

Assessment of Awareness among Periodontitis Patients Regarding Gum Disease and Diabetes Mellitus

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Abstract

Background: Diabetes Mellitus (DM) and periodontitis are very common and they interact with each other frequently. If information on knowledge and awareness of the link between diabetes and periodontal disease could be gathered, it might be used to inform public health campaigns and encourage individuals to change their lifestyles.

Objective: The objective of the current study was to assess the awareness regarding gum disease among patients with periodontitis, the association between socio demographic variables and to find out the proportion of referred diabetic patients by medical practitioners to dentist.

Methods: This prospective, cross-sectional, non-randomised and questionnaire-based study was carried out on 144 patients. The data collecting period was limited to twelve months, and statistical analysis was performed using SPSS statistical software.

Results: In our study, maximum (43.1%) of the cases belonged to the age group 41-50 years. A substantial proportion of study participants (32.6%) showed awareness of gum disease. Our study revealed that the cases with good awareness was higher but not significant as in cases with age 30-40 years (37.5%) compared to the cases with age 51-60 years (15.5%) and 41-50 years (17.7%).

Conclusion: The majority of research participants were aware of the connection between periodontal disease and diabetes. Only few diabetic patients were referred by medical practitioners for dentist consultation.

Keywords: Diabetes, Periodontitis, questionnaire, patient education.

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Introduction

The two most common chronic illnesses in the globe are periodontitis and diabetes mellitus [1]. 62.4 million individuals in India alone have type 2 diabetes, and 77 million are pre-diabetic. More than 50% of Indians have periodontal infections, which are the most common form of oral illnesses [2]. According to estimates, 300 million individuals will have diabetes by 2025, and

more than one in three adults over the age of >30 will have periodontitis.

Hyperglycemia, or increased blood sugar, is a hallmark of diabetes and is brought on by problems with insulin production, insulin action, or both. In most communities investigated, 10-15% of adults have severe periodontitis, which poses a risk to maintaining one's teeth. Forty to sixty

percent of people have moderate periodontitis, which is much more prevalent. Therefore, periodontitis is a chronic inflammatory disease that is extremely common yet frequently undiagnosed. Unquestionably, a significant risk factor for periodontitis is diabetes [3]. When compared to non-diabetics, diabetics have a roughly threefold higher chance of developing periodontitis.

Recently, there has been a lot of focus on the "two-way" connection between diabetes and periodontitis [4]. That is to say, periodontitis may have a deleterious impact on glycemic control in addition to being a risk factor for diabetes. An increased likelihood of poor glycaemic control (HbA1c > 9.0%) during follow-up (minimum 2 years) was shown to be related with severe periodontitis at baseline, showing that severe periodontitis is a risk factor for inadequate diabetes management [5]. According to studies, periodontitis among people without diabetes predicts how the HbA1c would change over time.

According to studies, dentistry and diabetic self-care have similar factors that might be used to better treat both disorders. Effective periodontal care can lower HbA1C, according to many meta-analyses. The dental team should consequently be included in the care of diabetes, according to a strong case. Since many individuals visit their dentist frequently (e.g., every six months, frequently more frequently than they visit their doctor), and because intra-oral findings may point to undetected diabetes, the dental team is in a good position to screen patients for diabetes [6]. People with diabetes should be encouraged to maintain good oral health as part of their overall diabetes treatment. For the collaborative care of persons with diabetes and periodontitis, the medical and dental teams must work more closely together, and interaction with dentists is crucial following a diabetes diagnosis.

In view of this the objective of current study was to evaluate awareness of gum disease among patients with periodontitis, to find

out association between socio demographic variables and awareness and to find out the proportion of referred diabetic patients by medical practitioners to dentist.

Material and methods

Over the course of a year, this prospective, cross-sectional, non-randomized, and questionnaire-based investigation was carried out at the Government Medical College in Ernakulam, Kerala, India. Sampling method involved convenient sampling wherein the consecutive patients with periodontitis attending the OPD were considered as study subjects.

Sample size calculation: In current study, sample size was calculated as per below formula:

$$\text{Sample size} = \frac{z^2 PQ}{D^2}$$

Where, P=Prevalence,

Q= 1-Prevalence and

D=Absolute Precision

Upon incorporating the respective values, the value of sample size = $\frac{1.96 \times 1.96 \times 46 \times 54}{9 \times 9}$ reached to around 117.80 patients

And the non-response rate was considered at 15%.

Therefore, upon rounding the value of sample size reached at 144. Hence, sample of 144 patients with periodontitis and presence OPD were selected in this study after taking their informed consent. Study patients having the probing depth (PD) $\geq 5\text{mm}$, bleeding on probing (BOP) and clinical attachment loss > 3-4mm were diagnosed to have periodontitis. Further, study participants were ensured to be free from any mental illness.

For analyzing the primary goal of the study, a structured questionnaire created in both English and Malayalam served as the research instrument. Patients with periodontitis at the department's outpatient unit who are between the ages of 30-59 and can read either English or the local language were given the questionnaire

(Malayalam). Data was gathered by the lead researcher.

Tool and Techniques of data collection involved the Mouth Mirror, explorer and Williams periodontal probe. Each person who was interested to participate in the study gave informed permission after being told of the aim of the investigation. Completely filled-up questionnaire was collected on the same day and was assessed for awareness.

Total composite score was calculated for each study subject. We considered a score of below 10 as Poor, score between 10 to 16 as average, score between 16 to 24 as good and score between 16 to 24 as excellent. Age, sex, educational attainment, and profession data were all captured and documented. Routine RBS was checked. RBS greater than 200 was checked for FBS and PPBS and subsequently referred to medical practitioners. Periodontal therapy was done on Periodontitis patients. Periodontitis patients with Diabetes were referred to medical practitioners.

Proportion of referred diabetic patients by medical practitioners to dentist was calculated.

Microsoft Excel was used to code and input the obtained data. Statistical Package for Social Sciences (SPSS) software (version 16) was used to analyze the data. Awareness regarding diabetes and periodontitis was represented as frequency, percentages, and graphs. Chi-square test was used for assessing association between demographic variables and awareness among periodontitis population. A p-value at 5% was measured statistically significant.

Results

Over the course of a year, this study was conducted at the Government Medical College in Ernakulam, Kerala, India. 144 periodontitis patients who were seeing the OPD were examined for this research. The following information tries to provide a detailed summary of the study's observations.

Table 1: Distribution of Demographic Variables

Demographic Variables	Frequency	Percent
Age (Years)		
30 – 40	24	16.7%
41 – 50	62	43.1%
51 – 60	58	40.3%
Sex		
Male	74	51.4%
Female	70	48.6%
Occupation		
Unemployed	81	56.3%
Unskilled	44	30.6%
Skilled	19	13.2%
Education		
School Level	43	29.9%
SSLC	48	33.3%
PDC / Higher Secondary	24	16.7%
Graduate	23	16.0%
Professional	6	4.2%
Total	144	100.0%

Nearly 16.7% of the cases, or cases, fall into the age range of 30 to 40 years, and 43.1% of the cases, or cases, fall into the age range of 41 to 50 years, according to the observations in Table

1 above. Age 51–60 patients made for about 40.3% of all cases. The standard deviation was 6.716 years, while the average age was 48.05 years. The age ranges were 30 years for the minimum and 60 years for the maximum. It is also noted that half (51.4%) of the cases were male and half (48.6%) of the cases were female.

From the section of occupation viewpoint, around 56.3% of the cases were unemployed. About 30.6% were unskilled workers and 13.2% were skilled workers. Education section revealed that almost 29.9% of the cases have school education, 33.3% of the cases were SSLC and 16.7% of them have qualification PDC or higher secondary. Around 16.0% graduates and 4.2% professionally qualified cases were also noted.

Table 2: Awareness of Gum Disease

Statement	Yes	No	Don't Know	Weighted Mean
Knowledge about gum disease	47 (32.6%)	33 (22.9%)	64 (44.4%)	0.882
Gum status	33 (22.9%)	111 (77.1%)	0 (0.0%)	1.229
Relation between brushing habit and gum status	110 (76.4%)	33 (22.9%)	1 (0.7%)	1.757
Symptoms of gum disease	90 (62.5%)	26 (18.1%)	28 (19.4%)	1.431
Whether Gum disease is preventable	86 (59.7%)	27 (18.8%)	31 (21.5%)	1.382
Gum disease and bad breath	93 (64.6%)	19 (13.2%)	32 (22.2%)	1.424
Diabetes and tooth loss	63 (43.8%)	27 (18.8%)	54 (37.5%)	1.063
Gum disease affect general health	45 (31.3%)	40 (27.8%)	59 (41.0%)	0.903
Dentist and past history	74 (51.4%)	38 (26.4%)	32 (22.2%)	1.292
Whether high blood sugar increases infection in oral cavity	54 (37.5%)	25 (17.4%)	65 (45.1%)	0.924
Gum disease affect blood sugar level	31 (21.5%)	37 (25.7%)	76 (52.8%)	0.688
Blood sugar post periodontal treatment in diabetic patients	10 (6.9%)	41 (28.5%)	93 (64.6%)	0.424
Oral care advices from health care providers	24 (16.7%)	99 (68.8%)	21 (14.6%)	1.021
Gum disease and heredity	22 (15.3%)	77 (53.5%)	45 (31.3%)	0.840
Oral health and general health.	80 (55.6%)	32 (22.2%)	32 (22.2%)	1.333
Diabetes status	61 (42.4%)	73 (50.7%)	10 (6.9%)	1.354
Risk of developing Diabetes	13 (15.7%)	10 (12.0%)	60 (72.3%)	0.434
Diabetic patients referred by medical practitioners for dentist consultation	4 (6.6%)	50 (82.0%)	7 (11.5%)	0.951

Above Table 2 discusses about the awareness of gum disease in Periodontitis patients. A substantial proportion of study participants (32.6%) showed awareness of gum disease whereas few study participants (22.9%) were not aware of gum disease. Majority of study participants (44%) were not aware about their gum status. With respect to the gum status, majority of study participants (77.1%) were not aware of their gum status, whereas rest (22.9%) know their gum status.

Table 3: Distribution of Awareness of Gum Disease

Awareness	Frequency	Percent
Poor	22	15.3%
Average	93	64.6%
Good	29	20.1%

Among 144 cases taken, almost 15.3% of the cases have poor awareness and 64.6% of the cases have average awareness of gum disease. Around 20.1% cases with good awareness of gum disease were also noted. The average awareness score was 13.05 with SD 4.703. The minimum and max awareness was 1 and 23 respectively, Table 3.

Table 4: Association between Awareness and Demographic Variables

Demographic Variables	Awareness			Total	p - value
	Poor	Average	Good		
Age (Years)					
30 - 40	5 (20.8%)	10 (41.7%)	9 (37.5%)	24	0.099
41 - 50	10 (16.1%)	41 (66.1%)	11 (17.7%)	62	
51 - 60	7 (12.1%)	42 (72.4%)	9 (15.5%)	58	
Sex					
Male	10 (13.5%)	47 (63.5%)	17 (23.0%)	74	0.624
Female	12 (17.1%)	46 (65.7%)	12 (17.1%)	70	
Occupation					
Unemployed	14 (17.3%)	51 (63.0%)	16 (19.8%)	81	0.245
Unskilled	7 (15.9%)	31 (70.5%)	6 (13.6%)	44	
Skilled	1 (5.3%)	11 (57.9%)	7 (36.8%)	19	
Education					
School Level	10 (23.3%)	28 (65.1%)	5 (11.6%)	43	0.000
SSLC	11 (22.9%)	30 (62.5%)	7 (14.6%)	48	
PDC / +2	1 (4.2%)	15 (62.5%)	8 (33.3%)	24	
Graduate	0 (0.0%)	19 (82.6%)	4 (17.4%)	23	
Professional	0 (0.0%)	1 (16.7%)	5 (83.3%)	6	
Total	22 (15.3%)	93 (64.6%)	29 (20.1%)	144	

Age: Here p-value was found to be greater than significance level 0.05; therefore, the association between awareness and age is not significant. The above table 4 revealed that the cases with good awareness was higher – not significant – in cases with age 30-40 years (37.5%) compared to the cases with age 51-60 years (15.5%) and 41-50 years (17.7%).

Sex: Her p-value was greater than significance level 0.05; therefore, the association between awareness and sex was not significant. The above Table 4 revealed that the cases with good awareness were found to be almost same in male (23.0%) and female (17.1%).

Occupation: Here p-value was greater than significance level 0.05; therefore, the association between awareness and occupation was not significant. The above table 4 revealed that the cases with good awareness were higher – not significant – in skilled workers (36.8%) compared to unskilled workers (13.6%) and unemployed cases (19.8%).

Education: Here p-value was less than significance level 0.05; therefore, association between awareness and education was considered statistically significant. The above table 4 revealed that the cases with good awareness was significantly higher in cases with professional qualification (83.3%) compared to the cases with school level (11.6%), SSLC (14.6%),

PDC/+2 (33.3%) and graduation (17.4%). It was also noted that the poor awareness is significantly higher in cases with school level (23.3%) and SSLC (22.9%) compared to the cases with professional qualification (0.0%), graduation (0.0%) and PDC/+2 (4.2%).

Table 5: Referred by medical practitioners for dentist Consultation

Response	Frequency	Percent
Yes	4	6.6%
No	50	82.0%
Don't Know	7	11.5%

This study also recorded the proportion of diabetic patients referred by medical practitioners for dentist consultation. Out of the total 61 responses, only 6.6% were referred by medical practitioners for dentist consultation, whereas 82% of periodontitis patients visited dentist of their own.

Discussion

According to systematic review and meta-analysis of epidemiologic research, persons with periodontitis had greater overall prevalence and probabilities of developing diabetes than people without the condition.[7]

Evidence suggests that diabetes and periodontitis exacerbate one another in a vicious cycle that eventually draws diabetics' cases to the attention of oral health professionals. Additionally, a patient's capacity for self-care in everyday activities—which is frequently enhanced when the patient is informed of the significance of oral health—is a key component of DM therapy. Patient education is therefore always seen as a crucial component.

At least 12% of Indians have type 2 diabetes, and 35% have some kind of periodontal disease. Given the high incidence, it is predicted that both illnesses affect a large number of people. It is now well-established that there is a connection between them, and this connection seems to be two-way. There haven't been many research looking at how primary care doctors are aware of the connection between diabetes and periodontal disease. Medical interns were asked in Indian studies about their

knowledge of periodontal disease in diabetic patients [8,9]. On this subject, a different study conducted in Jordan polled both general practitioners and other experts [10]. The bulk of participants in the current study (43.1%) were between the ages of 41 and 50. Male participants made up more of the study's gender distribution (51.4%) than female participants.

While other research showed that diabetics with lower education levels were more likely to be diagnosed with periodontal disease, one study found that health literacy and patient awareness scores were inversely connected to diabetes management [11,12]. The majority of our participants were aware that periodontal disease and diabetes mellitus were related. Their age, years of experience, level of training, demographics, or dental hygiene habits had no impact on this information. It is conceivable that the study participants learned about diabetes and periodontitis from various sources or contexts. Polypharmacy is a major problem for DM patients, who frequently have other medical co-morbidities such hypertension and dyslipidemia. Doctors may also need to manage other episodic illnesses during follow-up in addition to addressing all of the aforementioned. Therefore, given the short consultation timeframe, controlling periodontal disease may be given less importance [13-15].

Doctors only recommended 6.6% of diabetes patients for dental evaluation. This frequency demonstrates the importance of the role played by medical

professionals in teaching people about disease and the disease process. The primary drawback of this study was that only patients in one specific area of India were polled. The findings are exclusively applicable to the research area and cannot be extrapolated to patients in other regions of India. Random sampling in the public and private sectors can result in a better research design and more representative data. To examine the data in further detail, qualitative research or follow-up surveys might be created. Additionally, those who provided unfavorable information could have been less eager to return the questionnaire, such as those who were unaware of the link between diabetes and periodontal disease or who brushed their teeth seldom.

Conclusion

The majority of research participants were aware of the link between periodontal disease and diabetes. There should be further investigation into ways to improve patient understanding of diabetes mellitus and periodontal disease. Major role has to be played by health care practitioners, community dentists, periodontists and general practitioners to create awareness among the masses regarding oral manifestations and complications of diabetes mellitus. Public education is required on the link between periodontal disease and diabetes mellitus. India has to perform more dental and medical health initiatives and awareness activities.

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