

ORAL HEALTH AWARENESS, PRACTICES AND STATUS OF PATIENTS WITH DIABETES ATTENDING A TERTIARY HEALTH INSTITUTION IN NIGERIA

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ABSTRACT

BACKGROUND: Despite the reported increasing prevalence of diabetes mellitus, very few studies have documented report on oral health awareness and oral health conditions of individuals with diabetes mellitus from our environment. Thus this study aimed at assessing the oral health awareness, practices and status of individuals with diabetes mellitus attending a tertiary health facility in Nigeria.

METHODS: A cross sectional survey of 143 patients with diabetes attending the medical outpatients' clinic of the hospital. Information was obtained from participants using pretested structured questionnaires and oral examination. Tests of associations were determined using Chi-square and student t test.

RESULTS: One-fifth (20.3%) of the respondents were aware of good oral health preventing oral diseases in diabetes. Thirty-five (24.5%) knew that diabetes could worsen oral health condition and only 3 (2.1%) could correctly explain the association between diabetes and oral health conditions. Forty-three (30.1%) had participated in an oral health education program focused on diabetes and oral health. The majority (88.6%) had calculus accumulation while none had a healthy periodontium.

CONCLUSION: Oral health awareness, practices and status of patients with diabetes were poor in our environment. Thus, these individuals need to be better informed of the relationship between oral health and diabetes.

KEYWORDS: Oral disease; diabetes; awareness; oral health education

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INTRODUCTION

Diabetes mellitus refers to a group of disorders characterized by elevated blood glucose level and impairments of carbohydrate, fat and protein metabolism. Diabetes mellitus is a highly prevalent disease that affects millions of people worldwide.¹ A number of oral diseases and disorders have been associated with diabetes mellitus, and periodontal disease has been identified as a possible risk factor for poor metabolic control in individuals

with diabetes.^{1,2} Similarly, increasing evidence proves that diabetes is a risk factor for periodontal disease (which may result in tooth loss) and possibly oral pre-malignancies as well as oral cancer.^{3,4} The systemic inflammatory response generated by inflamed periodontal tissue may in turn exacerbate diabetes, worsen cardiovascular outcomes, and increase mortality. Hence, patients with diabetes who have periodontal disease have two chronic conditions, each of which may affect the other, and both of which require frequent professional evaluations, in-depth patient awareness and education as well as consistent educational support by health care providers.

A number of studies have investigated the oral health practices and oral health conditions as well as the awareness of patients with diabetes regarding their

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oral health and the increased risk for oral disease. In a case control study conducted in Sweden, 83% of patients with diabetes were found to be unaware of the connection between periodontal disease and diabetes.⁵ Furthermore, a cross-sectional study conducted in the USA reported that patients are less concerned with their oral health and were less likely to have seen a dentist than individuals without diabetes.⁶ Similarly, a different study in the USA found that only 18.2% of patients acknowledged that their oral health might be affected by diabetes.⁷ In addition, previous study in Finland documented that self-reported twice-daily tooth brushing is less frequent in individuals with diabetes than in those without diabetes.⁸

In Nigeria, despite the reported increasing prevalence of diabetes mellitus,⁹⁻¹² by different studies very few studies^{13,14} have documented report on oral health awareness and oral health conditions of individuals with diabetes mellitus. Thus, this study was conducted to assess the oral health awareness, oral health practices and oral health status of individuals with diabetes mellitus attending the University College Hospital, Ibadan, Nigeria.

Methods

This was a cross sectional survey conducted over a period of six months at the University College Hospital, Ibadan, Oyo State, Nigeria. The University College Hospital, Ibadan serves as a referral center for other levels of health care centers in the country. The study population comprised patients with diabetes attending the medical outpatients' clinic of the Hospital. Patients with complications like chronic kidney disease, human immunodeficiency virus infection, diabetic ketoacidosis or those in any form of discomfort were excluded from the study.

Data collection

A pretested structured questionnaire in addition to oral examination was used to obtain information from the study participants. The questionnaire was both self-administered and interviewer administered; for those who were not literate enough to fill it themselves. The questionnaire consisted of four sections that assessed; socio-demographic characteristics, glycemic status, awareness of the relationship between diabetes and oral health as well as oral health practices of the respondents.

Two trained and calibrated examiners according to the World Health Organization standards for basic oral health surveys¹⁵ performed the oral examination.

Questionnaire

The information obtained from the socio-demographic characteristics included: age, gender, marital status,

level of education and occupation of the respondents. The level of education was recoded as primary (6th grade equivalent) or less, secondary (12th grade equivalent) and tertiary. The respondents were classified occupation-wise into skilled workers, unskilled workers and dependents according to Esan et al.,¹⁶ which was a modification of the OPCS for this environment. The glycemic status of the respondents was assessed by Fasting Blood Glucose (FBG) level.

Oral health awareness was evaluated by asking questions on the knowledge of the respondents about the relationship between diabetes and oral health, common oral diseases in diabetes and if individuals with diabetes needed to consult the dentist regularly. Self-reported oral conditions of respondents were also assessed; these included experience of dry mouth, swellings in the mouth and bleeding gums when they brush or clean their teeth.

The questionnaire also evaluated oral health practices such as: frequency of tooth brushing, tooth cleaning agent, previous consultations with the dentists, reasons for consulting the dentist and what was done for them, if they had participated in any oral health education program in the past and personnel responsible for dissemination of oral health information.

Oral examination

Oral findings recorded into an oral health assessment form included: number of teeth present, number of missing teeth, caries experience using DMFT, which detected presence of decayed, missing and filled teeth due to caries. The periodontal status was assessed using the Community Periodontal Index (CPI). Other oral lesions such as abscesses and swellings were also documented.

Data management

Data obtained were analyzed using SPSS version 21. For the purpose of analysis, age was dichotomized with the mean age and marital status was converted into a binary variable as married and others (single, divorced, separated and widowed). Associations between categorical variables were determined using Chi-square statistics and student t test was used for numeric variables. The level of statistical significance was set at <5%.

Results

A total of 143 patients with diabetes participated in the study. There were 48 (33.5%) males. The ages of the respondents ranged from 26 to 89 years and the mean age was 62.0 ± 10.9 years. The majority, 109 (76.2%), was married, 61 (42.7%) had tertiary education and 59 (41.3%) were dependents (Table 1).

The time of diagnosis of the respondents with diabetes mellitus ranged from one year prior to the interview to 41 years with a mean of 12.2 ± 8.8 years. A total of 79.7% had a fasting blood glucose (FBG) evaluation ready at the time of the interview. The FBG values of the respondents ranged from 50 mg/dl to 261 mg/dl with a mean value of 111.7 ± 32.1 mg/dl.

One-fifth (20.3%) of the respondents were aware of the importance of good oral health in preventing common oral diseases in patients with diabetes and 15 (10.5%) were able to mention oral diseases and conditions that could occur if good oral health was not maintained. Oral disease conditions mentioned by respondents included; oral ulcers, dry mouth, tooth loss, periodontitis, gum swelling, oral abscesses, toothache, dental caries and gingivitis.

A few, 35 (24.5%), knew that diabetes could worsen oral health condition while 25 (17.5%) mentioned that having oral diseases could affect glycemic control. Only 3 (2.1%) respondents could correctly explain the reasons for the association between diabetes and oral health conditions.

A total of 67 (46.9%) respondents felt that regular consultations with the dentist were necessary. If the respondents had pain or swelling in the mouth, 67 (46.9%), will consult a dentist or their doctor, 31 (21.7%) will use warm saline mouth wash or other forms of mouth washes, 15 (10.5%) will self medicate and 30 (21.0%) did not know what to do.

Twenty-three (16.1%) respondents reported gum bleeding on brushing, 48 (33.6%) had experienced swelling of the gums and 33 (23.1%) had dryness of the mouth in the past.

Oral hygiene measures of the respondents were such that 84 (58.7%) cleaned their teeth once daily and toothbrush (69.2%) was the most frequently used tooth cleaning aid. A total of 72 (50.3%) respondents had consulted the dentist previously with only 7 (4.9%) doing so for dental check up or routine scaling and polishing (Table 2). Quite a few, 33 (23.1%), had tooth extraction as treatment when they consulted the dentist. Only 43 (30.1%) had participated in an oral health education program focused on diabetes and oral health. Personnel for dissemination of information about oral health and diabetes as mentioned by the respondents were: dentists, 27 (62.8%), health educators, 9 (20.9%), physicians, 5 (11.6%), nurses, 1 (2.3%) and friends, 1 (2.3%). The venue at which they participated in the oral health program included dental clinic, 22 (51.2%), diabetes clinic, 14 (32.6%), medical outpatients, 6 (14.0%) and at home, 1 (2.3%).

A total of 127 (88.8%) respondents consented to have their mouth examined; the number of teeth present in the examined mouth ranged from 26 to 32 with a mean of 31.3 ± 1.5 . The number of decayed teeth ranged from 1 to 6 with 15 (11.8%) respondents having a decayed tooth, 8 (6.3%) missing tooth due to dental caries, 6 (4.7%) filled tooth and the mean DMFT was 0.51 ± 1.5 . The prevalence of dental caries was 27.3%. The periodontal status was examined using the CPI probe in 70 patients of whom 62 (88.6%) had calculus accumulation (CPI score of 2), 5 (7.1%) had pocket depth less than 5.5mm (CPI score of 3) and 3 (4.3%) bled to probing (CPI score of 1). None of the respondents had a healthy periodontium (CPI score of 0).

A higher proportion of married respondents were more likely to be aware of the relationship between diabetes and oral health than others (66.7% vs. 13.5%) $p < 0.001$. There were no significant associations between other socio-demographic characteristics (age, gender, religious affiliation, educational status or occupational class) and oral health awareness $p > 0.05$.

Association between occupational class and oral health practices was such that dependents (66.1%) were most likely to consult the dentists when compared with skilled (50.0%) or unskilled workers (40.0%), $p = 0.016$. The older age group consulted the dentist more often than the younger age group (Table 3). No association was found between other socio-demographic variables and consultation with the dentist (Table 3).

DISCUSSION

This study revealed that less than a third (20.3%) of the respondents was aware of the importance of good oral health in preventing common oral diseases in patients with diabetes with 15 (10.5%) being able to mention specific oral diseases and conditions that could occur if good oral health is not maintained in patients. The low level of awareness of the relationship between oral health and DM shown in the present study is consistent with previous studies.¹⁷⁻¹⁹ The low level of awareness may be explained by non-availability of regular oral health education as well as lack of awareness of the managing physicians.

Although a good number (46.9%) of the participants indicated that regular consultation with the dentist were deemed necessary, only 10% of the participants had consulted dentists. Also 46.9% of the participants agreed to consult a dentist if they have pain or swelling in the mouth, an appreciable number (21.0%) did not know what to do while 10.5% indicated that they would use self-medication. Our finding is closely similar to previous study, which showed that only 8% of female diabetic patients visited their dentist on a

regular basis²⁰ and with another survey conducted among patients with diabetes in Jordan that showed only 10% of participants attended their dental appointments regularly.²¹ However, our observation concerning dental visit are lower than those reported in other studies,^{17,22} which reported 39% and 43%, respectively. The difference among the studies may be explained by the variations in the sociocultural factors of the different populations studied. In addition, less than half 43 (30.1%) of respondents in the current study had participated in an oral health education program focused on diabetes and oral health.

Although, our study did not ask the participants on the role of their managing physician on their oral health, a previous study among Saudis²³ had indicated that none of the patients with diabetes that participated in their survey had ever been advised by their physicians to brush their teeth and only 5.2% had received advice from a physician to see their dentist regularly. This suggests a huge underestimation among physicians of the importance of oral health for patients with diabetes. Dentists, physicians, and other health care providers need to provide appropriate education for the patients with diabetes on the association between diabetes and oral health and should encourage these individuals to seek regular oral or dental evaluation. This is important, because through preventive oral health measures, oral diseases can be reduced or prevented in patients, which could also improve the control outcomes in diabetes.

Thus, awareness of regular visits to the dentist should be emphasized in oral health education for individuals with diabetes and reinforcement and education on oral health information should be encouraged in all health care facilities for patients with diabetes. Patients should also be educated about the oral and systemic complications of diabetes, in an effort to meet the national health objective set by the USA, to increase the proportion of people with diabetes who have an annual dental checkup.

The findings from this study that showed that only 41.3% of the participants brushed their teeth twice daily, while 74% brushed their teeth once daily, indicate that proper oral hygiene measures are not routinely practiced in this population. Therefore, education and counseling on proper oral hygiene practices together with motivation should be emphasized in order to enhance oral health and prevent oral diseases in this high-risk population. Similar findings of inadequate oral hygiene practices among patients with diabetes had been reported by other studies.^{21,24,25}

Less than half of the studied population had

participated in an oral health education program focused on diabetes and oral health. Also personnel for dissemination of information about oral health and diabetes as mentioned by the respondents were more of dentists while the physicians and other health care providers constituted a very low percentage. This implies that other health care providers should be educated on their role to create awareness about oral health and diabetes mellitus. In addition, one of the reasons for patients' lack of awareness might be the lack of knowledge among physicians and other health care providers concerning the association between oral health and diabetes mellitus as previously reported.^{26,27}

Hence, dental and medical practitioners need to put in more efforts in updating their knowledge as well as awareness of the relationship between oral health and diabetes mellitus.

From the oral examination of the participants that consented to have their mouth examined, a number of oral disease conditions were observed ranging from decayed teeth, missing teeth due dental caries, filled teeth, dental caries to different stages of periodontal disease. In addition, the periodontal status was such that the majority had calculus accumulation (CPI score of 2), and none had a healthy periodontium (CPI score of 0). These findings are consistent with previous studies²⁸⁻³⁰ that showed increased prevalence of poor oral health as well as oral diseases in patients with diabetes.

Among the social factors assessed, marital status showed a positive relationship with awareness of the relationship between diabetes and oral health. In addition, association between occupational class and oral health practices was such that dependents were most likely to consult the dentists when compared with skilled or unskilled workers. These findings imply that the role of family members in creating awareness of oral health in patients with diabetes is important. Also, a previous study²³ reported that friends and family were the most useful source of information about oral health and diabetes to the patients. This implies that oral health education on the relationship between oral health and diabetes should be extended to the public.

A major limitation of the study was the inability to conduct comprehensive oral health examination on all the patients recruited for the study. However, the patients that were examined constituted a representative fraction, hence to a large extent, the findings could be generalized to the entire sample.

CONCLUSIONS

This survey revealed that the oral health awareness, practices and status of patients with diabetes are poor in our environment. Thus, patients with diabetes need

to be better informed of the relationship between oral health and diabetes as well as their role in maintaining good oral health to prevent oral diseases.

diabetes mellitus. Physicians should also be educated on the importance of oral health and hygiene in patients with diabetes and this could form parts of their curriculum.

RECOMMENDATIONS

Oral health education and care should be incorporated into the treatment plan of patients diagnosed with

Table 1: Sociodemographic characteristics of the study participants

Variable	Number	Percentage
Age (years)		
< 30	32	22.4
30 - 64	49	34.2
≥ 65	62	43.4
Gender		
Male	48	33.5
Female	95	66.5
Marital status		
Married	109	76.2
Separated/Widowed	34	33.8
Educational level		
No formal education	27	18.9
Primary	20	14.0
Secondary	35	24.5
Tertiary	61	42.7
Occupational class		
Skilled	18	12.6
Unskilled	66	46.2
Dependents	59	41.3

Table 2: Oral health practices of respondents

Variable	Number	Percentage
Oral hygiene measures		
<i>Tooth cleaning aid</i>		
Toothbrush	99	69.2
Chewing sticks	13	9.1
Toothbrush and chewing sticks	27	18.9
Others	4	2.8
<i>Frequency of tooth cleaning</i>		
Once	84	58.7
Twice or more	56	39.2
Did not respond	3	2.1
Previous dental consultation		
Yes	72	50.3
No	71	49.7

Reasons for consulting the dentist		
Pain	43	30.1
Routine check up	9	6.3
Trauma	9	6.3
Oral swelling	5	3.5
Tooth decay	3	2.1
Tooth replacement	3	2.1
Never consulted a dentist	71	49.7
Treatment received at the dental clinic		
Extraction	33	23.1
Routine prophylaxis	16	11.2
Medication	8	5.6
Reassurance/counseling	6	4.2
Denture	3	2.1
Filling	3	2.1
Routine prophylaxis and extraction	2	1.4
Surgery	1	0.7
Never consulted a dentist	71	49.7

Table 3: Relationship between socio-demographic characteristics and previous dental consultation

Socio-demographic variable	Previous dental consultation			χ^2	p value
	Yes (%)	No (%)	Total (%)		
Gender					
Male	21 (44.7)	26 (55.3)	47 (100.0)	1.579	0.209
Female	52 (55.9)	41 (44.1)	93 (100.0)		
Age group					
≤ 62 years	26 (36.6)	45 (63.4)	71 (100.0)	13.911	< 0.001*
> 62 years	47 (68.1)	22 (31.9)	69 (100.0)		
Marital status					
Married	16 (64.0)	9 (36.0)	25 (100.0)	1.715	0.190
Others**	57 (49.6)	58 (50.4)	115 (100.0)		
Occupational class					
Skilled workers	9 (50.0)	9 (50.0)	18 (100.0)	8.216	0.016*
Unskilled workers	26 (40.0)	39 (60.0)	65 (100.0)		
Dependents	37 (66.1)	19 (33.9)	56 (100.0)		
Highest level of education					
None	10 (43.5)	13 (56.5)	23 (100.0)	5.569	0.135
Primary (6 th grade)	8 (42.1)	11 (57.9)	19 (100.0)		
Secondary (12 th grade)	16 (45.7)	19 (54.3)	35 (100.0)		
Tertiary level	38 (64.4)	21 (35.6)	59 (100.0)		

*Statistically significant, **Others included single, separated, divorced or widowed

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