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Attitude and awareness of increased risk for oral diseases among diabetic patients

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Abstract

Objectives: To assess: 1) awareness of diabetic patients about their increased risk for oral diseases, 2) Attitudes of diabetic patients towards maintaining good oral health through oral self-care and regular dental visits and their sources of information on oral health.

Materials and Methods: A self-administered questionnaire was used to assess the main objectives of the study. Two hundred diabetic patients ranging in age from 17 to 78 years old participated in the study.

Results: A majority of the participants had type 2 diabetes. The awareness of diabetic patients of their increased risk for oral diseases is low compared to their awareness of systemic diseases. Their attitude towards maintaining good oral health is poor. Of the participants, only 17% brush their teeth twice daily, 61% never use dental floss, and 67% had not visited a dental clinic within the last year. Regarding participants' sources of awareness, 53% learned from a dentist and 30% through other media sources. A significant association ($P<0.05$) was found between glycaemic control and oral infections and between duration of diabetes and denture problems.

Conclusions: Diabetic patients were found to have little awareness of their increased risk for oral diseases. In order to promote proper oral health and to reduce the risk of oral diseases, health professionals in both the dental and medical fields need to develop programs to educate the public about the oral manifestations of diabetes and its complications for oral health.

Keywords: attitude, awareness, diabetes, oral health

Introduction

The prevalence of diabetes worldwide has increased to epidemic proportions; the World Health Organization (WHO) estimated 30 million people had the disease in 1985 and this is projected to increase to at least 366 million by 2030 [1]. The WHO declared that the prevalence of diabetes mellitus in Libya, the country in which this study was done, was 88,000 in 2000 and estimated that it would rise to 245,000 in 2030. The American Diabetes Association classified diabetes mellitus into two types: type 1, characterized by insulin defects in its secretion, and type 2, which is mainly characterized by insulin resistance [2].

While diabetes mellitus is one of the oldest known diseases, it is only recently that much attention has been paid to the link between this disease and oral health. Diabetes mellitus is known to cause systemic and oral complications, especially in diabetics who do not have proper control over their blood glucose levels. To determine if the patient has had glycaemic control over the past 3 months or not, the level of control is measured by the glycated haemoglobin (HbA1c) [3]. Diabetes can cause both chronic and acute complications. The chronic systemic manifestations are mainly seen as macrovascular, which include coronary artery, peripheral vascular and cerebrovascular diseases, and microvascular, such as retinopathy, nephropathy, and neuropathy. The acute complications are hyperosmolar hyperglycaemia, diabetic ketoacidosis and acute infections [4].

Orally, diabetes is linked to a multitude of manifestations. Uncontrolled and long-standing diabetes mellitus can affect the salivary glands, resulting in xerostomia [5, 6] or sialosis [7, 9]. When the salivary flow is significantly reduced in xerostomia, the oral cavity is deprived of the beneficial properties of saliva. This lack of saliva can make the mouth feel sore [10], especially if the patient is wearing a denture. Washing and cleansing of the oral cavity are known functions of saliva, but a lack of saliva leads to the accumulation of plaque and debris, which could be a contributing factor in diabetics' increased risk for dental caries [11, 12]. Saliva also plays a role in taste, so that a lack of saliva along with taste receptor anomalies [13] could account for the taste impairment in patients with diabetes mellitus. In addition, saliva has an antimicrobial action that prevents the growth and adhesion of yeast [14] which acts as nutrition for candida organisms [10]. Periodontitis is one of the widely discussed oral manifestations of diabetes mellitus. It has been suggested that the relationship between periodontitis and diabetes mellitus is bidirectional, in that uncontrolled diabetes increases the susceptibility of the patient to develop periodontitis [15]. Furthermore, severe periodontitis in diabetic patients increases their risk for microvascular and macrovascular complications [16]. Thus, the prevention and treatment of periodontitis are fundamental for diabetic patients. Despite the alarming global prevalence of diabetes mellitus, little information is available on the awareness and attitudes of diabetics towards their increased risk for oral

diseases and their sources of awareness.

The aims of the current preliminary study were to assess: 1) awareness of diabetic patients about their increased risk for systemic and oral diseases, 2) their attitudes towards maintaining good oral health through oral self-care and regular dental visits and 3) the sources of their information on health care.

Materials and Methods

A self-administered questionnaire was used to assess the main aims of the study. The questionnaire and a consent form were approved by the Research and Ethics Committee of the Dental College. Subsequently, the questionnaire was distributed to the diabetic patients attending the outpatient diabetic clinic in India. An information sheet explaining the need for the study and the procedure for responding to the questionnaire was enclosed as a cover sheet. All participants were able to read and write, were free from any mental disabilities, and had a confirmed diagnosis of diabetes mellitus. Patients who agreed to participate in the study were provided with the questionnaire and consent form to complete and sign. Two hundred completed questionnaires were collected from the participants, and a HbAlc level was obtained from the medical record for each participant. Data was entered on an Excel spreadsheet and imported into the Statistical Package for Social Sciences (SPSS) version 13 (SPSS; Chicago, IL, USA) for statistical analysis. The data were analysed for frequency distributions, and the chi-square test was used to find the significance of association between frequencies, glycaemic control (as measured by glycated haemoglobin level [HbA1c]), and duration of diabetes. Statistical significance was set at $P \leq 0.05$.

Results

Among the diabetic patients participating in this survey, 78 were male and 122 were female. The age of the participants ranged from 17 to 78 years. The length of time since participants had been diagnosed as diabetic ranged from 1 week to 40 years. Eighteen percent of participants had type 1 diabetes, 71% had type 2 and 11% did not know which type of diabetes they had. Of these participants, 42% were smokers and 31% were edentulous. Of the edentulous participants, only 44% were wearing complete dentures. The percentage of participants' awareness of their increased risk for heart disease, eye disease, kidney disease, periodontal disease, oral fungal infection, and dental caries is shown in Table 1. Regarding participants' response to the question 'do you know signs of gum disease?', 66% were aware of 'bleeding during brushing' as a sign of gum disease, and 53% of the participants were aware of redness and swelling of the gums as a sign of gum disease. Eighty-four percent of participants were aware of and had experience with dry mouth. The percentages of participants with knowledge of their increased risk for soreness, ulcers, oral infections and tooth caries due to mouth dryness is shown in Table 2.

Results of the questionnaire regarding their attitude towards using a toothbrush and dental floss revealed that 17% used a toothbrush twice a day, less than half of the respondents (47%) used a toothbrush only once a day and 36% did not use a toothbrush on a daily basis. A significant proportion of the respondents (61%) indicated they never use dental floss, 12% reported using dental floss at least once a day, and 27% reported they use it but not on a daily basis (table 3).

Thirty-three percent of respondents had visited a dental clinic within the last year, 22% reported they had visited within the last five years, and 16% had gone more than five years without visiting a dental clinic. Eighty percent responded that they visited the clinic for treatment, while only 20% reported they visited for a regular dental check-up. As for the sources of participants' awareness of their increased risk for oral diseases, 53% of the participants had received this information from their dentist, 20% from a diabetic team, 3% from a dental hygienist, and 30% from other sources (table 4).

Glycaemic control of participants ranged from 6.6% to 15.4%, with a mean value of 11.0%. A significant association ($P < 0.05$) was found between glycaemic control and self-reported oral infections ($P = 0.015$), and between duration of diabetes and self-reported denture problems ($P = 0.024$). Table 5 shows the relationship between the participants' experience of pain due to oral infections and their glycaemic control. Participants who indicated they 'always' experienced pain due to oral infections over the last three months had a low level of glycaemic control (12 ± 3.4%). Participants who indicated they 'occasionally' experienced such pain over the same 3-month period had a moderate level of glycaemic control (8 ± 0.5%). Those who 'never' experienced pain had a glycaemic control level of 6.8 ± 0.2%.

Table 1: Diabetic patients' awareness of complications associated with diabetes.

Complications	Percentage (%)
Eye disease	44
Heart disease	83
Kidney disease	83
Periodontal disease	66
Oral fungal infection	47
Dental caries	44

Table 2: Diabetic patients' awareness of oral and dental complications due to mouth dryness.

Oral complications due to dryness of mouth	Percentage (%)
Soreness	28
Ulcers	39
Infections	33
Caries	39

Table 3 Oral Hygiene aids among diabetic patients

Oral hygiene aids	Percentage (%)
Tooth Brushing	
Non-daily use	36
Once daily	47
Twice daily	17
Dental Floss	
Never	61
Once daily	12
Non-daily user	27

Table 4: Diabetic patients' source of information on health care.

Source of information	Percentage (%)
Dentist	53
Dental Hygienist	3
Diabetics team	20
Other sources	30

Table 5: Relationship between participants' experience of pain due to oral infections and their glycaemic control.

Oral infections	Glycemic Control
Always	12 ± 3.4%
Occasionally	8 ± 0.5%
Never	6.8 ± 0.2%

Discussion

One of the most important findings of the present study is that the awareness of diabetic patients of their increased risk for oral diseases such as periodontal disease, tooth decay, and fungal infection is low compared to their awareness of systemic diseases. Less than 50% are aware that oral infections and dental caries are complications associated with diabetes. Similar findings were reported by Allen *et al* [3], who assessed the knowledge diabetic patients had of their risk for periodontal disease, their attitude towards oral health and their oral health-related quality of life. Those researchers found 98% of the participants were aware of their increased risk for eye disease, 84% for heart disease, 94% for kidney disease, and 33% for periodontal disease. The data presented in both studies clearly demonstrate that diabetics have more knowledge about their increased risk for systemic complications associated with diabetes than they do about oral and dental complications.

This study also reveals the additional important finding that diabetic patients have limited awareness of the harmful consequences of mouth dryness on their oral health. More than 60% of the participants were unaware of their increased risk for oral and dental diseases as a result of mouth dryness. A significant reduction of salivary flow leading to mouth dryness is the most common oral manifestation of diabetes. It is very important to inform diabetic patients about the beneficial properties of saliva and the necessity of keeping the oral cavity moist through frequent water intake. Saliva's function of washing and cleansing the oral cavity is known to prevent accumulation of plaque and debris, which could be a contributing factor in diabetics' increased risk for periodontal disease and dental caries [11, 12].

As the present survey shows, the attitude of the participants towards maintaining good general and oral health is poor. In the current study, 31% of the participants were edentulous and of these edentulous participants, only 44% were wearing complete dentures to help them chew food. More than half of the participants (65%) were without dentures and ate selected soft foods which were easy to chew and swallow. These participants are deprived of the benefits of eating healthy food. This has negative consequences on their glycaemic (metabolic) control, general health, and health-related quality of life. A recent study showed a significant association between dentate status of diabetics and their metabolic control scores, where a higher proportion of patients in the dentate group were found to have lower metabolic control scores [3]. Moreover, the current study shows a significant association ($P < 0.05$) between oral infections and poor glycaemic control. It was found that participants suffering from various types of oral infections (such as periodontal disease and mouth sore spots) also exhibited poor glycaemic control (HbA1c> 8.5%). Importantly, participants who had not suffered from any oral infection during the previous three months also exhibited good glycaemic control (HbA1c ≤ 7%). Additionally, participants suffering from denture problems (such as ill-fitting dentures) had also been suffering from diabetes for more than 10 years.

Regarding their oral self-care, maintenance of good oral hygiene was also poor. Only 17% of the participants brushed their teeth twice daily, 47% brushed once daily, while 36% did not brush on a regular daily basis. In addition, more than half of participants (61%) never used dental floss to clean between their teeth. Similarly, Bakhshandeh *et al* [17] found that of 299 participants, only 29% brushed their teeth on a twice-daily basis. The same investigators reported a significant association between moderate glycaemic control and twice-daily tooth brushing. This highlights the relationship between glycaemic control and oral health and also the importance of maintaining good oral health among diabetic patients.

The data of the present study showed that about 67% of the participants had not visited a dental clinic within the last year. For 16%, the last visit was more than five years earlier. For the majority of participants, the main reason for visiting a dental clinic within the last year was to receive treatment for pain and/or discomfort. This survey clearly shows that participants' attitude towards their oral health is poor in comparison with the findings of other surveys. Only 20% of participants in this survey had dental check-ups, compared with 37% in the study carried out by Allen *et al* [3], 47% in a survey done by Bakhshandeh *et al* [17] and 59% in the survey by Kelly *et al* [18]. Karikoski *et al* [19] assessed the effects of oral self-care on periodontal health indicators among 120 dentate individuals with diabetes and found a significant association only between frequent dental visits and a reduced amount of calculus.

The results of this survey showed that the information regarding participants' increased risk for oral diseases associated with diabetes came from a dentist (53%), a dental hygienist (3%), a diabetes team (20%) and 30% from other sources such as television programs, the Internet, magazines and friends. It is of paramount importance for dental professionals to raise diabetic patients' awareness of their increased risk for oral diseases and of the impact of oral health on their general health.

Research projects have shown that diabetic patients' awareness of their increased risk for oral and dental diseases and their attitude to maintaining good oral health have a significant impact on quality of life. Early detection and treatment of dental caries, periodontal disease and other oral diseases would be of enormous benefit in protecting diabetic patients from the harmful oral complications associated with diabetes. In fact, one of the US national health objectives to be achieved by 2010 was to increase to 71% the proportion of people with diabetes who have an annual dental check-up [20]. Thus, it is necessary for dental professionals and related government agencies to promote awareness of the relationship between diabetes and oral health.

Conclusion

In conclusion, and within the limitations of the present study, diabetic patients were found to have little awareness of their increased risk for oral diseases. In order to promote proper oral health and to reduce the risk of oral diseases, health professionals in both the dental and medical fields need to take responsibility for educating the public about the oral manifestations of diabetes and its complications for oral health.

References

1. Smyth S, Heron A. Diabetes and obesity: the twin epidemics. Nat Med. 2006; 12:75-80.
2. The Expert Committee on the Diagnosis and Classification of Diabetes Mellitus. Report of the Expert Committee on the Diagnosis and Classification of Diabetes Mellitus. Diabetes Care. 1998; 21:5-19.
3. Allen EM, Ziada HM, O'Halloran D, Clerehugh V, Allen PF. Attitudes, awareness and oral health-related quality of life in patients with diabetes. J Oral Rehabil. 2008; 35:218-223.
4. Skamagas M, Breen TL, LeRoith D. Update on diabetes mellitus: prevention, treatment, and association with oral diseases. Oral Dis. 2008; 14:105-114.
5. Sheppard IM. Oral manifestation of diabetes mellitus: a study of one hundred cases. J Am Dent Assoc. 1942; 29:1188-1192.
6. Lamey PJ, Darwazeh AM, Frier BM. Oral disorders associated with diabetes mellitus. Diabet Med. 1992; 9:410-416.
7. Russotto SB. Asymptomatic parotid gland enlargement in diabetes mellitus. Oral Surg Oral Med Oral Pathol. 1981; 52:594-598.
8. Murrah VA. Diabetes mellitus and associated oral manifestations: a review. J Oral Pathol. 1985; 14:271-281.
9. Greenspan D. Xerostomia: diagnosis and management. Oncology. 1996; 10:7-11.
10. Manfredi M, McCullough MJ, Vescovi P, Al-Kaarawi ZM, Porter SR. Update on diabetes mellitus and related oral diseases. Oral Dis. 2004; 10:187-200.
11. Rees TD. The diabetic dental patient. Dent Clin North Am. 1994; 38:447-463.
12. Finney LS, Finney MO, Gonzalez-Campoy JM. What the mouth has to say about diabetes. 6. Careful examinations can avert serious complications. Postgrad Med. 1997; 102:117-126.
13. Hardy SL, Brennand CP, Wyse BW. Taste thresholds of individuals with diabetes mellitus and of control subjects. J Am Diet Assoc. 1981; 79:286-289.
14. Samaranayake LP, Hughes A, MacFarlane TW. The proteolytic potential of Candida albicans in human saliva supplemented with glucose. J Med Microbiol. 1984; 17:13-22.
15. Ureles SD. Case report: a patient with severe periodontitis in conjunction with adult-onset diabetes. Compend Contin Educ Dent. 1983; 4:522-528.
16. Lalla RV, D'Ambrosio JA. Dental management considerations for the patient with diabetes mellitus. J Am Dent Assoc. 2001; 132:1425-1432.
17. Bakhshandeh S, Murtomaa H, Vehkalahti MM, Mofid R, Suomalainen K. Oral self-care and use of dental services among adults with diabetes mellitus. Oral Health Prev Dent. 2008; 6:279-286.
18. Kelly M, Steele J, Nuttall N, Bradnock G, Morris J, Nunn J, *et al*. Adult dental health survey: oral health in the United Kingdom 1998. London: TSO, 2000.
19. Karikoski A, Ilanne-Parikka P, Murtomaa H. Oral self-care and periodontal health indicators among adults with diabetes in Finland. Acta Odontol Scand. 2001; 59:390-395.
20. Centers for Disease Control and Prevention (CDC). Dental visits among dentate adults with diabetes-United States, 1999 and 2004. MMWR Morb Mortal Wkly Rep. 2005; 54:1181-1183.