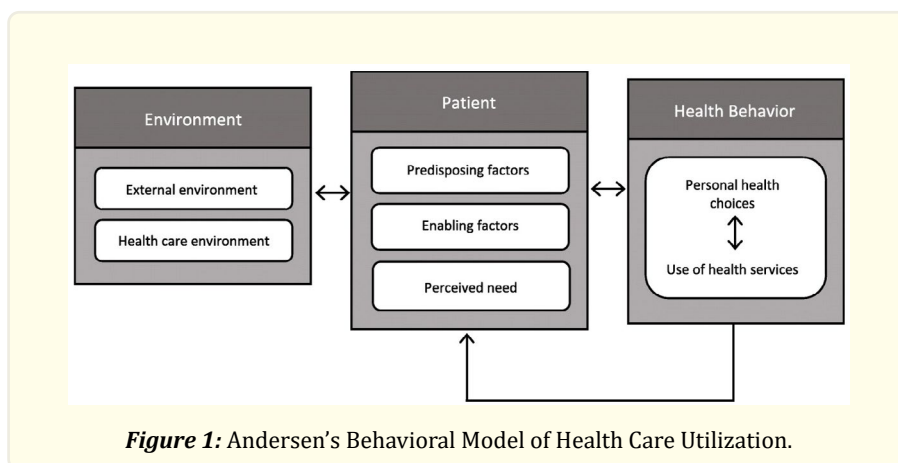
More than half (51 percent) of diabetics in Malaysia refused a dental referral because they felt their tooth problems were not significant, according to a survey (Sahril, et al., 2014). Some of the most common reasons cited by participants for not going to the dentist on a regular basis were dental costs, a lack of dental issues, uncomfortable dental visits, and the difficulty of organizing an appointment (Poudel, et al., 2018). In high-income nations, the expense of dental treatment was the primary cause for reduced dental visits, but in low-income countries, the perceived lack of necessity, pain, and fear of oral health care were the primary reasons (Aggarwal & Panat, 2012). Participants from low-income nations were more likely to visit the dentist if they needed immediate care (Aggarwal & Panat, 2012). Additionally, research in Ireland found that 32% of participants would rather preserve a painful posterior tooth than have it extracted (Allen, et al., 2008).

Patients' brushing, flossing, and dental appointments were all considered as part of oral health care procedures. Fewer than half of those with diabetes (mean 49.3%, 95 percent CI 35.70-62.90) reported brushing twice daily in the trials (n = 18). (Poudel, et al., 2018). Low- and middle-income nations like India, Malaysia and Jordan had a very low uptake of dental services (mean 34.6 %, range 10%-75.60 %), compared to high income countries (mean 60.6%, range 12.6-95.4 %), which included the United States, UK and Sweden (Poudel, et al., 2018).

Participants' oral health behaviors improved significantly after they were exposed to oral health information (Yuen, et al., 2009).

Andersen Behavioral Model ABM is one of the most well-known conceptual models used in the analysis of health services and key health outcomes (Figure 1) (Babitsch, et al., 2012). It provides a framework for the analysis of factors that influence utilization of health services and key health outcomes. The model was originally developed in 1968 and revised in 1995 by Andersen to analyze social, individual, and contextual factors that influence health services use (Andersen, 1995).

The model analyzes the difference in use of health services between individuals, and explains used of services by five factors: (i) predisposing, (ii) enabling resources, (iii) need, (iv) personal health practices and use of services, (v) health outcomes (Babitsch, et al., 2012). Predisposing factors include demographic characteristics (e.g., age, sex, race/ethnicity) that exist prior "health outcomes." Enabling resources are financial and organizational factors that enable services utilization (e.g., health insurance, education, cost of care). Need factors are perceived and clinician-evaluated need for health care treatment (Andersen, 1995). Some individuals may be more predisposed to seek healthcare services, and there are enabling resources that allow them to do so (Baker, 2009). However, even when predisposing and enabling factors present, health services use will only occur if an individual perceives a need for treatment or the individual is evaluated by a clinical for treatment need (Baker, 2009). The interrelationship between these three contextual factor categories will, in turn, determine the likelihood of personal health practices (e.g., smoking) and use of services (e.g., frequency of annual dental prophylaxis, reason of dental visit, dental visit frequency) (Baker, 2009). In addition, the ABM and the Baker et al., (2009) study suggest that personal health practices and use of services will influence health outcomes (both perceived and evaluated health status) and personal satisfaction with care.



## Conclusion

Diabetic patients are at greater risk for several oral health complications, particularly Periodontal disease. Periodontal disease is a consequence of diabetes mellitus. Degree of awareness of the dangers of oral health problems related to diabetes, the necessity of effective diabetic management, and preventative oral health habits (brushing, flossing and frequent dental visits) can minimize the risk of oral health problems. Patients' education and motivation especially for diabetic patient, will prevent and manage their oral health problems that might occur in the future.

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