Prevalence of teeth loss related to periodontitis among type 2 diabetic patients and non diabetic patients in Faculty of Dentistry- Aden University

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Abstract

Diabetes affects the health of the teeth and periodontal tissue leading to bone destruction and teeth loss. The idea that is present among dentists is that diabetic patients with periodontitis must lose more teeth than non-diabetic patients, but what we notice in our college clinics telling us the opposite.
The aim of this study isto compare the teeth loss of diabetic and non-diabetic patients considering the age, sex and presence of bad habits (smoking and qat chewing).
Teeth loss and depth of periodontal pocket of 65 adult diabetics and 65 adult non diabetic patients were examined. The presence of habits (smoking and qatchewing) among patients were recorded.
In this study, we classifythe number of the lost teeth into four categories: the first category with the least number of teeth loss, and the fourth with the highest number of teeth loss. The number of diabetic patients in the first and second categories were more than non-diabetic, whereas the number of non-diabetic patients was more in the third and fourth category.

Key words: Teeth loss, Diabetic patients, Periodontal pockets, Bad habits.

Introduction:

Diabetes mellitus is a metabolic disorder characterized by hyperglycemia due to defective secretion or activity of insulin[4]. The classification of this condition is like the following:

"Insulin-dependent diabetes mellitus (type 1) and Non-insulin-dependent diabetes mellitus" (type2) [7].

Type 1 diabetes mellitus encompasses diabetes resulting primarily from destruction of the beta-cells in the islets of Langerhans of the pancreas[4].

This condition often leads to absolute insulin deficiency [5].

These patients are more likely to suffer severe systemic complications as a result of the disease [7].

The causes of type 2 diabetes mellitus range frominsulin resistance with relative insulin deficiency to a predominantly secretory defect accompanied by insulin resistance [14].

This condition is often associated with obesity. In addition, the risk of type 2 diabetes increases with age and lack of physical activity, and this form of diabetes is more prevalent among people with hypertension or dyslipidemia. Type 2 diabetes has a strong genetic component. People with type 2 diabetes constitute 90% of the diabetic population [5].

The complications of diabetes are related to long-term elevation of blood glucose concentrations (hyperglycemia).

Long-term complications may occur in both type 1 and type 2 diabetes[8].

Macrovascular complications include coronary artery disease, cerebrovascular disease and peripheral vascular disease. Microvascular complications include retinopathy, nephropathy and neuropathy [8].

In terms of oral manifestations, the patient may experience delayed wound healing and xerostomia, as well as an increased susceptibility to periodontal disease [7].

Other oral manifestationsinclude: burning mouth syndrome, candidiasis, increasedinfections, increased caries development due to increase glucose in saliva. [9].

Diabetic patients with poor metabolic control should be seen more frequently, especially if periodontal disease is already present. Patients with well-controlled diabetes who have good oral hygiene and who are on a regular periodontal maintenance schedule have the same risk of severe periodontitis as non-diabetic subjects [5].

The key factor for maintaining oral health in diabetic patients is to maintain and control their blood glucose because the oral health for well controlled diabetic patient is the same for non-diabetic individuals [11].

Also, diabetic patients must keep a good oral hygiene (brushing, flossing, rinsing) because their susceptibly for plaque accumulation and infection is higher (due to reduce their salivary secretion and their compromise immunity) [13].

-Periodontitis is the most common type of periodontal disease [10].

It is a serious infection result in an inflammatory process that initiates in gingival and extends into the periodontal connective tissue and bone that support the teeth, and eventually may cause tooth loose[5].

-periodontitis has many etiological risk factors, the most important one is the oral hygiene [5].

Oral hygiene is an important risk factor in highly susceptible individuals and is of less importance in individuals with strong host resistance [14].

Periodontitis begins with plaque. The longer the plaque remains on the teeth, the more damage it causes. Periodontitis cause loss of tissue and bone. If too much bone is destroyed, one or more teeth may be lost[7].

Although the destructive cycle that starts with the accumulation of plaque is the most common cause of periodontal disease, a number of other factors can contribute to or aggravate the condition. These include: *nutritional deficiency (A poor diet, especially one deficient in Vit. A, B complex, C, and D and calcium and phosphorus)[6] .

*adverse habits: (tobacco smoking, tobacco chewing, betelnut [9] .

*drugs that contain ingredients that decrease the body's production of saliva [7].

*hereditary (close to one-third of the population may have inherited a predisposition to gum problems) [5].

*hormonal changes [9].

*diabetes (periodontitis is recognized complication of diabetes because diabetes makes the person more susceptible to infection [8].

But people with good oral hygiene are not at increased risk of periodontitis, however, their susceptibility to periodontitis increases when their diabetes is poorly controlled. While periodontitis is a recognized complication of poorly controlled diabetes, it has been proposed that sever periodontitis may make the metabolic control of diabetes more difficult [10].

The risk factors affecting prevalence and severity of periodontitis include: age (prevalence of disease increase with increasing age) [6].

Sex (males have higher prevalence and severity of the disease than females) [9]. race (the disease increases in blacks than whites may be due to poverty status) and education (the disease inversely related toincrease level of education) [10].

- A recent epidemiologic research has linked periodontal pathogens to several systemic diseases, including cardiovascular disease, diabetes mellitus, and preterm birth, possibly mediated through markers of systemic infection and inflammation[7].
- In addition, the results of several epidemiologic studies have suggested a possible positive association between periodontal disease and cancer risk in different tissues, most notably in the mouth, upper gastrointestinal system, lung, and pancreas[5].
- Maintaining good oral hygiene is very important for prevention of periodontitis ; tooth brushing , flossing , mouth rinse and receiving a professional (scaling and root planning) are important for maintaining a good oral hygiene and preventing periodontal disease[5].

General objectives:

The aim of this study is to compare the prevalence of teeth loss and the depth of periodontal pockets among a group of diabetic and non-diabetic patients (both are suffering from periodontitis).

Specific objectives:

1- To compare the number of teeth loss in diabetic and non-diabetic patients, considering the age and sex.
2- To compare the depth of periodontal pocket in diabetic and non-diabeticpatients.
3- To assess the relationship between the number of teeth loss in diabetic and non-diabetic patients and the presence of bad habits (smoking and qat chewing).

Material and Methods:

This study was conducted from September 2009 toApril 2013 in Aden College of dentistry, the samples constitute of65subjects of diabetic patients and 65 of non-diabetic. The subjects were selected from patients who came seeking dental treatment in the various department in Aden College of dentistry. The age range was between26-85years. The subjects were informed about the study and consent was obtained from each patient before the start of clinical examination. The data was gathered by a questionnaire and clinical examination. The clinical examination included full mouth examination,with recording of missing maxillary and mandibular teeth, and measuring the depth of periodontal pockets. Questions about smoking andqat chewing have been asked. Data was collected statisticallyand analyzed using SPSS program.

Results:

The study is composed of 130 patients, 65 are diabetic patientsand 65 are non-diabetic . The distribution of participating patients according to sex is shown in Table (1).

Table (1): Distribution according to **sex**

Patient's type	SEX		Total
	Female	Male	
Non diabetic	10	55	65
	15.4%	84.6%	100.0%
Diabetic	12	53	65
	18.5%	81.5%	100.0%
Total	22	108	130
	16.9%	83.1%	100.0%

Distribution of patients according to sex shown in table (1).

Samples are composed of 108 males (83.1%) and 22 females (16.9%).

49.1% of males are diabetic, and 50.9% are non-diabetic. In females, 54.5% are diabetic and 45.5% are non-diabetic.

Table (2): Distribution according to **age**

Age(years)	**Diabetic**	**Non diabetic**	**Total**
26-41	2	6	8
	25%	75%	100%
42-57	24	22	46
	52.2%	47.8%	100%
58-73	36	31	67
	53.7%	46.3%	100%
74-89	3	6	9
	33.3%	66.7%	100%
Total	65	65	130
	50%	50%	100%

Table (3): Distribution according to the **number of teeth loss**

Teeth loss	Diabetic	Non diabetic	Total
0-8	20 58.8%	14 41.2%	34 100%
9-17	14 56%	11 44%	25 100%
18-26	6 35.3%	11 64.7%	17 100%
27-32	25 46.3%	29 53.7%	54 100%
Total	65 50%	65 50%	130 100%

Table (3) shows the distribution of patients in relation to the number of teeth loss. The total number of patients who have loss of (0-8) teeth are 34, most of them are diabetic (58.8%).

The total number of patients who have loss of (9-17) teeth are 25, most of them are diabetic (56%).

The total number of patients who have loss of (18-26) teeth are 17, most of them are non-diabetic (64.7%).

The total number of patients who have loss of (27-35) teeth are 54, most of them are non-diabetic (53.3%)**.**

Table (4) shows patient's distribution according to **age**

Age group	Teeth loss	Diabetic	Non diabetic
26-41	0-8	100%	83.3%
	18-26	0%	16.7%
42-57	0-8	37.5%	27.3%
	9-17	29.17%	13.6%
	18-26	4.18%	9.1%
	27-35	29.15%	50%
58-73	0-8	25%	9.7%
	9-17	19.5%	22.6%
	18-26	13.9%	25.80%
	27-35	41.6%	41.9%
74-89	9-17	0%	16.7%
	27-35	100%	83.3%

In the (26-41) age group all diabetic patients' lost the least number of teeth. 16.7% of the non-diabetic patients lost 18-26 teeth.

In the (42-57) age group, most of diabetic patients (37.5%)have lost 0-8 teeth ,while 50% of non-diabetics lost 27-28 teeth .

In the (58-73) age group , most of diabetic and non-diabetic patients lost 27-28 teeth, followed by o-8 teeth in diabetic and 18-26 teeth in non-diabetic.

In the (74-89) age group, all diabetic patients lost 27-28 teeth, while 83.3% of non-diabetic patient's lost 27-28 teeth.

Table (5): Distribution of teeth loss in diabetic and non-diabetic **female patients**

Diabetic	Teeth loss	on diabetic
4 33.3%	0-8	6 60%
3 25%	9-17	1 10%
2 16.7%	18-26	2 20%
3 25%	27-35	1 10%
12 54.5%	Total	10 45.5%

Table (5) shows the distribution of teeth loss in diabetic and non-diabetic female patients. The number of teeth loss among diabetic females is more than teeth loss in non-diabetic females.

Table (6): Distribution of number of teeth loss among diabetic and non-diabetic **male patients**

Diabetic	Teeth loss	Non diabetic
16 30.1%	0-8	8 14.5%
11 20.8%	9-17	10 18.2%
4 7.6%	18-26	9 16.4%
22 41.5%	27-35	28 50.9%
53 100%	total	55 100%

Table (6) shows the distribution of number of teeth loss among diabetic and non-diabetic male patients. The number of teeth loss in non-diabetic males is more than the number of teeth loss in diabetic males.

Table (7) shows the distribution of patients according to the **mean of depth of periodontal pockets**

Patients	Periodontal measurement pocket		Total
	0-4	5-9	
Diabetic	47 72.3%	18 27.7%	65 100%
Non Diabetic	50 76.9%	15 23.1%	65 100%
Total	97 74.6%	33 25.4%	130 100%

Table (7) shows the distribution of patients according to the mean of depth of periodontal pockets. 97 (74.6%) of the participating patients have a mean of measurement (0-4), most of them are non-diabetic (51.5%).

33(25.4%) of the participating patients have a mean of measurement (5-9), most of them are diabetic 18(54.6%).

Table (8) shows the prevalence of smoking among diabetic and non-diabetic patients. Only 28.6% of the diabetic samples are smoking, whereas most of the non-diabetic patients (57.1%) are smoking.

Table (8): Prevalence of **smoking** among diabetic and non-diabetic patients

Patients	smoking	Non smoking	Total
Diabetic	28.6%	71.4%	100%
Non diabetic	57.1%	42.9%	100%

Table (9): Prevalence of **qat chewing** habit among diabetic and non-diabetic patients

Patients	Chewing qat	Not chewing	Total
Diabetic	60.7%	39.3%	100%
Non diabetic	64.3%	35.7%	100%

Table (9) shows the prevalence of qat chewing habit among diabetic and non-diabetic patients. In both group of patients, more than half of each sample are chewing qat, with the increasing of percentage in non-diabetic patients (64.3%) than diabetic (60.7%).

Discussion:

This study shows the prevalence of teeth loss in a sample composed of 130 patients, 65 patients are diabetic and 65 are non-diabetic.

Table (1): Shows the distribution of patients according to sex. 18.5% of diabetic patients are females and 81.5% are male. Non diabetic patients sample is composed of 15.4% females and 84.6%males.

Table (2): Shows the distribution of patients according to age .In the age group (26-41) years, 25% of the patients are diabetic, while 75% are non-diabetic . The decrease inthe number of diabetic patients is because type II diabetic appear in older age group (1).

In the age group (42-57) years, 52.2% of the patients are diabetic, and 47.8% are non-diabetic .In the age group (58-73) years, 53.7% of the patients are diabetic,and 46.3% are non-diabetic . In the age group (74-89) years, 33.3% of the patients are diabetic,and 66.7% are non-diabetic .

Table (3): Shows the distribution of the patients according to the category of teeth loss. The Total number of patients who have loss of (0-8) teeth are 34patients, 58,8%of them are diabetic and 41,2% are non-diabetic .The total number of patients who have loss of(9-17) teeth are 25 patients, 56% of them are diabetic , while 44% are non-diabetic. The total number of patients who have loss (18-26) teeth are 17patients, 35.3% are diabetic and 64.7% are non-diabetic . The total number of patients who have loss (27-35) teeth are 54 patients, 46.3% are diabetic and 53.7% are non-diabetic .

From what mentioned before, we can notice that, with the decreasing in number of teeth loss categories, the distribution of diabetic patients becomes more than the non-diabetic ; While, with the increasing number of teeth loss, the distribution of non-diabetic patients becomes more than diabetic .

Table (4): shows the distribution according to age group and number of lost teeth. In the age group (26-41) , all diabetic patients (100%) lost (0-8)teeth , while 83.3% of non-diabetic patients lost (0-8)teeth and 16.7% of them lost (18-26)teeth.

In the age group (42-57) , 37.5% of diabetic patients lost (0-8) teeth , followed by (9-17) teeth lost in 29.17% of diabetic patients , (27-35) teeth were lost in 29.15% of diabetic patient and (18-26) teeth in 4.18%of diabetic patient , While 50% of non-diabetic .

Patients lost (27-35) teeth, followed by 27.3% of them lost (0-8) teeth, then 13.9% of them lost (9-17) teeth, and finally 9.1% of the non-diabetic lost (18-26) teeth.

In the age group (58-73), 41.6% of diabetic patient lost (27-35) teeth, 25% of them lost (0-8) teeth, 19.5% lost (9-17) teeth, and 13.9% lost (18-26) ,while 41.9% of non-diabetic patients lost

(27-35) teeth, followed by 25.8% of them lost (18-26) teeth, then 22.6% of non-diabetic lost (9-17) teeth, and finally 9.7% of them lost (0-8).

In the age group (74-89), all diabetic patients (100%) lost (27-35) teeth whereas 83.3%of non-diabetic lost (27-35) and 16.7% of them lost (9-17) teeth.

It is noticed that ,with the increase of the age of the patient the number of teeth loss increases. It is also noticed that, in the age group (58-73), (74-89) most of diabetic and non-diabetic patient lost (27-35), and this is attributed to the old age of the patients.

Table (5) shows the distribution of teeth loss in female patients, 54.5% of them are diabetic and 45.5% are non diabetic.

It is found that 33.3% of female diabetic patients lost (0-8) teeth, followed by 25% who lost (9-17) teeth, also 25% of female diabetic patients lost (27-35)teeth, and 16.7% lost (18-26) teeth.

While in non diabetic female patients, it is observed that 60% lost (0-8) teeth ,followed by 20% who lost (18-26) teeth ; 10% lost(9-17) teeth and 10% of non diabetic female patients lost (27-35) teeth .

So, we can observe that the diabetic female patient's loss is more than non-diabetic female patients, this agrees with a study that found the same results (15).

Table (6) shows the distribution of teeth loss in male patients. It is noticed that 41.5% of male diabetic patients lost (27-35)teeth , 30.1% of them lost (0-8) teeth , 20.8% lost (9-17) teeth , and 7.6% lost (18-26)teeth ,whilein male non diabetic patients ,

It is observed that 50.9% of them lost(27-35) teeth; 18.2% lost (9-17) teeth, 16.4% lost (18-26) teeth, and 14.5%of non diabetic male patients lost(0-8) teeth.

So, we observe that the non-diabetic male patients loss teeth more than diabetic male patients. This result disagrees with a study that found that diabetic male patients have lost more teeth than non-diabetic male patients (15).

Table (7)Shows the distribution of the patients according to the mean of the depth of periodontal pocket .It is noticed that 72.3% of diabetic patients have pocket depth of (0-4)mm and 27.7% have pocket depth of (5-9)mm ,while 76.9% of non-diabetic patients have pocket depth of (0-4)mm and 23.1%of non-diabetic patients have depth pocket of (5-9)mm.

It is observed that most of diabetic and non-diabetic patients have pocket depth of (0-4) mm. Also noted that there is slight increase in depth of pocket in diabetic patients than non diabetic patients, this agrees with a study that found the same results(10).

Table (8) Shows the prevalence of smoking in diabetic and non-diabetic patients. We can see in this table that most of diabetic patients are non-smokers, with a percentage of 71.4% ,whereas most of non-diabetic patients are smokers with a percentage of 57.1%. this result disagrees with a study that showed an increase in the prevalence of smoking among diabetic more than the non diabetic (15) , and other study showed that there is no difference between the diabetic and non diabetic patients in their use of tobacco (3).

Table (9) Shows the prevalence qat chewing habit among diabetic and non-diabetic patients. We can see that most diabetic and non-diabetic patients are qat chewers with an increase in the percentage among the non-diabetic patients (64.3%).

The Results of this study showed that there is a differences in the number of lost teeth between the diabetic and non-diabetic patients, with an increase in the prevalence of teeth loss among non diabetic patients , This may be attributed to the increase in the prevalence of smoking and qat chewing among them that led to worsen their periodontitis. These findings suggest that smokers are at a high risk for developing Periodontitis and that smoking may be the single most important environmental risk factor for getting Periodontitis (3).

Smoking is associated with an increased rate of periodontal disease in terms of alveolar bone loss and attachment loss, as well as pocket formation. Nicotine, the major component of cigarette smoke, may weaken host defenses to the bacterial invasion induced by plaque(1).

Smokers have 2.7 times greater probabilities to have established periodontal disease than non-smokers, independent of age, sex and plaque index (2).

Regarding sex, the results show the number of teeth loss increase in diabetic females more than the non diabetic females, this relationship agrees with many studies that suggest the teeth loss to be more in diabetic than in non-diabetic; this may be attributed to the absence of bad habit factors (smoking and qat chewing)among females, so this relationship between diabetic and teeth loss took its usual pathway. But ,in males, the result shows that teeth loss is more in non diabetic patients than in diabetic.

Conclusion:

Teeth loss appears to be higher in non-diabetic group (with high percentage of smokers and qat chewers) than the non-diabetic ones (with small percentage of smokers and qat chewers), showing that the bad habits are a definite risk factor for teeth loss that may compete the risk of systemic diseases.

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انتشار فقدان الأسنان المتعلقة باللثة بين نوع 2 لمرضى السكري وغير مرضى السكري في كلية طب الأسنان – جامعة عدن

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الملخص

مرض السكري يؤثر على صحة الأسنان والأنسجة اللثوية التي تؤدي إلى تدمير العظام وفقدان الأسنان. الفكرة التي موجوده بين أطباء الأسنان أن مرضى السكري مع امراض اللثة يسبب فقدان أكثر الأسنان من المرضى غير المصابين بالسكري. ولكن ما لاحظناه في هذه الدراسة يؤكد لنا عكس ذلك. والهدف من هذه الدراسة مقارنة فقدان الأسنان عند مرضى السكري وغير المصابين بالسكري مع الاخذ بعين الاعتبار العمر والجنس ووجود العادات السيئة (التدخين ومضغ القات).
تتم فحص فقدان الأسنان الجيوب اللثوية من 65 مرضى السكري البالغين و65 الكبار غير مرضى السكري. ووجود عادات (التدخين و (qat chewing) بين المرضى الذين تم فحصهم* .
في هذه الدراسة صنفت عدد الأسنان المفقودة إلى أربع فئات، الفئة الأولى مع أقل عدد من فقدان الأسنان، والفئة الرابعة مع أكبر عدد من فقدان الأسنان. وبلغ عدد مرضى السكري في الفئات الأولى والثانية أكثر من غير مرضى السكري. في حين أنَ عدد المرضى غير المصابين بالسكري وأكثر في الفئة الثالثة والرابعة.

الكلمات المفتاحية: فقدان الأسنان عند مرضى السكري، والجيوب اللثوية، والعادات السيئة.