



Periodontal treatment needs of type 2 diabetic Iraqi patients

Dr. Dalia Kudier Abbas. *

Abstract

Periodontitis is a persistent bacterial infection causing chronic inflammation in periodontal tissues. Type 2 diabetes mellitus (DM) is a common metabolic disease that is associated with increased prevalence and severity of periodontitis.

Our aim is to evaluate periodontal treatment needs of type 2 diabetic Iraqi patients according to the age and the duration of DM.

One hundred and seventy one type 2 diabetic Iraqi patients were enrolled in this study. Recording of gender, age, and duration of DM was done. Periodontal examination to evaluate treatment needs (TN) was performed by using community periodontal index of treatment needs (CPITN), Scoring for each patient was done by dividing his mouth into six sextants.

CPITN showed a variation in the distribution of the patients according to age. In the age category (30-39) years; code 0 and code 1 represented 23.6 % and 59.8 % of the sextants respectively. Concerning treatment needs, only 11.8 % of patients did not need any treatment (TN 0). In the age category (40-49) years; code 1 was the most frequent code and represented 61.5% of the sextants . All patients in this age category need a sort of treatment . In the age categories (50-59) years and (60-69) years; code 3 represented 21.8% and 30.6% of the sextants respectively and TN3 represented 50% and 49.2% of the patients respectively. In this study, when the duration of DM is 1-5 years, code 3 represented only 13.6% of the sextants and periodontal treatment needs TN3 was 26.3% of patients while code 3 reached 26% of the sextants and TN3 represented 52.7% of the patients when the duration of DM was > 5 years.

In conclusion periodontal treatment needs of type 2 diabetic patients became more complicated if the patients were older and the duration of DM was longer.

Key wards: Periodontitis, Diabetes mellitus, Treatment needs

Introduction

Periodontitis is a persistent bacterial infection causing chronic inflammation in periodontal tissues and is characterized by destruction of the periodontal ligament fibers attaching teeth to the alveolar bone and of alveolar bone itself⁽¹⁾.

Diabetes mellitus (DM) is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or

both⁽²⁾. The type 2 DM is by far the most prevalent endocrine or metabolic disease in the world⁽³⁾. Prevalence may be (< 3 %) in some communities while of very high figures (> 20 %) in some other communities⁽⁴⁾. It is associated pathologically with microvascular and macrovascular complications as well as an increased susceptibility to infection⁽⁵⁾.

* Lecturer, Department of Pedodontics, Orthodontics and Preventive dentistry.

It is generally accepted that diabetes increases the prevalence and severity of periodontitis^(6, 7). Elevated glucose levels and the accumulation of advanced glycation end products (AGEs) in the gingival tissue of individuals with diabetes are thought to be primarily responsible for oral and other complications of diabetes^(8,9). It is also thought that periodontitis can worsen diabetes mellitus, the mechanism of such an effect may be the infection by gram-negative bacteria to periodontal tissues which will reduce insulin-mediated glucose uptake by skeletal muscles and this may lead also to whole-body insulin resistance⁽¹⁰⁾. Evidences for such bidirectional relationship between diabetes and periodontal disease were derived from many studies^(7, 11, 12).

Many studies have reported that there is a direct relationship between the severity of periodontitis and the age of the patients^(13, 14), as well as the duration of DM^(14, 15).

Community periodontal index of treatment needs (CPITN) is an index that was developed primarily for the evaluation of periodontal treatment needs using clinical parameters. CPITN is useful to construct an effective periodontal care programs and to evaluate the dental personnel required, which are essential for prevention and control of periodontal diseases⁽¹⁶⁾.

The aim of study is to evaluate periodontal treatment needs of type 2 diabetic Iraqi patients according to age and duration of DM.

Materials and Methods

Setting: This study was conducted in the National Diabetes Center, University of Al-Mustansiriya, Baghdad, Iraq.

Patients: One hundred and seventy one type 2 diabetic patients

attending the outpatient clinics of the National Diabetes Center for routine follow up were enrolled in this study. Recording of gender, age, and duration of DM was done by interviewing.

Periodontal examination: Periodontal examination to evaluate treatment needs of type 2 diabetic patients was performed by using CPITN index⁽¹⁶⁾. A periodontal probe, as recommended by WHO for CPITN, was used in the examination. Exclusion was made for edentulous patients and a single examiner has performed all CPITN for all patients (the examiner passed both inter- and intra-examiner calibrations).

Scoring for each patient was done by dividing the mouth into six sextants, designated as S1 – S6 beginning in maxillary right sextant S1 in clockwise manner and finishing in mandibular right sextant S6. Concerning the posterior sextants (S1, S3, S4, S6), the first and second molars are examined as index teeth. They were examined in pairs and an only one score, the highest score, was recorded. For the anterior sextant S2, the maxillary right central incisor was used as an index tooth while for the anterior sextant S5, the mandibular left central incisor was used. If any of the index teeth was missing, the substitution will follow the instructions of CPITN index. The highest score in the six sextants, of each patient, was chosen to indicate his treatment needs (TN)

Codes of CPITN index:

Code 0 = No periodontal disease (Healthy periodontium)

Code 1= Bleeding observed during or after probing

Code 2= Calculus or other plaque retentive factors either seen or felt during probing

Code 3= Pathological pocket 4 to 5 mm in depth

Code 4= Pathological pocket 6 mm or more in depth

Code X= When only one tooth or no teeth are present in a sextant (third molars are excluded unless they function in place of second molars)

Treatment needs according to coding:

TN0 = No treatment need (code 0)

TN1 = Improving personal oral hygiene, oral hygiene instruction (code1)

TN2 = Professional cleaning of teeth and removal of plaque retentive factors, oral hygiene instruction (code 2)

TN3 = Professional cleaning of teeth and removal of plaque retentive factors, oral hygiene instruction in addition to root planning (code 3)

TN4 = Complex treatment may involve deep scaling, root planning and complex surgical procedures (code 4)

Results

One hundred and seventy one type 2 diabetic patients were categorized according to gender into 87 males and 84 females. According to age, the patients were categorized into four age groups; 30-39, 40-49, 50-59, and 60-69 years. The duration of DM was used to categorize patients into two groups; one group was of (1-5) years, while the other group was of (> 5) years (Table 1).

As the mouth of each patient was divided into six sextants, the total number of examined sextants for all patients was 1026 sextants.

Community periodontal index of treatment needs CPITN showed a variation in the distribution of the patients according to age. In the age category (30-39) years; code 0 represented 23.6% of the sextants, code 1 is the most frequent code; it reached 59.8% of the sextants, code 3 and code X were only 2.9% of the sextants, while no sextant in this age category reached code 4 (Table 2). Concerning treatment needs of the age (30-39) years, only 11.8% of patients did not need any treatment (TN0) while in 47% of the patients, treatment needs were of TN1. Concerning TN2 and TN3; they represented 29.4 % and 11.8 % respectively (Table 3).

In the age category (40-49) years; code 0 represented 4.6 % of the sextants, code 1 is also the most frequent code in this age category; it represented 61.5 % of the sextants, code 2 increased in frequency in the category (40-49) years more than in the category (30-39) years; it represented 21.3 % of the sextants. Code 3, code 4, and code X represented 4.6%, 1.1%, and 6.9% of the sextants respectively (Table 2). All patients in the age category (40-49) years need a sort of treatment starting with TN1 which represented 31% of the patients and in 48.3 % of patients treatment needs were of TN2 while 17.2% of patients need more complicated treatment represented by TN3. Only in 3.5 % of patients, treatment needs were of TN4 (Table 3).

In the age category (50-59) years; code 0 and code 1 became lower than in previous age categories and represented only 2.9 % and 37.5 % of the sextants respectively while codes 2, 3, 4, and X represented 19.8%, 21.8%, 2.1%, and 15.9 % of the sextants respectively (Table 2). Treatment needs of TN3 was found in 32 patients in this age category and this represented 50% of the patients while

TN1, TN2, and TN4 were found in 15.6%, 25%, and 9.4 % of patients (Table 3).

In the age category (60-69) years; code 0 represented only 0.3% of the sextants while codes 1, 2, 3, 4, and X represented 20.7%, 19.7%, 30.6%, 7.1%, and 21.6 % of the sextants respectively (Table 2). The patients in this age category need more complicated treatment; the number of patients of TN3 was 30 and of TN4 was 18 patients, this represented 49.2% and 29.5% of patients respectively while TN0, TN1, and TN2 represented only 0.0%, 3.3%, and 18.0 % of patients respectively (Table 3).

A variation in the distribution of 171 type 2 diabetic patients was detected when the values of community periodontal index of treatment needs CPITN were studied according to the duration of DM.

When the duration of DM of patients was (1-5) years; codes 0, 1, 2 represented 7.9 %, 47.1%, and 19.8 % of the sextants respectively while code 3, 4, and X represented 13.6%, 2.7%, and 8.9% of the sextants respectively (Table 4). Periodontal treatment needs TN0, TN1, TN2, TN3, and TN4 represented 2.5%, 26.3%, 33.7%, 26.3%, and 11.2 % of patients respectively (Table 5).

When the duration of DM of the patients was > 5 years; code 0, 1, and 2 represented 1.1%, 29.7%, and 18.5% of the sextants respectively while code 3, 4, and X represented 26.0%, 4.2%, and 20.5% of the sextants respectively (Table 4). Periodontal treatment needs of 48 patients reached TN3 and in 16 patients treatment needs reached TN4, this represented 52.7 % and 17.6 % of the patients while TN0, TN1, and TN2 represented only 0.0 %, 8.8%, and 20.9% of patients respectively (Table 5).

Discussion

Periodontitis is a bacterial infection caused by gram-negative anaerobes which populate the subgingival plaque causing a chronic inflammatory condition characterized by loss of connective tissue attachment and of alveolar bone⁽¹⁷⁾.

Etiopathogenetic mechanisms of the inflammatory diseases of periodontal tissues remain unknown⁽¹⁸⁾. Only some factors that influence the occurrence and development of periodontitis have been identified⁽¹⁹⁾. Most cases of inflammatory periodontal disease are associated with systemic diseases that change the response of the host to dental plaque and increase the predisposition to the disease⁽²⁰⁾. One of such diseases is diabetes mellitus⁽⁶⁾. A number of studies have found a higher prevalence of inflammatory diseases of periodontal tissues among people with diabetes mellitus^(21,22) and this will complicate treatment needs⁽²³⁾.

In this study, the CPITN showed that the distribution of the codes varies among age categories groups, The results exhibit that the severity of periodontitis increases with age which means a more complicated treatment needs in older ages. This finding is concomitant with many studies that reported that an older age increases severity of periodontitis^(13,14).

This study revealed that when the duration of DM is > 5 years the severity of periodontitis will increase. These results agree with many previous studies that reported a direct association between severity of periodontitis and duration of DM^(14,15) and this means that patients with DM, need a more complicated periodontal treatment when the duration of DM is > 5 years.

Most cases in all age categories were located in the intermediate codes of severity of periodontitis (code2 and

code3). The same was applied on the two studied intervals of duration of DM. This may be related to the fact that periodontal destruction is the consequence of a disequilibrium between the subgingival microflora and the host defense system. Several immune system mechanisms will prevent tissue invasion by microorganisms or their products⁽²⁴⁾. Such host response to infection and the innate immune response will limit the number of patients who reach code 4 (pocket depth 6 mm or more).

In conclusion, any preventive and treatment program for type 2 diabetic patients must take into consideration the ages of patients and the duration of DM.

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Table 1: Distribution of study group according to gender, age, and duration of diabetes mellitus (DM)

Percentage %	Number	Study group categories	Study group
50.9	87	Male	Gender
49.1	84	Female	
9.9	17	30-39 years	Age category
17.0	29	40-49 years	
37.4	64	50-59 years	
35.7	61	60-69 years	
46.8	80	1- 5 years	Duration of DM
53.2	91	> 5 years	

Table 2: Community periodontal index of treatment needs CPITN in 1026 sextants of 171 type 2 diabetic patients categorized according to age

Total of each age category N (%)	code X N (%)	code 4 N (%)	code3 N (%)	code 2 N (%)	code 1 N (%)	code 0 N (%)	Age category
102(100)	3 (2.9)	0 (0)	3 (2.9)	11 (10.8)	61(59.8)	24(23.6)	30-39 years
174(100)	12 (6.9)	2 (1.1)	8 (4.6)	37 (21.3)	107 (61.5)	8 (4.6)	40-49 years
384(100)	61(15.9)	8(2.1)	84(21.8)	76 (19.8)	144 (37.5)	11 (2.9)	50-59 years
366(100)	79(21.6)	26(7.1)	112(30.6)	72 (19.7)	76 (20.7)	1 (0.3)	60-69 years
1026(100)	155(15.1)	36(3.5)	207(20.2)	196(19.1)	388(37.8)	44(4.3)	Total of each code N (%)

N : Number of sextants

Table 3: The number and the percentages of sorts of treatment needs (TN) of 171 type 2 diabetic patients according to their age category

Total of each age category N (%)	TN4 N (%)	TN3 N (%)	TN2 N (%)	TN1 N (%)	TN 0 N (%)	Age category
17 (100)	0 (0)	2 (11.8)	5 (29.4)	8 (47)	2 (11.8)	30-39 years
29 (100)	1 (3.5)	5 (17.2)	14 (48.3)	9 (31)	0 (0)	40-49 years
64 (100)	6 (9.4)	32 (50)	16 (25)	10 (15.6)	0 (0)	50-59 years
61 (100)	18 (29.5)	30 (49.2)	11 (18)	2 (3.3)	0 (0)	60-69 years

Table 4 : Community periodontal index of treatment needs CPITN in 1026 sextants of 171 type 2 diabetic patients categorized according to duration of DM

Total N(%)	code X N(%)	code 4 N(%)	code3 N(%)	code 2 N(%)	code 1 N(%)	code 0 N(%)	Duration of DM
480(100)	43(8.9)	13(2.7)	65(13.6)	95(19.8)	226(47.1)	38(7.9)	1-5 year
546(100)	112(20.5)	23(4.2)	142(26.0)	101(18.5)	162(29.7)	6(1.1)	>5 year
1026(100)	155(15.1)	36(3.5)	207(20.2)	196(19.1)	388(37.8)	44(4.3)	Total of each code N(%)

N : Number of sextants

Table 5: The number and the percentages of sorts of treatment needs (TN) of 171 type 2 diabetic patients according to duration of DM

Total N(%)	TN4 N(%)	TN3 N(%)	TN2 N(%)	TN 1 N(%)	TN 0 N(%)	Duration of DM
80(100)	9(11.2)	21(26.3)	27(33.7)	21(26.3)	2(2.5)	1-5 years
91(100)	16(17.6)	48(52.7)	19(20.9)	8(8.8)	0(0)	>5 years