Assessment of correlation between various factors and their association with caries and tooth loss in diabetic patients

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ABSTRACT

Background: Diabetes is a chronic disease caused due to hyperglycemia resulting from absolute or relative deficiency of insulin. This research aims to find out the correlation between various factors and their association with caries and tooth loss in diabetic patients.

Materials & Methods: 40 patients were recruited. Dental caries and missing teeth were examined clinically using the Decayed, Missing, Filled Teeth Index (DMFT). The patients were questioned regarding their brushing habits and the current toothpaste they were using. HbA1c levels were recorded.

Results: Out of 40 patients, 12 were male and 28 were female. Tobacco intake was seen among 10 patients. 14 patients were using abrasive toothpaste and 26 were using non-abrasive toothpaste. Type of diabetes was type I in 2 and type II in 38 patients. The difference was significant (P< 0.05). Decayed score was 1.80, missing was 0.60 and filled was 0.05. The mean dmft score in tobacco users was 2.42 and non- abuser was 2.00, in patients using abrasive toothpaste was 2.34 and non- abrasive toothpaste was 2.16, in type I diabetes was 2.04 and in type II diabetes was 2.38. The difference was significant (P< 0.05).

Conclusion: There was a high caries index in patients suffering from diabetes. A higher dmft score was observed in tobacco abusers, and those using abrasive toothpaste.

Key words: Diabetes, tooth paste, abrasive

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INTRODUCTION

Diabetes is a chronic disease caused due to hyperglycemia resulting from absolute or relative deficiency of insulin. It is one of the most common lifestyle diseases. In India, there are estimated 77 million people above the age of 18 years suffering from diabetes (type 2) and nearly 25 million are prediabetics (at a higher risk of developing diabetes in near future).[1] Caries is a disease of the hard tissues of the teeth resulting from activity of cariogenic bacteria which metabolizes sugar to produce acid and ultimately causes the demineralization and destruction of the tooth. Dental caries is one of the most frequent noncommunicable diseases in the world.[2] Periodontitis is an inflammation of the periodontium which if left untreated affects the deeper tissues causing mobility and tooth loss.[3] Diabetes has several complications like neuropathy, retinopathy, nephropathy along with oral complications like increased incidence of caries, periodontitis, delayed wound healing and dry mouth. Diabetes affects the oral cavity both directly and indirectly. Dental caries can cause infections, abscess formation and pain. Absence of teeth makes it difficult to speak, eat and lead an overall healthy life. Loss of teeth also has a psychological impact on the patient.[4]

Other factors like age, smoking, use of abrasive toothpaste, brushing habits, level of HbA1c (a blood test which shows the average blood sugar level over the past two or three months)

also affect the incidence of caries and missing teeth in diabetic patients. Studies have revealed that incidence of oral diseases is more in diabetic patients than the general population.[5] The various factors affecting decay and tooth loss in diabetic patients have not been completely investigated in a single study.[6] Thus, this research aims to find out the correlation between various factors and their association with caries and tooth loss in diabetic patients.

MATERIALS & METHODS

The study was conducted during a camp held in Indore in Masand Clinic in the month of August 2023. Informed consent was taken from each patient. All the patients who visited the camp were examined.

Inclusion criteria included known or previously diagnosed diabetic patients and exclusion criteria included those unwilling to participate and complete denture wearing patients. Demographic details including name, age, gender were recorded. The study variables, including dental caries and missing teeth were examined clinically by four dental interns using the Decayed, Missing, Filled Teeth Index (DMFT). The patients were questioned regarding their brushing habits and the current toothpaste they were using. HbA1c levels were recorded during the camp itself. Data thus obtained was subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 40		
Gender	**Male**	**Female**
Number	12	28

Table I shows that out of 40 patients, males were 12 and females were 28.

Table II Assessment of parameters

Parameters	**Variables**	**Number**	**P value**
Tobacco intake	Yes	10	0.01
	No	30	
Tooth paste	Abrasive	14	0.02
	Non- abrasive	26	
Type of diabetes	Type I	2	0.01
	Type II	38	

Table II, graph I shows that tobacco intake was seen among 10 patients. 14 patients were using abrasive tooth paste and 26 were using non- abrasive tooth paste. Type of diabetes was type I in 2 and type II in 38 patients. The difference was significant (P< 0.05).

Graph I Assessment of parameters

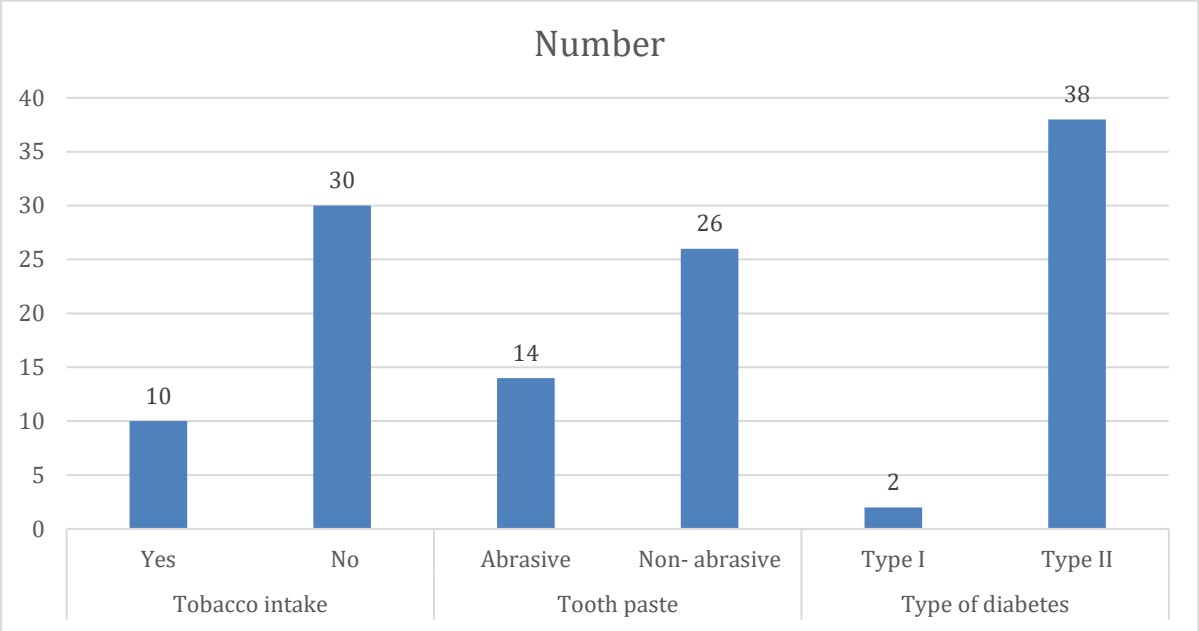

Table III Assessment of DMFT score

DMFT	Mean	SD
Decayed	1.80	0.42
Missing	0.60	0.12
Filled	0.05	0.01
Total	2.45	0.55

Table III shows that decayed score was 1.80, missing was 0.60 and filled was 0.05.

Table IV Correlation of dmft score and parameters

Parameters	Variables	Dmft score	P value
Tobacco intake	Yes	2.42	0.04
	No	2.00	
Tooth paste	Abrasive	2.34	0.05
	Non- abrasive	2.16	
Type of diabetes	Type I	2.04	0.05
	Type II	2.38	

Table IV shows that mean dmft score in tobacco users was 2.42 and non- abuser was 2.00, in patients using abrasive tooth paste was 2.34 and non- abrasive toothpaste was 2.16, in type I diabetes was 2.04 and in type II diabetes was 2.38. The difference was significant (P< 0.05).

DISCUSSION

Diabetes mellitus (DM) is a common chronic disease that has emerged as a major health-care problem.[7,8] There was an estimation of 40 million people with diabetes in India in 2007 and this number is predicted to rise to almost 70 million people by 2025.DM is a metabolic disease with numerous systemic manifestations that are also noticeable in the oral cavity.[9] Manifestations in the oral cavity include abnormal development of dentition, increased frequency and intensity of caries, pathologies of the oral mucosa, xerostomia as well as atrophic changes in the alveolar process.[10,11] The present study found out the correlation between various factors and their association with caries and tooth loss in diabetic patients.

We found that out of 40 patients, males were 12 and females were 28. Tobacco intake was seen among 10 patients. 14 patients were using abrasive tooth paste and 26 were using non-abrasive tooth paste. Singh et al[12] evaluated the impact of various factors present in saliva on tooth decay amid type-II DM. The subjects in our analysis comprises of 50 patients with type-II DM and 50 controls within the age group of 30–60 years. Diabetic status was assessed by estimating random blood glucose levels. Dental findings were recorded using modified World Health Organization (WHO) Oral health survey-basic method 2013. Salivary samples from all the subjects were collected and sent to the laboratory for interpretation of pH, flow rate, and salivary calcium. The results have shown a significantly lower values of salivary pH, flow rate, and calcium levels in diabetics than in nondiabetics.

We found that type of diabetes was type I in 2 and type II in 38 patients. Shiferaw et al[13] compare the prevalence of dental caries and associated factors among 200 diabetes and 400 nondiabetic adult patients. A total of 582 patients were involved in the study with a response rate of 97.0%. The prevalence of dental caries was 67.9% [95% confidence interval (CI): 63.2%–72.8%] and 79.6% (95% CI: 74.0%–85.70%) in nondiabetic and diabetic group, respectively. Females gender [adjusted odds ratio (AOR) = 1.79, 95% CI: 1.15–2.77], poor oral hygiene (AOR = 2.95, 95% CI: 1.71–5.11), lack of regular teeth cleaning habits (AOR = 3.26, 95% CI: 2.13–4.97), feeling dry mouth (AOR = 2.31, 95% CI: 1.11–4.81), sugared tea drinking (AOR = 2.00, 95% CI: 1.18– 3.38), inadequate oral health knowledge (AOR = 3.51, 95% CI: 2.19–5.62), and khat chewing (AOR = 2.14, 95% CI: 1.24–3.71) were significantly associated factors with high prevalence of dental caries.

We found that the decayed score was 1.80, missing was 0.60 and filled was 0.05. The mean dmft score in tobacco users was 2.42 and non- abuser was 2.00, in patients using abrasive tooth paste was 2.34 and non- abrasive toothpaste was 2.16, in type I diabetes was 2.04 and in type II diabetes was 2.38. Latti et al[14] evaluated the effects of diabetes mellitus on dental caries micro-organisms responsible for caries. This study was carried out on 60 subjects consisting of 2 groups. The Group A (study group) consisted of 30 subjects with diabetes mellitus and dental caries, and the Group B (control group) consisted of 30 subjects with dental caries but no systemic disease. DFS/dfs index in all subjects was evaluated and compared. Unstimulated salivary flow was collected and levels of Streptococcus mutans were analyzed. It was found that the fasting blood sugar in Group A subjects because of which there was increased streptococcus mutans count and hence high caries index as compared to that of Group B.

The limitation of the study is small sample size.

CONCLUSION

Authors found that there was a high caries index in patients suffering from diabetes. A higher dmft score was observed in tobacco abusers, and those using abrasive toothpaste.

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