

Periodontitis and Diabetes: How Well the Patients have Knowledge about the Established Interrelationship?

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ABSTRACT

Background

Type 2 diabetes is an escalating health problem in Nepal and it holds a strong bidirectional Inter relationship with periodontitis. However, lack of its knowledge and motivation among patients may deteriorate and complicate their condition.

Objective

To assess knowledge among general population regarding the relation between diabetes and periodontitis and to evaluate the role of dentists and physicians in suggesting the diabetic patients for oral health care.

Method

A cross-sectional study was conducted among the patients visiting Department of Periodontics, Gandaki Medical College. A total 422 patients were interviewed using a set of pretested questionnaire and at the end they were counselled about the impact of diabetes mellitus on periodontal status and vice versa.

Result

Majority of the patients 257 (60.9%) had no idea about the interrelation between periodontitis and diabetes mellitus. Almost all the patients 363 (86.02%) assumed that poor oral health cannot increase the risk of developing diabetes and amongst those who had knowledge about this relation, the major source of information was their diabetic friends and relatives 46 (10.9%) and other sources such as syllabus 46 (10.9%). Only handful of patients 30 (7.10%) were informed about the relation by their dentist. Ironically, none of them were provided information about the interrelation by their treating physician.

Conclusion

Overall, only few participants had knowledge about the bidirectional relation between periodontitis and diabetes. Hence, our findings support the greater need for more targeted and specific health education along with close collaboration between dentists and physicians.

KEY WORDS

Awareness, Diabetes, Knowledge, Oral Health, Periodontitis, Physician

INTRODUCTION

Chronic periodontitis is an infectious disease resulting in inflammation within supporting tissues of teeth with progressive attachment and bone loss.¹ The association between systemic diseases and periodontitis has long been established. Diabetes mellitus (DM) is a highly prevalent health problem in Nepal and has been proven to have a bidirectional relationship with periodontitis.^{2,3} A recent scientific consensus reveals how these widespread chronic conditions reinforce each other and meticulous management of one may assist the treatment of other.³⁻⁵ This implies that periodontitis patients have a higher chance of developing diabetes. Conversely, diabetics are at greater risk of developing periodontal complications.

Several studies have shown a lack of knowledge about this interrelationship among the patients.⁶⁻⁸ Some studies reported that perceived need and importance of oral health care among diabetic patients was poor.^{9,10} The main reason is limited oral health education and the motivation provided to these patients. Till date, no such surveys on assessing the knowledge regarding this established relation have been conducted in Nepal.

Therefore, this study was carried out to assess the knowledge regarding inter relationship between DM and periodontitis and ultimately raise awareness in them about the need of extra periodontal health care using questionnaire by interview method in a dental institution. A DM-specific oral health education program should involve both dentists and physicians as such patients had a better attitude and superior oral care.^{8,11} Hence, this study also probes the role of physicians in suggesting the diabetic patients to visit a dentist for oral healthcare.

METHODS

A cross-sectional study was conducted from August 2020 to January 2021 among the patients visiting Department Periodontology and Oral Implantology, Gandaki Medical College, Pokhara using a set of prepared questionnaire. The study aimed to assess their knowledge regarding the interrelationship between periodontal status and diabetes mellitus and to evaluate the role of dentists and physicians in suggesting the diabetic patients for oral health care. Convenience sampling method was used. Based on the study by Umadishetty et al. at 95% confidence interval and 49.8% prevalence, sample size of 384 was calculated.¹² The total sample size of 422 was calculated after adding 10% to compensate for the non-response rate. Questionnaire was developed after careful reviewing of several relevant literatures on diabetes and periodontal disease.^{7,9,12-14} Pretesting was done in 42 patients who were not included in the sample. After pretesting and taking opinions from the experts, some relevant modifications were made in the questionnaire. The reliability was measured by

Cronbach's alpha (0.7). A single investigator collected the data by interviewing the participants. The questionnaire consisted 17 close-ended questions designed to evaluate sociodemographic factors, knowledge, their source of information regarding the relationship and the role of physicians in recommending them for oral screening. At the end of the data collection, the patients were counselled about the impact of diabetes mellitus on periodontal status and vice versa.

Ethical clearance was obtained from Institutional Review Committee, Gandaki Medical College. Prior to data collection, an informed consent was taken from the participants after explaining the details about the relevance of the research project. The confidentiality of participants was ensured. All the patients (both diabetic and non-diabetic) aged ≥ 18 years and visiting the Department of Periodontology and Oral Implantology were included in the study. However, non-complaint patients, those with obvious physical or mental illnesses and diabetic patients who had not visited dentists in past were excluded in the study.

The data were entered into the excel sheet and was analysed using SPSS version 16.0. Univariate analysis such as frequencies and percentage of demographic variables and the responses to the questionnaires were calculated.

RESULTS

The demographic details of the participants are displayed in table 1. The mean \pm SD. of age of the sample population was 40.05 ± 16.23 . Out of the 422 patients questioned, 231 (54.7%) were females, 301 (71.3%) had non-health related occupation, and majority of them 221 (52.4%) had pursued higher education. Of the total, only 176 (41.7%) had periodontal problems, 75 (17.8%) were suffering from diabetes mellitus, and 252 (59.7%) had positive family history of diabetes mellitus (fig. 1).

The responses to the questionnaires by diabetic and non-diabetic patients are shown in table 2. Majority of them 257 (60.9%) did not know about the relationship between periodontitis and diabetes. Similarly, 257 (60.9%) were not aware about the fact that diabetic patients are more prone to have periodontal problems and that diabetics tend to have gum problems more often if their blood sugar remains high 268 (63.51%). A significant number of patients 363 (86.02%) assumed that poor oral health could not increase the risk of developing diabetes. Larger proportion of patients 399 (94.55%) believed that it is necessary for the patients with diabetes to inform their dentists about their medical history. However, 346 (81.99%) of them considered that the dentists cannot initially diagnose diabetic condition based on their oral findings and more than half of them 221 (52.37%) assumed that dentists should not be involved in diabetes screening.

Table 1. Demographic details of participants in the study (N=422)

Variables	Frequency (n)	Percentage (%)
Age (Years) Mean ± SD	40.05±16.23	
Age		38.4
18-30 years	162	17.1
31-40 years	72	16.6
41-50 years	70	17.1
51-60 years	72	10.9
> 60 years	46	
Sex		45.3
Male	191	54.7
Female	231	
Occupation		28.7
Health related	121	71.3
Non-health related	301	
Education level		5.9
Illiterate	25	13.0
Primary	55	28.7
Secondary	121	52.4
Higher Education	221	
Last Dental Visit		
In last 6 months	124	29.4
In last 1 year	69	16.4
> 1 year	229	54.3

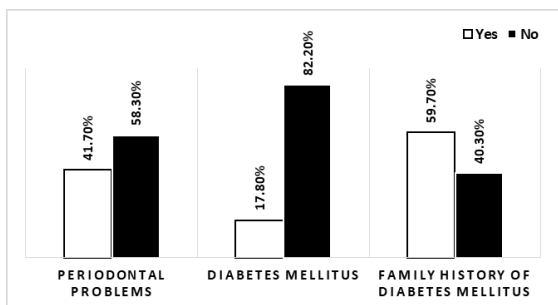


Figure 1. Periodontal and diabetic history of participants (N=422)

Regarding the referral by the physician (fig. 2), none of the diabetic participants 75 (100%) in this study were told to take extra care of their oral health nor were suggested to visit dentist 75 (100%). Surprisingly, only 15 (20%) diabetic patients were informed about the interrelation by their dentist.

According to our study, most of the patients 257 (60.9%) had no idea about the bidirectional interrelation between periodontitis and diabetes mellitus. As depicted in Figure 3, the various sources of information were diabetic friends and relatives 46 (10.9%), electronic and printed media 43 (10.2%), other sources such as academic syllabus 46 (10.9%). Only handful of patients were educated regarding the relation by their treating dentist 30 (7.1%). Ironically, none of the diabetic participants were told by their treating physician to take extra care of their oral health nor they were advised to visit the dentists routinely.

Table 2. Responses of the participants (N=422)

Questions	Responses	Non-diabetic patients n(%)	Diabetic patients n(%)	Total
Do you think that there is a relationship between DM and periodontal status?	Yes	138(83.64)	27(16.36)	165(39.1)
	No	209(81.32)	48(18.68)	257(60.90)
Are you aware that diabetic patients are more prone to have swollen/tender gums and loosening of teeth?	Yes	138(83.64)	27(16.36)	165(39.1)
	No	209(81.32)	48(18.68)	257(60.90)
Do you think poor oral health increases risk of developing DM?	Yes	56(94.9)	3(5.08)	59(13.98)
	No	291(80.17)	72(19.83)	363(86.02)
Diabetics have gum problems more often if their blood sugar remains high.	Yes	131(85.06)	23(14.94)	154(36.49)
	No	216(80.60)	52(19.40)	268(63.51)
People with diabetes are just as likely to get gum disease as people who don't have DM	Yes	204(81.60)	46(18.40)	250(59.24)
	No	143(83.14)	29(16.86)	172(40.76)
Do you think periodontitis can have negative effect on blood sugar control in diabetic patients?	Yes	63(95.45)	3(4.55)	66(15.64)
	No	284(79.78)	72(20.22)	356(84.36)
Do you think it is necessary for patients with DM to inform their dentists about their medical history?	Yes	336(84.21)	63(15.79)	399(94.55)
	No	11(47.83)	12(52.17)	23(5.45)
Do you think a dentist can initially diagnose DM?	Yes	69 (90.79)	7 (9.21)	76(18.01)
	No	278(80.35)	68(19.65)	346(81.99)
Do you think should dentists be involved in diabetes screening?	Yes	175(87.06)	26(12.94)	201(47.63)
	No	172(77.83)	49(22.17)	221(52.37)

At the end of the study, the interviewed patients were counselled about the manner in which these chronic conditions reinforce each other and the need of regular dental visits as well as conscientious home care especially for diabetic patients. Those patients were later asked about their opinion regarding the health education given by us, where, all of them 422 (100%) found the session good and informative.

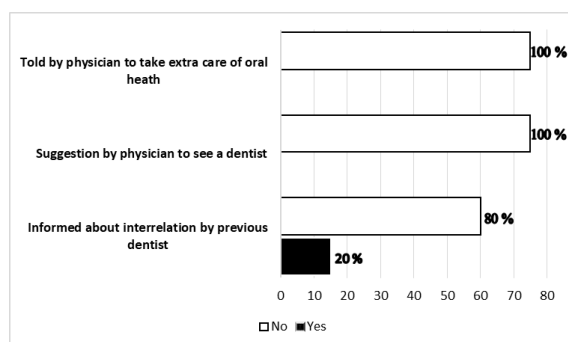


Figure 2. Referral for dental visit (n=75)

DISCUSSION

Type 2 diabetes is an up surging health problem in Nepal and it holds a strong bidirectional interrelationship with periodontitis.^{2-4,15} A new scientific consensus reveals how these widespread chronic conditions reinforce each other and how the meticulous management of one ameliorates the other.^{16,17} In 1993, Loe proposed that periodontal disease was the sixth complication of diabetes mellitus.¹⁸ Hyperglycaemia increase the inflammatory mediators, induce oxidative stress in periodontal tissues forming Advanced Glycation End products (AGE). It interacts with Receptor for AGE (RAGE) to cause exaggerated inflammatory response and periodontal tissue destruction.¹⁹ Several epidemiological studies have further ascertained that diabetes is one of the major risk factors for periodontitis, increasing the risk approximately three-fold compared to non-diabetic patients, especially when the glycaemic control is poor.²⁰ On the contrary, the ulcerated sulcular epithelium, in periodontitis, acts as portal of entry for the oral microorganisms and proinflammatory cytokines to enter the connective tissue and thus gain access into systemic circulation.³ These cytokines also tend to antagonize insulin.²¹

An adequate knowledge and motivation among the patients can aid in early diagnosis and timely management of periodontal disease thereby, decreasing the morbidity and complications. Hence, this study aims to provide an insight into the knowledge of Nepali population regarding the didactic relation between periodontitis and diabetes and endeavours to make inferences for the larger population. Our study showed that only smaller proportion of patients (39.1%) knew about this mutual interrelationship. This finding corroborates with the study by Allen et al. where, only 33% of the participants were aware of the increased risk of periodontal diseases in diabetic patients.¹⁰ On the contrary, the result of our study is considerably lower than the findings of previous studies conducted in several countries. Almost 84.4% of the Saudi Arabian patients, 49.8% of population of an Indian community, 48% of Jordanian patients knew about this relationship.^{12,22,23} Due to the lack of knowledge and motivation, oral health care is often neglected while attempting to manage and control other complications associated with diabetes. This may

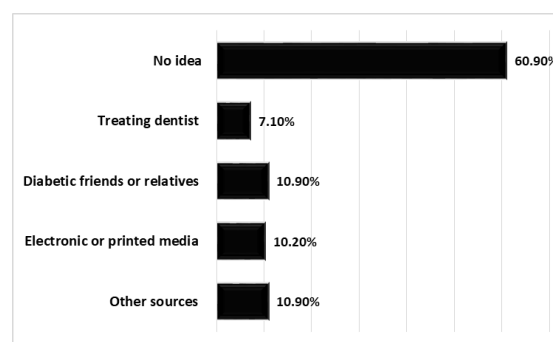


Figure 3. Source of information regarding the interrelation (N=422)

lead to hidden morbidity and undue suffering from oral health related problems.

In the present study, around 39.1% patients knew that diabetic patients are susceptible to various periodontal problems and only 36.49% of them believed that such patients are prone to have gum problems more often if their blood glucose level is uncontrolled. This shows that very small proportion of patients had idea that diabetes can lead to various periodontal problems just like any other complications. Likewise, their lack of awareness may partly be explained by the fact that around 86.02% of respondents assumed that poor oral health could not increase the risk of developing diabetes. Similarly, only 15.64% patients in our study believed that periodontitis could negatively affect blood sugar controls in diabetics. Comparable result was seen in the study by Bahammam et al. where, only 21.8% knew that gum disease makes it harder to control blood sugar in diabetics.¹³

Majority of the patients (94.55%) deemed that it is necessary for diabetic patients to inform the dentists about their medical history. However, only 18.01% felt that a dentist can initially diagnose DM and 47.63% believed that dentists should be involved in diabetes screening. This result confirms with the findings of the study by Bowyer et al. where 53.5% supported the idea of dentists offering screening of diabetes.⁹ Bartold and Phillips emphasized the dentist's role in the management of DM through a "Team Care Arrangement" because oral manifestations accompany many systemic diseases and oral cavity might well be thought of as the window to the body.²⁴

Among the sample population who had the knowledge about this interrelation, the major source of information was their diabetic friends and relatives (10.9%) and their academic syllabus (10.9%). International Diabetes Federation and World Dental Federation have made emphasis on the fact that the key of prevention of periodontitis for patients with DM lies in close collaboration between dentists and physicians.²⁵ However, only handful of patients (7.10%) were informed about the relation by their dentists in our study. Ironically, none of the participants in this study had ever been counselled about this interrelation by their

treating physician. Likewise, neither of them were advised to take extra care of their oral health nor suggested to visit dentist routinely. This shows that there exists an ill-matched situation between the scientific evidence and current practice behaviours. In contrast to our study, at least 46% of the diabetic patients were recommended by their physician to visit a dentist routinely in a study conducted by Umadishetty et al.¹² Several studies have shown that patients who were educated by their dentist or physician had a better attitude and superior oral care.^{8,11} In addition to it, diabetic patients tend to visit a physician earlier than a dentist. Thus, it becomes their responsibility to educate and motivate their patients to seek dental treatment and maintain their periodontal health as well.

Additional clinical examination of the participants, as well as follow-up visits to assess the effectiveness of our counselling session would have added value to our study.

Long-term programs are recommended in order to evaluate and retain the positive effect of the study. Furthermore, dentists and physicians should also be encouraged to educate their patients so as to reduce the hidden morbidity and undue suffering from oral health related problems.

CONCLUSION

The findings of the present study showed that only handful participants had knowledge about the bidirectional relation between periodontitis and diabetes. Such lack of knowledge and motivation often leads to negligence in oral health care while attempting to manage and control other complications associated with diabetes. Periodontal diseases can be prevented in susceptible individuals at an early stage, if regular oral examination and periodontal management are considered as routine standard of care. Hence, our findings support the need for more targeted and specific health education along with close collaboration between dentists and physicians.

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