ORIGINAL ARTICLE e-ISSN: 2349-0659 p-ISSN; 2350-0964

Dental and Oral Problems among Diabetic Patients: A Developing Country – Local Perceptual Study

Azzam A. S. AlMulhim[1]*, Ossama M. Zakaria[2,3], Mohamed Yasser Ibrahim Daoud[2], Saleh A. S. Almulhim[2]

Abstract

Background: Diabetes mellitus (DM) is a metabolic disorder that is globally considered as a commonly encountered, non-communicable disease. **Aim:** The main study objective was to gauge how a section of diabetic patients in a developing nation does perceive the general complications of DM with a special emphasis on the oral health. It also aimed to evaluate their knowledge and practice of oral hygiene and dental health care in general. **Methodology:** A cross-sectional Arabic language questionnaire-based study was performed. It included 24 questions. Study sample was those diabetic patients attending the different themes of the university health outpatients clinics. It included patients, suffering from type 1 or type 2 diabetes. Obtained data were statistically analyzed using Statistical Package for the Social Sciences for version 26.0. Armonk, NY, IBM Corporation. **Results:** Nine hundred and eighteen diabetic patients were included in the study. They were 507 females and 411 males the female-to-male ratio of 1.2–1. Their average age ranged from 10 up to 68 years. Studied sample showed 532 illiterate patients (58%). The remaining 386 literate ranged from elementary education up to university. Five hundred and seventy patients (65%) suffered of DM for more than 12 years. Among the total studied 918 patients, 165 (18%) were smokers. Three hundred and seven patients (40%) were highly oriented with the dental and oral complications of diabetes with different perceptual levels. **Conclusion:** Although DM patients are highly susceptible to suffer of an increased risk of developing dental caries, their knowledge and perception dental health was deficient. However, most of them attained satisfactory knowledge about different. Medical complications of diabetes and the effect of DM on the body systems. There overall practice of oral hygiene is found to be good. Despite the limited sample size of the current study, it highlighted the necessity of inaugurating a more intensive community educational program to educate the general population about the general health complication of DM with a special of focus on oral and dental health. It is recommended to carry other similar studies with higher numbers in the future to assure the efficacy of public educational programs.

Keywords: Dental problems, Diabetes mellitus, General complications

Asian Pac. J. Health Sci., (2021); DOI: 10.21276/apjhs.2021.8.2.14

Introduction

Diabetes mellitus (DM) is a chronic disease that presents with an abnormal increase of the blood sugar level. This will be pronounced as metabolic abnormalities affecting the carbohydrates, fat, and proteins. It is currently considered as one of the comments metabolic disorders worldwide.[1,2] It usually presents with different systemic complications due to microvascular, macrovascular, and neuropathic disorders. Moreover, uncontrolled hyperglycemia may cause many serious short- and long-term health complications, including renal disease, heart disease, and diabetic foot ulcer that may lead to amputation. Diabetic oral problems are the most commonly encountered complications of the uncontrolled DM.[3,4] Many oral problems may exist among diabetics due to both the micro- and macrovascular complications. They include gingivitis, periodontitis, xerostomia, opportunistic infections, candidiasis, greater accumulation of plaque, delayed wound healing, as well as oral paresthesia and loss of taste.[5] Periodontal diseases may also be presented due to hyperglycemia. They were reported to have double or triple the incidence compared to those among the non-diabetic populations.[4] The low flow of salivary gland secretion, and the alterations in pH of saliva in the oral cavity during the hyperglycemic status among diabetic patient, may facilitate the acid uric bacteria growth leading to dental caries.[3-6]

A mutual relationship was reported between DM and periodontal diseases that hyperglycemia induces the periodontal disorders that negatively impacted the control of blood glucose level.[7,8] Regular and proper oral hygiene is of a paramount value among the population with a higher significant among vulnerable sector such as the diabetics. The measures must include properly and regularly using the tooth brush and floss. Nevertheless, regular periodic visits to dental clinics are crucial to control and limit the hyperglycemic-related dental and oral complications.[9,10] Many factors may influence the patient's adherent to his oral and dental care among the general population and particularly the diabetics. These include the educational level, illiteracy, and socioeconomic status.[11] A holistic proper perception of diabetic patients about the disease is crucial to prevent periodontal and oral disorders. Hence, intensive educational programs must be stressed on to decrease the dental, oral morbidity, as well as a better control of the blood sugar level among diabetics.[12,13] The current study

[1]Department of General Dental, College of Dentistry, King Faisal University, Al Ahsa, KSA

[2]Department of Surgery, College of Medicine, King Faisal University, Al Ahsa, KSA

[3]Department of Surgery, Division of Pediatric Surgery, Faculty of Medicine, Suez-Canal University, Ismailia, Egypt

Corresponding Author: Azzam A. S. AlMulhim, Department of General Dental, College of Dentistry, King Faisal University, Saudi Arabia. E-mail: azzam-95-almulhim@hotmail.com

How to cite this article: AlMulhim AAS, Zakaria OM, Daoud MYI, Almulhim SAS. Dental and Oral Problems among Diabetic Patients: A Developing Country – Local Perceptual Study. Asian Pac. J. Health Sci., 2021; 8(2):67-70.

Source of support: Nil

Conflicts of interest: None.

Received: 10/01/2021 **Revised:** 20/03/2021 **Accepted:** 10/04/2021

aimed to gauge how a population's section of diabetic patients in a developing nation does perceive the general complications of DM with a special emphasis on the oral health. It also aimed to evaluate their knowledge and practice of oral hygiene and dental health care in general.

Patients And Methods

This prospective cross-sectional Arabic language questionnaire-based study was conducted in a period of 2 years from January 2018 to January 2020. The ethical approval was issued by our Institutional Research Board concerning all of the study ethically related issues. Study samples were, those diabetic patients attending the different themes of the university health outpatients clinics. It included patients, suffering from type 1 or type 2 diabetes. The implemented questionnaire included 24 questions. They were divided into five sections. The first section included six major questions to evaluate the participants sociodemographic status, educational level, special habits such as smoking and the history, and time lag since the patient's was proved to be diabetic.

The second section contained five questions to evaluate the patient's perception of diabetes in general, type of used medication, the effect on oral diseases; dental carries, gingivitis, oral fungal infections, and the influence of smoking on oral health among diabetics. The third section contained three questions, concerned with the clinical presentations of gingival diseases. The fourth part contained five questions to measure the general knowledge of different body systems diabetes-related morbidity. While the final section formed of extra five questions to find out the the patients habits and practice of proper oral hygiene etiquette. Obtained data were presented in tables and statistically analyzed using Statistical Package for the Social Sciences for version 26.0. Armonk, NY, IBM Corporation.

Results

Nine hundred and eighteen diabetic patients were included in the study. They were 508 females and 410 males the female-to-male ratio of 1.2–1. Their average age ranged from 10 up to 68 years, with a mean age of 52.6 ± 12.8. Saudi nationals were 891 patients (97.1%) compared to 27 non-Saudis (2.9%). The studied sample showed 532 illiterate patients (58%). The remaining 386 literate ranged from elementary education up to university. Four hundred and seventy-nine patients (52%) suffered of DM for more than 12 years [Table 1].

Nearly half of the included patients (49.2%) were not aware that diabetic patients are more prone to oral diseases. However, more than half of patients (51.8%) did not know that DM may cause dental carries. Yet, nearly a similar percentage (50.1%) has also expressed their ignorance about gingival affections among diabetics. Consequently, 54.7% of patients were not aware that DM may induce oral fungal infections. On the other hand, the majority (87%) expressed the proper knowledge that diabetic smokers are at a higher risk of injury to gums [Table 2]. Consequently, similar percentage of recruited patients has expressed satisfactory knowledge as regard the oral complications of DM. These include the incidence of oral morbidities, dental caries, gingival affections, as well as oral fungal infections. However, a very high percentage (87%) was highly acquainted about the harmful effects of smoking on the oral cavity among diabetics [Table 3].

Table 1: Sociodemographic data of the studied sample

Patients criteria	*Number*	*Percentage*
Gender		
Male	410	44.7
Female	508	55.3
Age (years)		
30	36	4
30	138	15
30	278	30
More than 55	466	51
Nationality		
Saudi	891	97.1
Non-Saudi	27	2.9
Educational level		
Illiterate	532	58
Elementary	125	13.6
Intermediate	32	3.5
Secondary	173	18.8
University or above	56	6.1
Smoking status		
Yes	150	16.3
No	768	83.7
Onset of diabetes (years)		
<1	20	3
1–5	239	26
5–10	180	19
More than 10	479	52

Table 2: Knowledge and perception about the effect of DM on the oral health

Question	*Yes (%)*	*No (%)*	*Neutral do not know (%)*
Diabetics usually have a higher incidence of oral morbidities	448 (48.8)	19 (2)	452 (49.2)
DM induces dental caries	419 (45.6)	24 (2.6)	475 (51.8)
DM causes gingival affection	435 (47.4)	23 (2.5)	460 (50.1)
Diabetes induces oral fungal infection	375 (40.8)	41 (4.5)	502 (54.7)
Smoking among diabetics is more injurious to the gum than non-diabetics?	799 (87)	52 (5.7)	77 (7.3)

DM: Diabetes mellitus

Table 3: Perception about gingival diseases presentations

Question	*Yes (%)*	*No (%)*	*Neutral do not know (%)*
Fresh bleeding when using with tooth brushing	240 (26.1)	54 (5.9)	624 (68)
Swollen red-colored gingiva (inflammation signs)	210 (22.9)	78 (8.5)	630 (68.6)
Soreness and gingival ulcers	210 (22.9)	90 (9.8)	618 (67.3)

More than two-third of the participating patients showed a satisfactory knowledge and perception when asked about the DM-related ophthalmologic, renal, neurologic, and cardiac manifestations, although a higher percentage of them (85.5%) expressed very good perceptual information about diabetic foot infections, ulcers, and gangrene [Table 4].

Participating patient (76.8%) visited their dentist quite often when having any oral problem, while lesser percentages (6.5%) had an adopted self-remedy as a sole management tool. The percentage of those patients who used the tooth brush was 83.2%, yet, 26.2% were seldom using it or even never brush their teeth. Overall, 65.8% expressed their intentions to have an educational program of oral care [Table 5].

Table 4: Perceptual knowledge about systemic complications of DM

Question	*Yes (%)*	*No (%)*	*Neutral do not know (%)*
Ophthalmological complications of DM	615 (67)	20 (2.2)	283 (30.8)
Renal complications of DM	608 (66.2)	14 (1.5)	296 (32.3)
Neurological complications of DM	593 (64.5)	10 (1.2)	315 (34.3)
Cardiac complications of DM	609 (66.3)	30 (3.3)	279 (30.4)
Diabetic foot infections, ulcers, and gangrene	788 (85.8)	6 (0.7)	124 (13.5)

DM: Diabetes mellitus

Table 5: Patients response to oral problems

Question	*Number*	*Percentage*
How to act when having an oral problem?		
Consult a physician	135	14.7
Consult a dentist	705	76.8
Self-remedy	60	6.5
Do nothing as it may spontaneously resolve	18	2
Do you use a brush for your teeth?		
Yes	773	84.2
No	145	15.8
How many times?		
Frequently post every meal	182	19.8
Twice daily	150	16.3
Once daily	263	28.7
Randomly or nil	323	35.2
How frequent do you perform dental care at the clinic?		
Every 3 months	45	4.9
Every 6 months	149	16.2
Every 12 months	638	69.5
More than 12 months	14	1.5
Non	72	7.9
Are you willing to be educated about DM and oral health?		
Yes	403	65.8
No	209	34.2

DM: Diabetes mellitus

Discussion

DM has many negative effects on the different body systems with many reversible and/or irreversible complications. Most of these complications need a full DM patients' perception to be avoided, early tickled, and treated. Hence, integrated educational programs are needed to avoid these complications.[14]

The current study populations were 918 patients with the higher female prevalence and majority above the 45 years of age. These data can be compared to another similar study from a relatively similar settings in the Far East.[15]

Deficient perception about DM and the oral health was so apparent among our study participants. Consequently, a respectable percentage of the current study sample lacks the general information related to DM and its general complications. This may be explained by the high illiteracy rate among the community as well as the inadequate educational health programs. These data coincide with similar local studies and globally.[16-18]

However, the current study data showed that <25% of patients were attaining adequate information and positively perceive the clinical manifestations gingival diseases including the swollen, red bleeding, and soreness of gums. These results are supporting those of the previous studies.[19,20]

Most of our study participants had enough knowledge and perception about the different systemic manifestations and complications of DM on the different body organ functions and pathology such as the ophthalmological, renal, hepatic, neurological, as well as the different vascular complications related to the disease, yet, their knowledge and information about its effect on the oral health were not satisfactory. This may be attributed to the lack of dental and oral counseling by the family medicine specialists or general physician as previously published.[12,21]

Nevertheless, a quite good percentage of our studied patients have properly practiced the measures for oral hygiene. They also used to frequently consult their dentists for a biannual or sometimes annual check-up. These findings are agreeing with others.[16,21] Yet, they did not coincide with other data that supported the deficient oral hygienic measures among diabetics.[17]

Conclusion

It may be concluded that although the general oral hygienic methods among the current studied sample were satisfactory practiced, obvious shortage of perception and knowledge about the dental and oral complications among diabetics is well documented. This will necessitate integrated dental health program to be adopted by the health authorities targeting the general community with special empathize on diabetic patients. Similar perceptual studies with larger participants number in the future may be of value to realistically gauge the success of these educational tools.

References

1. Chun DI, Kim S, Kim J, Yang HJ, Kim JH, Cho JH, *et al*. Epidemiology and burden of diabetic foot ulcer and peripheral arterial disease in Korea. J Clin Med 2019;8:748.
2. King H, Aubert RE, Herman WH. Global burden of diabetes, 1995-2025: Prevalence, numerical estimates, and projections. Diabetes Care 1998;21:1414-31.
3. Siudikiene J, Machiulskiene V, Nyvad B, Tenovuo J, Nedzelskienel. Dental caries and salivary status in children with Type 1 diabetes mellitus, related to the metabolic control of the disease. Eur J Oral Sci 2006;114:8-14.
4. Manfredi M, Mccollough MJ, Vescovi P, Al-Kaaraw ZM, Porter SR. Update on diabetes mellitus and related oral diseases. Oral Dis 2004;10:187-200.
5. Saini R, Al-Maweri SA, Saini D, Ismail NM, Ismail AR. Oral mucosal lesions in non oral habit diabetic patients and association of diabetes mellitus with oral precancerous lesions. Diabetes Res Clin Pract 2010;89:320-6.
6. Baliga S, Mugilkar S, Kale R. Salivary pH: A diagnostic biomarker. J Indian Soc Periodontol 2013;17:461-5.
7. Mirza KM, Khan A, Ali MM, Chaudhry S. Oral health knowledge, attitude, and practices and sources of information for diabetic patients in Lahore, Pakistan. Diabetes Care 2007;30:3046-7.
8. Khader YS, Dauod AS, El-Qaderi SS, Alkafeji A, Batayha WQ. Periodontal status of diabetics compared to nondiabetics: A meta-analysis. J Diabetes Complications 2006;20:59-68.
9. Lamster IB, Lalla E, Borgnakke WS, Taylor GW. The relationship between oral health and diabetes mellitus. J Am Dent Assoc 2008;139:19-24.
10. Mealey BL, Oates TW, American Academy of Periodontology. Diabetes mellitus and periodontal diseases. J Periodontol 2006;77:1289-303.
11. Mealey B. Diabetes mellitus. In: Glick M, Greenberg M, editors. Burket's Oral Medicine Diagnosis and Treatment. 10th ed. Hamilton: BC Decker; 2003. p. 563-77.
12. Tsai C, Hayes C, Taylor GW. Glycemic control of Type 2 diabetes and

severe periodontal disease in the us adult population. Community Dent Oral Epidemiol 2002;30:182-92.
13. Morgan R, Tsang J, Harrington N, Fook L. Survey of hospital doctors' attitudes and knowledge of oral conditions in older patients. Postgrad Med J 2001;77:392-4.
14. Shah VN, Kamdar PK, Shah N. Assessing the knowledge, attitudes and practice of type 2 diabetes among patients of Saurashtra region, Gujarat. Int J Diabetes Dev Ctries 2009;29:118-22.
15. Dinesh DK, Palaian S, Shankar R, Mishra P. Knowledge, attitude and practice about diabetes among diabetes patients in Western Nepal. Rawal Med J 2008;33:1.
16. Fatin A. Oral health knowledge and practices in Saudi diabetic female patients. Pak Oral Dent J 2009;29:1.
17. Kamran M, Ayyaz A, Munawar M. Oral health knowledge, attitude, and practices and sources of information for diabetic patients in Lahore, Pakistan. Diabetes Care 2007;30:3046-7.
18. 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;35:218-23.
19. Moore PA, Orchard T, Guggenheimer J, Weyant RJ. Diabetes and oral health promotion: A survey of disease prevention behaviors. J Am Dent Assoc 2000;131:1333-41.
20. Al Habasneh R, Khader Y, Hammad, MM, Almuradi M. Knowledge and awareness about diabetes and periodontal health among Jordanians. J Diabetes Complications 2010;24:409-14.
21. Rehana Y, Mazoor AM. Diabetic patients; level of awareness about oral health knowledge, attitude and practices. Pak Oral Dent J 2011;31:2.