Short Term Effects of Non-Surgical Periodontal Treatment on the Clinical Parameters of Periodontal Diseases among Attendees of a Periodontology Clinic in Nigeria

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Abstract. Objective of the study was to determine the short term effects of non-surgical periodontal treatment on the clinical parameters of periodontal diseases among attendees of a periodontology clinic in Benin City, Nigeria. This interventional study was carried out among patients attending the periodontology clinic of the University of Benin Teaching Hospital, Benin City, Edo state, Nigeria. Data collection was through a pre-tested interview–administered questionnaire and periodontal examination. Periodontal diseases were assessed using Gingival Index (GI) and periodontal probing depth measurement with Williams' periodontal probe. Demographic characteristics, pattern of dental clinic attendance and previous treatment pattern were elicited using a pre-tested interview–administered questionnaire. Various forms of non-surgical periodontal treatment were carried out as required by the study participants. The periodontal examination and data collection were again carried out for the participants 3 months after intervention. Data collected were analyzed using IBM SPSS version 23 and test for significance was done using chi-square statistics or Fisher's exact test. All (100%) the study participants had non-surgical periodontal treatment intervention with 100% from the chronic gingivitis group of periodontal diseases having scaling and polishing and oral hygiene instruction and 100% from the chronic periodontitis group of periodontal diseases having scaling and polishing, oral hygiene instruction and root planning. More than half (52.5%) of the participants had mild gingival inflammation and this was higher among the chronic gingivitis group (80.0%) than chronic periodontitis group (25.0%) of periodontal diseases participants before non-surgical periodontal treatment intervention. A total of 30.0% of the participants had periodontal probing depth of 4 mm with 60.0% being from the chronic periodontitis group of periodontal diseases and 0.0% being from the chronic gingivitis group of periodontal diseases before non-surgical periodontal treatment intervention. A total of 100.0% of the participants had mild gingival inflammation with 100.0% being from the chronic gingivitis group of periodontal diseases and 100.0% being from the chronic periodontitis group of periodontal diseases after non-surgical periodontal treatment intervention. A total of 100.0% of the participants had periodontal probing depth of less than 3 mm with 100.0% being from the chronic gingivitis group of periodontal diseases and 100.0% being from the chronic periodontitis group of periodontal diseases after non-surgical periodontal treatment intervention. The mean pocket depths among the chronic periodontal group of periodontal diseases participants before and after non-surgical periodontal treatment intervention were 4.40 and 1.05 respectively. A significant reduction in the clinical parameters of periodontal diseases with non-surgical periodontal treatment intervention was seen among attendees of a periodontology clinic in Nigeria. This necessitates the need for early intervention in patients with periodontal diseases to control and prevent the clinical progression to a more advance stage of the disease. This study is also recommended among a larger number of participants.

Keywords: periodontal clinic attendees, periodontal diseases, non-surgical periodontal treatment, clinical parameters, gingival inflammation, periodontal pocket depth.

Introduction

Periodontal diseases may be predominantly referred to as chronic inflammatory conditions of the tooth supporting structures: gingiva, periodontal ligament, cementum and alveolar bone induced by dental plaque biofilm (Novak, 2002: 64-72). Traditionally, periodontal diseases can be categorized based on the extent of involvement of the inflammation into chronic gingivitis and chronic periodontitis (Armitage, 2004: 9-21). Chronic gingivitis is an initial and reversible form of periodontal disease in which there is inflammation of the gingival without destruction of the other tooth supporting structures (Research, Science and Therapy Committee of the American Academy of Periodontology, 2001: 1790; Research, Science and Therapy Committee of the American Academy of Periodontology, 2001: 851; Eley et al., 2010). Chronic periodontitis, on the other hand, is an advanced and irreversible form of periodontal disease in which there is inflammatory disease involving the other tissues of the periodontium. Chronic periodontitis may lead to clinical attachment loss, radiographic evidence of alveolar bone loss, periodontal pocket characterized by increasing periodontal probing depth, tooth mobility and eventual tooth loss (Korman, 2021: 778).

Chronic gingivitis may remain confined to the gingiva for many years or may spread into the deeper tissues to become chronic periodontitis. It has, however, be reported that not everyone is equally susceptible to chronic periodontitis (Korman, 2021: 777-784). Genetic predisposition of the individual has been identified as a factor affecting susceptibility and progression of chronic periodontitis (Korman et al., 2010: 23-34). Non-surgical periodontal treatments of periodontal diseases are procedures performed to control dental plaque biofilm, without the use of surgical blade. It halts the progression of periodontal diseases and returns the periodontium to a state of health. It involves the removal of all plaque deposits including supra and subgingival plaque, calculus and stains by scaling and polishing, correction of plaque retention factors, meticulous debridement of root surfaces by root planning within the periodontal pocket, instruction in home care as well as use of antiseptics/antibiotics as adjuncts.

These measures are often referred to as cause-related therapy since they aim at controlling microbial aetiology and factors that contribute to periodontal diseases (Korman et al., 2000: 33-53; Mullaly et al., 2007: 326; Rabbani, 1981: 119-123; Caffesse, 1986: 205-211). It has been reported that following non-surgical periodontal treatment, plaque bacteria plaque bacteria is eliminated and further destruction of the periodontium is halted (Rooney et al., 2002: 342). Non-surgical periodontal treatment has also been reported to bring about a reduction in the periodontal pocket depth in patients with chronic periodontitis (Greenstein, 2000: 1580). A regular and effective maintenance care including regular checks on oral hygiene and periodontal status, repeat of non-surgical periodontal treatment as necessary and good home care is desired to prevent recurrence and progression of periodontal diseases (Rooney et al., 2002: 342; Greenstein, 2000: 1580).

The information on the effects of non-surgical periodontal treatment on the clinical parameters of periodontal diseases will enable the clinician to develop a preventive and interventional program geared towards the prevention, restoration and maintenance of periodontal health among individuals with periodontal diseases.

However, there is paucity of information on effects of non-surgical periodontal treatment on the clinical parameters of periodontal diseases among individuals with periodontal diseases especially among patients seeking dental care like attendees of a periodontology clinic in Nigeria. Therefore, additional interventional studies, using hospital-based participant recruitment system, on the effects and benefits of non-surgical periodontal treatment on the clinical parameters of periodontal diseases are deemed necessary. The objective of this study was to assess the short term effects of non-surgical periodontal treatment on the clinical parameters of periodontal diseases among attendees of a periodontology clinic in Benin City, Nigeria.

Materials and Methods

This interventional study was carried out among patients attending the periodontology clinic of the University of Benin Teaching Hospital (UBTH), over a three-month period. Study participants were 18 years and above (consenting adults), highly motivated and willing to keep appointments. UBTH is a tertiary health facility which was established to provide quality health services, research and training. Benin City is an urban and capital City of Edo State in Nigeria. Tool of data collection was a pre-tested interview–administered questionnaire and periodontal examination. Periodontal diseases were assessed using Gingival Index (GI) and periodontal probing depth measurement with Williams' periodontal probe. The questionnaire elicited information on demographic characteristics, pattern of dental clinic attendance and previous treatment pattern. The questionnaires were hand delivered and completed questionnaire were returned to the researcher. Informed consent forms were duly completed and signed by willing participants. Various forms of non-surgical periodontal treatment were carried out as required by the study participants. The periodontal examination and data collection were again carried out for the participants 3 months after intervention. Data was analyzed using IBM SPSS version 23.0 for frequency distribution and cross tabulation. Test for statistical significance was done using chi-square statistics or Fisher's exact test.

Results

A total of 44 patients met the inclusion criteria and were recruited for the study. However, 40 completed the study, giving an overall participation of 90.9%. Of the 40 participants that completed the study, 50% (20/40) were from the chronic gingivitis group of periodontal diseases and 50% (20/40) were from the chronic periodontitis group of periodontal diseases. The mean age of participants from the chronic gingivitis group of periodontal diseases was 44.1±3.8 while that of participants from chronic periodontitis group of periodontal diseases was 54.4±4.8. Majority (55%) of the participants in the chronic gingivitis group were below 45 years of age while 60% of the participants in the chronic periodontitis group were 45 years and above. More females (62.5%) were studied with slightly more females among chronic gingivitis group (65.0%) than chronic periodontitis group (60.0%) respondents. Patients with tertiary level of education made up 67.5% of the participants with 70.0% from chronic periodontitis group and 65.0% from chronic gingivitis group. Professionals made up 60.0% of the participants with 55.0% from chronic periodontitis group and 65.0% from chronic gingivitis group (Table 1).

Table 1. Demographic characteristics of the respondents

Characteristics	Chronic gingivitis n (%)	Chronic gingivitis n (%)	Total n (%)
Age (years)			
<24yrs	6 (30.0	1 (5.0)	7 (17.5)

25-34	4 (20.0)	5 (25.0)	9 (22.5)
35-44	1 (5.0)	2 (10.0)	3 (7.5)
45-54	8 (40.0)	8 (40.0)	16 (40.0)
55-64	1 (5.0)	4 (20.0)	5 (12.5)
Sex			
Male	7 (35.0)	8 (40.0)	15 (37.5)
Female	13 (65.0)	12 (60.0)	25 (62.5)
Educational status			
Tertiary	13 (65.0)	14 (70.0)	27 (67.5)
Secondary	2 (10.0)	3 (15.0)	5 (12.5)
Primary	3 (15.0)	1 (5.0)	4 (10.0)
Non formal	2 10.0)	2 (10.0)	4 (10.0)
Occupation			
Professionals	13 (65.0)	11 (55.0)	24 (60.0)
Associate professionals	5 (25.0)	1(5.0)	6 (15.0)
Craft and related trade workers	2 (10.0)	8 (40.0)	10 (25.0)
Total	20 (100.0)	20 (100.0)	40 (100.0)

All (100%) the study participants had non-surgical periodontal treatment intervention with 100% from the chronic gingivitis group of periodontal diseases having scaling and polishing and oral hygiene instruction and 100% from the chronic periodontitis group of periodontal diseases having scaling and polishing, oral hygiene instruction and root planning (Table 2).

Table 2. Type of intervention instituted

Intervention	Chronic gingivitis n (%)	Chronic periodontitis n (%)	Total n (%)
Scaling and polishing plus oral hygiene instruction	20 (100.0)	0 (0.0)	20 (50.0)
Scaling and polishing plus oral hygiene instruction plus root planing	0 (0.0)	20 (100.0)	20 (50.0)
Total	20 (100.0)	20 (100.0)	40 (100.0)

More than half (52.5%) of the participants had mild gingival inflammation and this was higher among the chronic gingivitis group (80.0%) than chronic periodontitis group (25.0%) of periodontal diseases participants before non-surgical periodontal treatment intervention. Less than half (47.5%) had moderate gingival inflammation and this was higher among the chronic periodontitis group (75.0%) than the chronic gingivitis group (20.0%) of periodontal diseases before non-surgical periodontal treatment intervention. A total of 30.0% of the participants had periodontal probing depth of 4 mm with 60.0% being from the chronic periodontitis group of periodontal diseases and 0.0% being from the chronic gingivitis group of periodontal diseases before non-surgical periodontal treatment intervention; whereas a total of 20.0% of the participants had periodontal

probing depth of 5mm with 40.0% being from the chronic periodontitis group of periodontal diseases and 0.0% being from the chronic gingivitis group of periodontal diseases before non-surgical periodontal treatment. All (100.0%) the participants from the chronic gingivitis group of periodontal diseases had periodontal probing depth of <3mm before non-surgical periodontal treatment (Table 3).

Table 3. Distribution of respondents according to clinical parameters before non surgical periodontal treatment intervention

Parameters	Chronic gingivitis n (%)	Chronic periodontitis n (%)	Total n (%)
Gingival index			
Normal	0 (0.0%)	0 (0.0)	0 (0.0)
Mild	16 (80.0)	5 (25.0)	21 (52.5)
Moderate	4 (20.0)	15 (75.0)	19 (47.5)
Severe	0 (0.0%)	0 (0.0%)	0 (0.0%)
Periodontal probing depth (mm)			
<3.0	20 (100.0)	0 (0.0)	20 (50.0)
4.0	0 (0.0)	12 (60.0)	12 (30.0)
5.0	0 (0.0)	8 (40.0)	0 (0.0)
Total	20 (100.0)	20 (100.00)	40 (100.0)

A total of 100.0% of the participants had mild gingival inflammation with 100.0% being from the chronic gingivitis group of periodontal diseases and 100.0% being from the chronic periodontitis group of periodontal diseases after non-surgical periodontal treatment intervention. A total of 100.0% of the participants had periodontal probing depth of less than 3 mm with 100.0% being from the chronic gingivitis group of periodontal diseases and 100.0% being from the chronic periodontitis group of periodontal diseases after non-surgical periodontal treatment intervention (Table 4).

Table 4. Distribution of respondents according to clinical parameters after non surgical periodontal treatment intervention

Parameters	Chronic gingivitis n (%)	Chronic periodontitis n (%)	Total n (%)
Gingival index			
Normal	0 (0.0%)	0 (0.0)	0 (0.0)
Mild	20 (100.0)	20 (100.0)	40 (100.0)
Moderate	0 (0.0%)	0 (0.0%)	0 (0.0%)
Severe	0 (0.0%)	0 (0.0%)	0 (0.0%)
Periodontal probing depth (mm)			
<3.0	20 (100.0)	20 (0.0)	40 (100.0)
Total	20 (100.0)	20 (100.00)	40 (100.0)

The mean pocket depths among the chronic periodontal group of periodontal diseases participants before and after non-surgical periodontal treatment intervention

were 4.40 and 1.05 respectively. There was a statistically significant difference in the periodontal pocket depth among the participants from the chronic periodontitis group of periodontal diseases before and after non-surgical periodontal treatment. (P=0.001) (Table 5).

Table 5. Comparison of pre- and post- treatment periodontal pocket depth among the chronic periodontitis group of respondents

	n	Mean pocket depth	SEM	t	P value
Pre-treatment	20	4.40	0.112	12.674	0.001
Post-treatment	20	1.05	1.468		

There was a significant relationship between the pre-treatment pocket depth and the post-treatment pocket depth in the chronic periodontitis group (0.05)

Discussion

This study with set objective to determine the short term effects of non-surgical periodontal treatment on the clinical parameters of periodontal diseases among attendees of a periodontology clinic in Benin City found that the older age group of participants constituted the majority of subjects in the chronic periodontitis .i.e, the older adults who participated in the study had more severe forms of periodontal diseases. This may be related to the fact that age is related to the incidence of periodontal destruction. Majority (67.5%) of the participants had tertiary level of education and 60% were professionals. This finding may be because of the study centre being in close proximity to the university community. More females (62.5%) participated in the study than males. This may be related to the fact that more females than males are conscious of the facial appearance and oral health. Indeed studies have documented gender based differences in the utilization of dental services (Weijden, 2002: 55-71; Okunseri et al., 2004: 127-130). Patients with periodontal diseases receive different treatment modalities depending on the type of periodontal diseases the present to the clinician. This was reflected in this study as 50% of participants had scaling and polishing and oral hygiene instruction while 50% had scaling and polishing, oral hygiene instruction and root planning. The equal distribution of participants in the study could be as a result of the grouping of the subjects in the study and the sampling technique used. Scaling and polishing suffices for patients in the chronic gingivitis group of periodontal diseases because it effectively removes calculus, which is a plaque retentive factor and plaque is the primary aetiologic factor of gingivitis. Scaling and polishing thus help in the complete resolution of signs and symptoms of chronic gingivitis in the absence of other plaque retentive factors. In chronic periodontitis, where periodontal pocket is a presenting clinical feature, scaling and polishing alone results in partial resolution of signs and symptoms until a more complex non-surgical periodontal treatment like root planning or surgical periodontal treatment is carried out, depending on the depth of the periodontal pocket.

Majority (80.0%) of the participants in the chronic gingivitis group had mild gingival inflammation whereas majority (75.0%) of participants in the chronic periodontitis group had moderate gingival inflammation before non-surgical periodontal treatment intervention. This may be related to the fact that there is continuing gingival inflammation as periodontal disease progresses. However, the presence and severity of gingival inflammation at any stage of periodontal diseases depend upon the oral hygiene status

of the individual. Where the patient has poor oral hygiene (Ansari and Honkala, 2007: 41-46), there is marked gingival inflammation whereas good oral hygiene may lead to patient having mild gingival inflammation. This may account for the reason different study participants have varying degree of gingival inflammation in both groups of periodontal diseases. Periodontal pocket is one of the hall marks of chronic periodontitis. This was reflected in this study as all (100%) the participants from the chronic periodontitis group of periodontal diseases had either 4 or 5 mm periodontal probing depth, indicating presence of periodontal or true pocket, before non-surgical periodontal treatment intervention; whereas all (100.0%) the participants from the chronic gingivitis group of periodontal diseases had periodontal probing depth of <3mm before non-surgical periodontal treatment, indicating the absence of true pocket.

In this study, there was improvement in the degree of gingival inflammation and periodontal pocket depth, that is, the clinical parameters of chronic gingivitis and chronic periodontitis groups of participants, following non-surgical periodontal treatment intervention. There was a statistically significant difference in the periodontal pocket depth among the participants from the chronic periodontitis group of periodontal diseases before and after non-surgical periodontal treatment. This result explains the need for early intervention in patients with periodontal diseases. The result concurred with previous studies (Hung and Douglas, 2002: 844-847; Eley et al., 2010: 163-165; Ivic-Kardum et al., 2001: 39-42) that showed clinical improvement in gingival bleeding and pocket depth following non-surgical periodontal treatment intervention.

Conclusion

Non-surgical periodontal treatment brought about a reduction in the severity of the clinical parameters of periodontal diseases among attendees of a periodontology clinic in Benin City.

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