Oral Health-Related Awareness, Practices (Attitude) and Determination of the Level of Awareness of Periodontal Disease Risk among Diabetic Patients

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Abstract

Background: A comprehensive knowledge about the mutual influence between diabetes and periodontitis is decisive for the successful treatment of both diseases. The present study aimed at assessing the level of awareness of the relationship between diabetes and periodontitis among the diabetic patients.

Material and Methods: This survey was conducted among one hundred and fifty two diabetic patients who were recruited using a systematic random sampling technique. Participants completed a self-administered, structured questionnaire each after obtaining institutional ethical approval. Descriptive statistics and frequency distributions were used for demographic variables and chi squared test was used when comparing categorical data. Statistical significance was determined as $p < 0.05$.

Results: The knowledge of diabetes on their increased risk for oral diseases was low. Only 49.8% of the sample population knew about the mutual relationship between diabetes and periodontitis. Their attitude towards maintaining good oral health was also not up to the desired standard. Among the participants, only 63.2%, 11.8% and 15.8% brushed their teeth once daily, used dental floss regularly and visited the dentist once yearly respectively.

Conclusion: There is an insufficient knowledge among the study group about the mutual relationship between diabetes and periodontitis. This lack of knowledge emphasized the need for more information about oral health care in patients with diabetes mellitus.

Keywords: Diabetes Mellitus, Awareness, Periodontal disease.

Introduction

Diabetes is a chronic metabolic disorder causing hyperglycemia which leads to long-term damage of different organs including the heart, eyes, kidneys, nerves, and vascular system including the periodontium. Periodontitis is the most common oral infection in humans and it is the major cause of tooth loss in adults[1]. The most common oral complication of diabetes mellitus is periodontal disease. It has been considered as the sixth complication of diabetes due to its signs and symptoms[1].

The relationship between periodontal diseases and diabetes has become a recent focus of attention among healthcare professionals because of substantial evidence supporting a two-way relationship with diabetes; diabetes mellitus (DM) increases the risk of periodontitis and the periodontal inflammation negatively affecting glycemic control[2]. The number of diabetic individuals is increasing worldwide[3]. According to the World Health Organization (WHO), the number of diabetics worldwide is estimated to increase to at least 366 million by 2030, as compared to the previously estimated number of 30 million in 1985[3]. The recent rise in diabetes is not a genetic shift only but also environmental as a result of lifestyle habits[3]. For a successful treatment of periodontitis and diabetes

mellitus, patients are the most determining factor. Specific changeable lifestyle behaviours have been identified as critical risk factors especially in type 2 diabetes mellitus and chronic periodontitis.

While the development of type 2 diabetes mellitus is closely connected with the metabolic syndrome that is characterized by overweight, hypertension, dyslipidemia, and lack of physical activity,[4] the etiology of chronic periodontitis is strongly associated with behavioural factors such as insufficient oral hygiene on one hand and smoking, malnutrition, psychological stress, and excessive alcohol consumption on the other hand[5]. Due to the mutual influence between diabetes mellitus and periodontitis, a comprehensive knowledge about this interaction seems to be decisive for a successful treatment of both diseases.

Many studies have looked at the level of knowledge of periodontal disease and diabetes link among diabetic patients. Studies from other researchers have shown that majority of diabetic patients have low level of periodontal disease risk[6-9]. The data regarding the level of awareness on periodontal disease risk and oral health practice among diabetic patients are few in Nigeria.

This study therefore aimed to examine diabetic patients in a Nigerian population, regarding their oral health-related awareness, practices (attitude) and to determine their level of awareness of periodontal disease risk.

Materials and Methods

This cross-sectional observational study was conducted among diabetic patients attending the diabetic clinic, Lagos State University, Teaching Hospital (LASUTH), Ikeja, Lagos State, Nigeria, between January 2018 and March 2018.

Target and study population

The target population for this study includes all the diabetic patients attending the diabetes clinic in LASUTH, Ikeja from January 2018 to March 2018. All the diabetic patients who were selected met the inclusion criteria and consented to participate were our study population.

Sample size determination

Sample size was determined using statistical formula for descriptive cross sectional studies[10]. Where n = sample size, statistics for a level of confidence (set at 1.96 corresponding to 95.0% confidence level), P = 0.203 (20.3%), which was the prevalence of the awareness of good oral health in preventing oral diseases in diabetes patients carried out in a medical outpatient clinic of a Nigerian Teaching Hospital[11]. q = 1 – p and d = degree of accuracy desired (error margin) = 5% (0.05). Adjustments were made for finite population and a non-response rate of 10%, thus, a sample size of 152 was calculated.

Sampling technique

Participants were recruited using a systematic random sampling technique from the records of patients that attended the diabetes clinic, LASUTH, Ikeja. An average of about 300 diabetes patients is usually seen over 3 months duration. A sampling interval was calculated and determined from the rate of diabetes patients attending the clinic within the last 3 months and the estimated sample size and found to be 2. Therefore, every 2nd diabetic patient presenting at the diabetic clinic was recruited into the study. The first member to be recruited was determined by random sampling by balloting from a list of diabetes patients enrolled for consultation on the first day the study commenced, thereafter every 2nd diabetic patient was enrolled for the study.

Inclusion criteria

Subjects included in the study were 18 years or older and diagnosed as having had type 1 or 2 diabetes for at least one year before the study commenced.

Exclusion criteria

Patients whose consent could not be obtained.

Ethical considerations

The protocol for this research was reviewed and approval granted by the Ethics and Research Committee of the LASUTH, Ikeja, Lagos. Written informed consent was obtained from the participant.

Data collection

The self-administered questionnaire included questions on demographic data, which consists of age, gender, race and educational background. It also assessed participants' oral health practice such as frequency of tooth brushing, type of inter-dental cleaning aid used and frequency of dental visits. Frequency of dental visits once in 6 months to 1 year was set as regular dental attendees. Questions were on the awareness of the relationship between diabetes and oral health problems. Awareness of this relationship was evaluated by the questions: "Did you know that there is a relationship between periodontitis and diabetes negatively affect each other?" "Did you know that periodontitis and diabetes negatively affect each other?" "Did you know that diabetics are more prone to develop periodontitis than nondiabetics?" and "Are you aware that diabetic

patients' need to be extra careful on their oral health practices?".

Each question answered "Yes" was given a score of 1 while for "No", score, 0 was given. Thus, the dental knowledge score was in an interval scale and ranged from 0 to 11, a higher knowledge score indicating better knowledge. The knowledge scores were grouped into 3 categories: those with good oral health knowledge, fair oral health knowledge and those with poor oral health knowledge. Thus a score of 0 – 3 as poor knowledge, 4 – 7 as fair knowledge and 8 – 11 was graded as good knowledge.

Data analysis

Data was analyzed using SPSS version 20.0. Descriptive statistics and frequency distributions were used for demographic variables and chi squared test was used when comparing categorical data. Statistical significance was determined as $p < 0.05$.

Results

A total of 152 diabetic patients participated in this study: 109 (71.7%) females and 43 (28.3%) males. The age range of patients was 28 – 79 years with a mean age of 61 ± 12.5 years. Participants were subdivided into three age groups, those aged above 66 years made up the majority, 70 (46.0%). The sample consisted mainly of the Yoruba tribe 106 (69.7%) and majority were in the secondary level of education and below with 91(59.9%) (Table 1).

Table 1: Socio demographic profile of the participants

Variables	Frequency	Percentage
Age		
<45 years	13	8.6
46 – 65 years	69	45.4
>66 years	70	46.0
Gender		
Female	109	71.7
Male	43	28.3
Marital status		
Married	111	73.0
Unmarried	41	27.0
Ethnic group		
Yoruba	106	69.7
Ibo	35	23.0
Others	11	7.3
Education status		
None	8	5.3
Primary	42	27.6
Secondary	41	27.0
Diploma	31	20.4
Tertiary	19	12.5
Postgraduate	11	7.2
Total	**152**	**100.0**

The oral hygiene practices of the participants, showed that 63.2% of them brush their teeth once daily, 11.8% floss their teeth regularly, and only 15.8% visited the dentist in a year. The participants' other oral hygiene behaviors are presented (Table 2).

Table 2: Oral health practices among respondents

Variables	Frequency	Percentage
Frequency of brushing		
Once	96	63.2
Twice	56	36.8
Interdental cleaning		
Dental floss	18	11.8
Toothpick	89	58.6
Interdental brush	4	2.6
None	41	27.0
Dental visit		
Yes	77	50.7
No	75	49.3
Last dental visits		
1 year	24	15.8
2-5 years	23	15.2
5 years	30	19.7
None	75	49.3
Total	**152**	**100.0**

About 53.3% of the participants were aware of the type of diabetes they have. 70.4% of the participants had family history of diabetes and 62.5% knew that it could be prevented.

The awareness that diabetic patients were prone to developing periodontal disease than the non-diabetes was from 36.2% of the participants. Meanwhile, 50.7% of respondents were aware that they need to be extra careful on oral health practice (tooth brushing and visit dentist regularly) because they have diabetes. Only 38.2% agreed that dental visit is important for diabetic patients.

More than half (83.0%)of the participants in our study were aware of systemic complications while 67.8% of this population were aware of oral complications that can occur in diabetes. The awareness of the relationship between periodontal diseases and diabetes was 30.3%. (Table 3).

The mean awareness score was 6.30 ± 2.64. It was higher among the younger age group, the unmarried and the postgraduates. The awareness score was good in 35.5% of the participants and poor in 14.5%. (Table 4).

Table 3: Participants response to questions on oral health problems related to diabetes.

Variable	Aware N (%)	Not aware N (%)
1. Aware that DM run in the family	107 (70.4)	45 (29.6)
2. DM can be prevented	95 (62.5)	57 (37.5)
3. Aware of the types of DM	81 (53.3)	71 (46.7)
4. FBS of 250mg/dl is too high	113 (74.3)	39 (25.7)
5. More gum disease with high FBS	62 (40.8)	90 (59.2)
6. Can DM affect other systems of the body	126 (83.0)	26 (17.0)
7. Aware that oral complications occur in DM	103 (67.8)	49 (32.2)
8. Told to be extra careful about oral health	77 (50.7)	75 (49.3)
9. Dental visit important for DM Patients	58 (38.2)	94 (61.8)
10. Is it necessary to give history of DM before dental treatment	81 (53.3)	71 (46.7)
11. More gum diseases in DM	55 (36.2)	97 (63.8)
12. Relationship between PD and DM	46 (30.3)	106 (69.7)

Table 4: Awareness score of participants

Variables	Total	Awareness Score			Mean
		Good	Fair	Poor	Awareness
		N (%)	N (%)	N (%)	Score
Age (years)					
<45	13	6(46.2)	6(46.2)	1(7.6)	7.00 ± 2.12
46 – 65	69	22(31.8)	39(56.5)	8(11.6)	6.33 ± 2.45
>66	70	26(37.1)	31(44.3)	13(18.6)	6.14 ± 2.90
		0.480			***0.557***
Marital Status					
Unmarried	38	15(39.5)	20(52.6)	3(7.9)	6.68 ± 2.384
Married	114	39(34.2)	56(49.0)	19(16.8)	6.18 ± 2.714
		0.405			***0.312***
Education					
None	8	3(5.5)	2(2.6)	3(13.6)	5.50 ± 4.04
Primary	42	10(18.5)	26(34.2)	6(27.3)	5.86 ± 2.50
Secondary	41	14(26.0)	21(27.6)	6(27.3)	6.12 ± 2.60
Diploma	31	10(18.5)	18(23.7)	3(13.6)	6.39 ± 2.33
University	19	10(18.5)	5(6.7)	4(18.2)	7.00 ± 2.85
Post graduate	11	7(13.0)	4(5.2)	-	7.82 ± 2.27
		0.086			***0.212***
Total	**152**	**54(35.5)**	**76(50.0)**	**22(14.5)**	**6.30 ± 2.64**

The relationship between awareness of periodontal risk and the need for extra attention on oral health practices with oral health practice is shown (Table 5). Those who were aware of the risk and the need for extra oral health practice were more among those who brushed once a day (55.8%)and among those that visited the dentist regularly (61.0%). However, those who were not aware of the risk were also high among those who brush daily (69.3%) and those who do not visit the dentist regularly (60.0%). The difference between periodontal disease and diabetes and the need for extra care for diabetes in relation to dental visit was statistically significant.

Table 5: Respondents awareness on the periodontal risk among diabetics and oral health practice

Variables	Brushing once daily (%)	Brushing twice daily (%)	p-value	Regular Dental visit (%)	Irregular dental visit (%)	p-value
Extra care need for Diabetics						
Yes	43 (55.8)	34 (44.2)	*0.086*	47 (61.0)	30 (39.0)	*0.009***
No	52 (69.3)	23 (30.7)		30 (40.0)	45 (60.0)	
Diabetics more prone to periodontal disease						
Yes	30 (54.5)	25 (45.5)	*0.127*	30 (54.5)	25(45.5)	*0.470*
No	65 (67.0)	32 (33.0)		47 (48.5)	50 (51.5)	
Relationship of periodontal disease and diabetes						
Yes	26 (56.5)	20 (43.5)	*0.317*	31(67.4)	15 (32.6)	*0.007***
No	69 (65.0)	37 (35.0)		46 (43.4)	60 (56.6)	
Total	**95**	**57**		**77**	**75**	

** Significant at $p < 0.05$

Discussion

An important finding of this study was that the knowledge of diabetics about their increased risk for periodontal diseases was low. Our study revealed that 30.3% of the study population knew about the mutual relationship between diabetes and periodontitis. This was similar to reports from other studies[6-9,12] but in contrast to the study of Al Amassi et al[13] where 75.9% of them believed they were at higher risk of developing periodontal disease.

This study also showed that 83.0% of the participants were aware of systemic complications while only 67.8% were aware of the various oral complications that can occur in diabetics. Similar findings were reported by several other researchers who also demonstrated that diabetics had more knowledge about their increased risk for systemic complications than they had about their oral and dental complications[8,12-14].

Thirty-six point two percent of the participants were aware that diabetic patients are more prone to gum diseases and oral health complications than the non-diabetics which agrees with the findings of some other studies[6,15-17]. This was regarded as inadequate and signified the need for dental health education and awareness.

Only 40.8% of the participants were aware that diabetics would have gum problems more often if their blood sugar remained high, similar to the study of Bahmam et al[6]. where only 46.7% of the participants were aware that diabetics would have gum problems more often if their blood sugar remained high. These findings indicate that participants in this study were not aware of the possible connection between periodontal diseases and diabetes and did not know that the presence of diabetes increased the risk of periodontal diseases. This was in contrast to the study of Al Amassi[13],where 74.4% believe that controlling diabetes is very important for minimizing the risk of developing oral health problems.

The present study shows that the attitude of the participants towards maintaining good oral health needs to be improved, as only 36.8% said they brush twice a day, while 63.8% brush once a day. Studies done worldwide also showed similar results wherein majority of the diabetics brushed their teeth only once daily[6,12,14,18,19]. This is in contrast to the findings of Kejriwal et al[8], where higher number of participants (62.0%) brushed their teeth twice daily while 35.0% brushed once daily. This indicates that brushing more than once a day has not been a practice among our study population group, despite the fact that the sample had been taken from an urban population. It is necessary that oral health care providers should make it a priority to educate diabetic patients about the importance of good oral self-care.

Another important finding of the study was that only 73.0% of the participants used other aids to maintain their oral hygiene, out of which 58.6% still used toothpicks. Only 11.0% of the respondents indicated the use of dental floss, while 2.6% reported using interdental brushes. This agrees with the findings of Kejriwalet al[8]. and Aggarwal et al[19]. This suggests that interdental cleaning using the dental floss is not a common practice among the studied population. The low usage of other aids for maintenance of oral hygiene may be due to financial constrains or lack of knowledge of the availability of these various aids[19]. Daily self-care is very important for the prevention and treatment of various oral diseases[8], hence diabetic patients should be informed and encouraged on the need for establishing a healthy oral hygiene so as to prevent the occurrence of oral diseases including gingivitis and periodontitis.

Only a few of the participants (38.2%) believe in the importance of visiting the dentist regularly for routine dental check up for diabetic patients while only 16.4% of participants visited their dentists for the past 6 months – 1year. This low compliance to regular dental visits shown in the present study was consistent with previous studies[6,8,13] which implies that oral health behaviour of such patients can be further improved by continuous motivation by the dental health care providers. Therefore, diabetic patients' regular visits to the dentist for reinforcement and education on oral health information should be encouraged.

About 50.7% of this study population claimed to have been advised by a dentist to take care and monitor diabetes, this was lower compared to the report from Bahammam[6], where 74.9% had been advised by the dentist to do so. It is the duty of the dentist to raise diabetic patient's awareness of their increased risk of oral diseases and the impact of oral health on their general health. More than fifty percent (50.7%) reported that they were never told that they should be extra careful of oral health and visit a dentist often because they have diabetes. Shanmukappa et al[12], reported that 35.0% of the participants in their study and Al Amassi[13], that 79.5% of the participants believe they have to focus more on daily oral self-care practices as compared to non-diabetic persons. Also, 53.3% of the participants claimed that it was necessary to inform the dentist of their diabetic status before starting any dental treatment. This was also reported in some other studies by Shanmukappa et al[12] and Al Amassi and Al Dakheel[13], who claimed that (90.0%) of participants believe that it is necessary to inform the dentist of their condition before starting any dental treatment.

This study also looked at the respondents who reported awareness of the periodontal risk. This was higher among regular dental attendees and those who brushed once per day. This would suggest that more information regarding periodontal disease risk and diabetes are conveyed to the patients when they visit their dentist frequently. In a study done in Malaysia[7], it was found that respondents with good knowledge on periodontal disease were among those with frequent dental visits and better tooth brushing habits. In addition, those participants who reported regular dental visits were more likely to be aware of the association between periodontal disease and diabetes. Similarly, in a study conducted by Al Habashneh et al[15], it was found that diabetic patients with healthier lifestyle behaviours were more likely to have knowledge of the association between diabetes and oral health. However, this study also showed that there was also high proportion of regular dental attendees who were not aware of the periodontal disease risk. This suggests that sufficient information on periodontal risk on a diabetic patient was not gained by diabetic patients from dentists.

Diabetic patients should also be educated about the oral and systemic complications of diabetes

Conclusion

There is an insufficient knowledge among the study group about the mutual relationship between diabetes and periodontitis. This lack of knowledge emphasizes the need for more information about oral health care in patients with diabetes mellitus. In order to promote proper oral health and reduce the risk of oral diseases, health professionals in both the dental and medical fields need to motivate and educate the diabetics about the oral manifestations of diabetes and its complications.

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