ORIGINAL ARTICLE

Dental anxiety before the first step and after the second step of periodontitis therapy[1]

Ansiedad dental antes del primer paso y después del segundo paso del tratamiento de la periodontitis[1]

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ABSTRACT

Introduction: *individuals that experience Dental Anxiety (DA) may avoid dental appointments and even postpone treatments, including periodontal treatment. The aim of this study was to 1) determine DA in patients with periodontitis before the first step and after the second step of periodontitis therapy (non-surgical periodontal treatment), and 2) collect sociodemographic and clinical characteristics of the studied population.* ***Methods:*** *patients with periodontitis that had never received subgingival instrumentation and attended the Clinic of Periodontics of the Facultad de Odontología, Universidad de Costa Rica, were invited to participate. From the electronic dental record, the following information was obtained: periodontal staging, Plaque Index (PI) and Gingival Bleeding Index (GBI). A questionnaire was applied before the first step and after the second step of periodontitis therapy. Data collected included: sociodemographic factors, smoking habits, ex-smoker status, pain, and the Modified Corah Dental Anxiety Scale (MDAS).* ***Results:*** *fifty-one patients completed the study, 19 men and 32 women, mean age 46 ±11.16 years. Most of the participants reported having completed high school. Regarding smoking habits, 46% were non-smokers. Of the non-smokers, 7.8% were former smokers. Patient's maximal pain in the last month decreased after the completion periodontitis therapy. The most prevalent periodontal diagnosis was Stage III followed by Stage II. The average PI was 61.4% and the average GBI was 39.5%. Fear to the sound of rotatory instruments/ultrasonic scalers ameliorated after completion of therapy. Total MDAS score and sub scores decreased from baseline.* ***Conclusion:*** *self-perceptions of DA improved over the course of periodontal treatment in our clinical setting.*

Keywords: *dental anxiety, non-surgical periodontal therapy, periodontal diseases.*

Resumen

Introducción: *las personas que experimentan Ansiedad al tratamiento Dental (AD) pueden evitar las citas odontológicas e incluso posponer los tratamientos, incluyendo el tratamiento periodontal. El objetivo de este estudio fue 1) determinar la AD en pacientes con periodontitis antes del primer paso y después del segundo paso del tratamiento de la periodontitis (tratamiento periodontal no quirúrgico) y 2) recopilar características sociodemográficas y clínicas de la población estudiada.* ***Métodos:*** *se invitó a participar a pacientes con periodontitis que nunca habían recibido instrumentación subgingival, que asistían a la Clínica de Periodoncia de la Facultad de Odontología de la Universidad de Costa Rica. Del expediente electrónico se obtuvo la siguiente información: estadio periodontal, Índice de Placa (PI) e Índice de Sangrado Gingival (ISG). Se aplicó un cuestionario antes del primer paso y después del segundo paso del tratamiento de la periodontitis. Los datos recolectados incluyeron: factores sociodemográficos, hábitos de tabaquismo, condición de exfumador, dolor y la Escala de Ansiedad Dental de Corah Modificada (MDAS).* ***Resultados:*** *51 pacientes completaron el estudio, 19 hombres y 32 mujeres, con un promedio de edad de 46 ± 11,16 años. La mayoría de los participantes refirió haber terminado la enseñanza media (37,3%). En cuanto al hábito de fumado, el 46% de los participantes eran no fumadores. De los no fumadores, el 7,8% eran exfumadores. El dolor máximo del paciente en el último mes disminuyó después de completar el segundo paso del tratamiento de la periodontitis (p=0,002). El diagnóstico periodontal más prevalente fue el Estadio III seguido del Estadio II. El PI medio fue del 61,4 % y el GBI medio fue del 39,5 %. El miedo al sonido de los instrumentos rotatorios y los raspadores ultrasónicos mejoró después del tratamiento periodontal. La AD se redujo en comparación con el valor inicial, según la puntuación total del MDAS y para todas las sub-puntuaciones del MDAS.* ***Conclusión:*** *la autopercepción de la AD mejoró en el trascurso del tratamiento periodontal en nuestro entorno clínico.*

Palabras clave: *ansiedad al tratamiento odontológico, tratamiento periodontal no quirúrgico, enfermedades periodontales.*

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INTRODUCTION

Periodontal diseases, including gingivitis and periodontitis, are inflammatory conditions that are highly prevalent, affecting up to 90% of the population worldwide[1,2]. Gingivitis is a reversible disease with proper periodontal care and maintenance. Periodontitis is preventable and treatable in most cases. However, if left untreated, periodontitis can comprise the integrity of tooth-supporting tissues[1]. According to the World Health Organization, about 15%-20% tooth loss is caused by periodontitis and occurs between the ages of 35-44[3]. A recent study by Murillo et al., reported that the prevalence of gingivitis associated with dental biofilm alone, in a representative sample of three Latin American countries, Mexico City-Mexico, Bogotá-Colombia, and San José-Costa Rica, was of 99.6%[4]. Lao and Araya described the periodontal condition in Costa Ricans from a sample of 101,188 patients, and reported the prevalence of periodontitis was 59.10% in the age group of 20-45 years and 40.64% in the elderly[5].

Nonsurgical periodontal therapy, also called subgingival debridement, subgingival scaling, root planning, etc., is the gold standard for treatment[6]. This procedure is effective in reducing probing depth and improving clinical attachment level. After the incorporation of the current classification of periodontitis in 2017, two clinical practice guidelines for the treatment of Stage I-III, and Stage IV periodontitis were developed[7,8]. Leading experts on these consensuses gave recommendations and approaches to therapy, depending on the periodontal disease stage, including different interventions. In addition, these guidelines introduced new terms. For example, the first step of periodontitis therapy aims to guide and motivate patients to change behavioral practices to undertake successful removal of supragingival dental biofilm and control of risk factors associated with periodontitis. The second step, or cause-related therapy, seeks the elimination/reduction of subgingival biofilm and calculus, and in some cases root surface cementum. In the commented guidelines, the experts agreed to use the term subgingival instrumentation to refer to all non-surgical periodontal procedures, performed manually, or with the aid of power-driven instruments[8].

Although most patients experience limited discomfort or pain during subgingival instrumentation, women and patients aged 30 to 40 years are likely to be more anxious during scaling[9]. Resulting tooth sensitivity during treatment[10] and previous bad experiences at the dentist, could discourage patient attendance and increase dental fear levels. DA (Dental Anxiety) is defined as an excessive, disproportionate, and persistent fear of dental procedures. Therefore, feeling anxious about dental situations may be a reason why patients avoid periodontal screening, appointments and even postpone treatment, contributing to initiation or relapse of the disease. It has been documented, patients with this transient anxiety, avoid dental preventive measures, and exhibit poor oral hygiene compliance[11], which may compromise periodontal health.

Previous studies have reported that periodontal therapy was associated with high levels of DA. For example, 71% patients had dental fear related to periodontal treatment, and 12.1% patients had

extreme anticipatory fear during treatment, caused by discomfort experienced during periodontal therapy process[3,12-15]. It has also been postulated that patients with periodontal disease have higher dental fear levels, which may have negative effects on their clinical outcome during subgingival instrumentation[10]. Moura et al. reported women with lower educational level were more susceptible to DA[16]. DA promotes a vicious cycle, since a greater delay in dental visiting, promotes deteriorated dental and periodontal health, with higher treatment needs[17]. DA may influence a less tendency to visit the dentist or dental specialist, for the purpose of relieving pain or a specific problem, in lieu of a check-up. Subsequently, patients that tend to avoid dental services due to severe DA may experience poorer general health and lower quality of life[18].

A handful of studies have reported DA in relation to periodontal treatment[10,12,13,19,20], however, there is a lack of assessment of this condition in the Costa Rican population and other Latin American countries. Therefore, the aims of this study were to: (1) evaluate DA before the first step and after the second step of periodontitis therapy in patients with periodontal diseases, and (2) collect sociodemographic and clinical data of the studied population.

METHODS

Population of study

The present study has a before-after (pre-post) design. It was conducted between the months of February to September 2022 at the Clinic of Periodontics of the Faculty of Dentistry of the University of Costa Rica. Only newly admitted patients with periodontitis, who had never had subgingival instrumentation, were chosen to determine if participants perceived a change in DA before the first step of periodontitis therapy and one month after the second step of therapy. Written informed consent for participation was obtained from all participants prior to the investigation. The present study was approved by the Scientific Ethics Committee of the University of Costa Rica.

The calculated population of the study was 69 participants, based on estimates of a confidence level of 95%, a maximum permissible error of 7% in the proportion of people with DA after treatment, which was estimated at 85%. The Finite Population Correction Factor was used. This sample was adjusted with a 10% non-response.

Inclusion criteria for the subjects included: 1. Over 18 years old, 2. Both sexes, 3. Diagnosed with periodontal disease with at least twenty teeth 4. No cognitive impairments 3. Able to complete the questionnaire independently. Exclusion criteria for the subjects included: 1. Use of illicit drugs, malignant diseases, taking sedatives, anxiolytics, or analgesics, 2. pregnancy or lactation, 3. an acute dental or periodontal condition, and patients who had in the past subgingival instrumentation.

Data collection and questionnaire

From each participant's electronic dental record, the following information was obtained before the first step of periodontitis therapy: periodontal staging, Plaque Index (PI) according to the Modified O'Leary Index[21] and Gingival Bleeding Index (GBI)[22]. Also, at the initial visit of the participant, before initiation of the first step of treatment, participants were asked to complete a questionnaire that consisted of: (1) demographic information: age, gender, and completion of educational level (elementary school, high school, university studies, or other), (2) smoking habits (past and current smoking habits; current smokers were asked the number of cigarettes consumed per day), (3) current dental pain and dental pain in the last month (4) and the Modified Corah's Dental Anxiety Scale (MDAS). After completion of the second step of periodontitis treatment, participants were asked to complete a questionnaire about (1) smoking habits, (2) dental pain and (3) MDAS.

To estimate dental pain, patients rated their average intensity of dental pain on a scale of 0 to 10, using a numeric rating scale (NRS), where 0 represented "no pain", 5 moderate pains, and 10 represented "the worst pain possible". The participant was asked to indicate the current pain and the maximal pain in the last month on the NRS.

Assessment of DA was based on the MDAS Spanish version[23], which comprises 5 questions, each assessing DA levels in different dental situations. A "not anxious" response is scored 1, and an "extremely anxious" response is scored 5. To assess the patient's level of DA, response scores of all 5 questions are added. The total score of this scale ranges from 5 to 25. A score <11 is considered normal/slight, whereas those lying between 11 and 18 represent moderate anxiety. Scores>19 represent extreme anxiety[24, 25].

MDAS questions were: 1) If you went to your Dentist for treatment tomorrow, how would you feel? 2) If you were sitting in the waiting room (waiting for treatment), how would you feel? 3) If you were about to have a tooth drilled, how would you feel? 4) If you were about to have your teeth scaled and polished, how would you feel? 5) If you were about to have a local anesthetic injection in your gum, above an upper back tooth, how would you feel?

To analyze other specific stimuli that may trigger anxiety in the dental clinic, participants were asked to indicate a yes/no response, if the following stimuli evoked anxious feelings, before the first step and after the second step of periodontitis therapy: 1) dental injection; 2) the sound of the dental drill, the sound of rotatory instruments or the sound of the ultrasonic scaler noise; and 3) having a foreign object in the mouth.

Data analysis

Data was tabulated and statistical analysis was performed using R studio software version 4.0.3. Continuous variables are presented as means and standard deviations, and categorical variables are presented as frequencies and percentages. Normality was determined using a Quantile Plot and Shapiro-wilk Test. No variable met the assumption of normality.

Internal consistency of the MDAS was determined by Cronbach's Alpha coefficient. The change in DA was assessed by subtracting MDAS scores at follow-up from baseline. To analyze the hypothesis that there were differences before and after treatment for quantitative variables, the Wilcoxon rank test was used. For binary variables, a sign test was used. Significance level was set at 5% (0.05). The Chi-square test was used to determine differences between MDAS categories before and after therapy. Cohen's D test was used to measure effect size. The effect size was calculated by dividing the mean change score by the standard deviation of the baseline score. An effect size of < 0.2 indicated a small but clinically significant magnitude of change, 0.3–0.7 a moderate change, and > 0.7 a large change[26].

RESULTS

Sociodemographic characteristics

Fifty one of sixty-nine participants completed both questionnaires, 19 (37.3%) men and 32 (62.7%) women. Mean age of the participants was 46.88 ±11.16 years. Regarding educational level, 12 people completed primary studies (23.5%), 19 completed high school (37.3%), 18 university studies (35.3%), and 2 indicated getting another degree (3.9%), which could include technical studies (Table 1).

Table 1. Sociodemographic data, smoking habits, and pain scores of the population of study

Parameter	Variable	n (%)		
Gender	Men	19 (37.3)		
	Women	32 (62.7)		
Educational level	Primary	12 (23.5)		
	High school	19 (37.3)		
	University	18 (35.3)		
	Other	2 (3.9)		
Smoking habit	Yes	5 (9.8)		
	No	46 (90.2)		
Ex-smoker	Yes	4(7.8)		
	No	47(92.2)		
Parameter	**Variable**	**Mean**	**Standard deviation**	***P* value****
Age		46.88	11.16	
***Number of cigarettes per day**		10.2	8.96	
Current dental pain	Before	1.73	2.81	0.388
	After	1.29	2.64	
Dental pain in the last month	Before	3.41	3.01	0.002
	After	1.61	2.86	

*****The variable "number of cigarettes per day" only considered current smokers

******Sign test, P value in bold denotes statistical significance (P < 0.05)

Source: by the authors

Smoking habits

Only 5 persons (9.8%) indicated being current smokers, and 46 subjects (90.2%) were non-smokers. Of non-smokers, 4 individuals (7.8%) were former smokers. Current smokers reported smoking 10.2 ±8.96 cigarettes per day (Table 1).

Dental pain

Table 1 shows data on current pain reported by participants before the first step of periodontitis therapy, 1.73 ± 2.81, and after the second step of therapy, current pain reported was 1.29 ± 2.64 (p = 0.388). Regarding the maximum dental pain in the last month, patients indicated pain reduced from 3.41 ± 3.01 to 1.61 ± 2.86 (p = 0.002) after one month of concluding the second step of therapy.

Periodontal diagnosis

Periodontal diagnosis by gender is shown in Table 2. Most of the participants were diagnosed with Stage III periodontitis, 31 patients (60.8%), followed by Stage II periodontitis, 13 patients (25.5%). Mean BI before step one of periodontitis therapy was 61.4 % ± 17.6 and GBI was 39.5% ± 23.5 (data not shown on the tables presented).

Table 2. Periodontal diagnosis by gender

Diagnosis	n (%)	Gender	
		Men n (%)	Women n (%)
Gingivitis	2(3.9)	1(2.0)	1(2.0)
Stage I	1(2.0)	0(0.0)	1(2.0)
Stage II	13(25.5)	6(11.8)	7(13.7)
Stage III	31(60.8)	12(23.5)	19(37.3)
Stage IV	4(7.8)	0(0.0)	4(7.8)

Source: by the authors

Assessment of dental anxiety

To further characterize DA, we asked participants about stimuli in the dental setting that have been related to fear. Table 3 shows that 23 people (45.1%) indicated fearing the dental injection, whereas 28 persons (54.9%), did not, before step one. After the second step of periodontal treatment, 21 persons (41.2%) still feared dental injections and 30 people (58.8%) did not, at this timepoint (p = 0.688). Table 3 also shows the percentage of patients that feared the sound of rotatory instruments and the ultrasonic scaler before therapy, 19 individuals (37.3%). After one month of the completion of the second step of periodontal treatment, only 12 patients (23.5%) reported this fear (p = 0.039). Additionally, it can be observed in Table 3 that 12 participants (23.5%) feared having a foreign object in the mouth, such as dental instruments, pre-treatment. Post-treatment, 9 subjects (17.6%) reported this fear (p = 0.375).

Table 3. Assessment of dental anxiety

Stimuli that may cause anxiety in dental setting	Variables	Before treatment	After treatment	*P* value
		n (%)	n (%)	
Fear of dental injection	Yes	23(45.1)	21(41.2)	0.688*
	No	28(54.9)	30(58.8)	
Fear to the sound of rotatory instruments or ultrasonic scalers	Yes	19(37.3)	12(23.5)	0.039*
	No	32(62.7)	39(76.5)	
Fear of having a foreign object or dental instrument in the mouth	Yes	12(23.5)	9(17.6)	0.375*
	No	39(76.5)	42(82.4)	
MDAS categories	Normal/Mild anxiety	30(58.8)	37(72.5)	
	Moderate anxiety	16(31.4)	13(25.5)	
	Extreme anxiety	5(9.8)	1(2.0)	

MDAS categories MDAS Questionnaire	Before treatment		After treatment		Effect size	*P* value
	Mean	*Standard deviation*	*Mean*	*Standard deviation*		
MDAS Q1	1.94	1.17	1.55	0.78	0.39	0.010**
MDAS Q2	1.88	1.07	1.39	0.67	0.55	<0.001**
MDAS Q3	2.22	1.22	1.67	1.05	0.48	<0.001**
MDAS Q4	2.24	1.14	1.63	0.96	0.58	<0.001**
MDAS Q5	2.53	1.3	1.94	1.01	0.51	<0.001**
Total MDAS Score	10.8	5.03	8.18	3.84	0.58	<0.001**

*Sign test

**Chi-square test

***Wilcoxon test, *P* values in bold denote statistical significance ($P < 0.05$); MDAS, modified dental anxiety scale; Q, question

Source: by the authors

Cronbach's Alpha coefficient before and after periodontitis therapy, as assessed in this study, was 0.9, suggesting that the items have relatively high internal consistency. Table 3 also shows MDAS categories of the studied population. Before step one of periodontitis therapy, 30 participants (58.8%) reported normal/slight anxiety, 16 persons (31.4%) moderate anxiety, and 5 persons (9.8%) presented extreme anxiety. After step two of periodontal treatment, 37 people (72.5%) had normal/slight anxiety, 13 (25.5%) moderate anxiety, and only 1 person (2.0%) indicated extreme anxiety.

As stated, for MDAS questionnaire, subjects responded to five possible scenarios in the dental setting. Responses were rated in a scale from one to five, where one meant no anxiety at all and five the highest level of anxiety. These results are shown in Table 3 as well. In relation to MDAS question 1) If you went to your dentist for treatment tomorrow, how would you feel, before step one the mean sub score was 1.94 ± 1.17, and after the second step, 1.55 ± 0.78 ($p = 0.010$). Effect size was $d = 0.39$, which is considered small, but clinically significant. As for MDAS question 2) If you were sitting in the waiting room (waiting for treatment), how would you feel, mean sub score reported by the participants was1.88 ± 1.07 and decreased to 1.39 ± 0.67 ($p < 0.001$) after the second step of

periodontal treatment, with a moderate change (d = 0.55). Regarding the third question, 3) If you were about to have a tooth drilled, how would you feel, MDAS mean sub score decreased from 2.22 ± 1.22 to 1.67 ± 1.05 (p< 0.001), with a small but clinically significant effect size (d=0.48). We clarify none of the participants had any of their teeth drilled for periodontal treatment purposes. Some of these participants were collaterally being treated for dental restorations at the time subgingival instrumentation was performed. Question number four, 4) If you were about to have your teeth scaled and polished, how would you feel, MDAS mean sub score was 2.24 ± 1.14, before step one of periodontitis therapy, and 1.63 ± 0.96 (p < 001), after the second step of periodontal treatment. Effect size was moderate (d=0.58). About question five of the MDAS, 5) If you were about to have a local anesthetic injection in your gum, above an upper back tooth, how would you feel, mean sub score decreased from 2.53 ± 1.3 to 1.94 ± 1.01 (p < 0.001). A moderate effect size was found (d=0.51). Finally, the total MDAS score improved from 10.8 ± 5.03 to 8.18 ± 3.84, with a moderate effect size (d=0.58). In summary, MDAS total score and all sub scores enhanced after periodontitis therapy (all Ps< 0.001).

Table 4 shows mean total score and sub scores, before the first step and conclusion of the second step of periodontal treatment of the studied population, according to periodontal diagnosis.

Table 4. MDAS total and sub scores by periodontal diagnosis

		Periodontal Diagnosis				
		Gingivitis Mean (SD)	**Stage I Mean (SD)**	**Stage II Mean (SD)**	**Stage III Mean (SD)**	**Stage IV Mean (SD)**
MDAS Total	Before	8.0(4.2)	8.0(NA)	10.9(4.4)	11.3(5.6)	8.8(3.5)
	After	5.5(0.7)	5.0(NA)	9.6(4.5)	8.0(3.7)	6.8(2.9)
MDAS Q1	Before	1.5(0.7)	1.0(NA)	1.8(0.8)	2.1(1.3)	1.5(1.0)
	After	1.0(0.0)	1.0(NA)	1.8(0.8)	1.5(0.8)	1.5(1.0)
MDAS Q2	Before	1.5(0.7)	1.0(NA)	2.1(1.0)	1.9(1.2)	1.2(0.5)
	After	1.0(0.0)	1.0(NA)	1.8(0.9)	1.3(0.5)	1.0(0.0)
MDAS Q3	Before	1.5(0.7)	2.0(NA)	2.3(1.1)	2.3(1.3)	2.0(1.4)
	After	1.0(0.0)	1.0(NA)	1.9(1.1)	1.6(1.1)	1.5(1.0)
MDAS Q4	Before	1.5(0.7)	2.0(NA)	2.2(1.1)	2.3(1.2)	2.5(1.0)
	After	1.0(0.0)	1.0(NA)	1.8(1.0)	1.6(1.0)	1.5(1.0)
MDAS Q5	Before	2.0(1.4)	2.0(NA)	2.5(1.1)	2.7(1.4)	1.5(0.6)
	After	1.5(0.7)	1.0(NA)	2.2(1.0)	2.0(1.1)	1.2(0.5)
P value*		1.000	1.000	0.372	<0.001	0.098

MDAS, modified dental anxiety scale; Q, question; SD, standard deviation;
*Wilcoxon test; P < 0.05 denotes statistical significance
Source: by the authors

DISCUSSION

The findings of the present study demonstrated DA reduction in patients treated for periodontal disease. Significantly higher anxiety scores were observed at baseline, and scores ameliorated after therapy.

Regarding sociodemographic data, most of the participants that concluded the study were women. Even though we did not assess anxiety levels by gender, Ihara et al., identified male gender and high trait anxiety as considerable factors associated with severe dental fear and avoidance[27]. Evidence is not conclusive about gender, since other studies have reported dental fear is more common in women, however, it has been established men pay fewer visits to the dentist[28-30].

In our study, only 29.3% of the participants completed higher education, indicating most of the studied population had a lower educational level. Different studies have been conducted to explore the association between level of DA and education. It is hypothesized that a better educational level allows patients to get informed about the procedures they will undergo, and eventually cope better with DA[31-33].

Regular tobacco smokers are more likely to have dental fear than those who use tobacco occasionally or not at all34. We cannot compare this finding with other studies since a minority of the studied population, 9.8% of the participants, referred smoking at baseline. This may be related to the fact that Costa Rica has an anti-tobacco law. This law regulates smoking and vaping in public areas; therefore, it is reasonable the consumption of tobacco cigarettes has decreased over the last years. One of our limitations is that we did not ask if participants vaped. The increasing prevalence of e-cigarettes in younger generations is a challenge to achieve tobacco-free environments worldwide.

Periodontal disease is usually not accompanied by pain as opposed to other inflammatory conditions. It has been evidenced that periodontal bacteria and host cells create a unique environment, characterized by an accumulation of classically pro-algesic mediators[35]. No differences were reported between baseline current pain and current pain after second step of treatment. Participants reported a significant decrease in maximal pain felt in the last month. However, during subgingival instrumentation it is not uncommon that patients refer feeling sensitivity due to scaling and root planning. In our clinic, we usually treat these symptoms with desensitizing agents, such as dentifrices and mouthwashes. Therefore, the reduction in pain in the last month may be related to sensitive teeth treatment and not periodontal treatment.

Regarding stimuli that may cause state anxiety in the dental clinic, in our studied population, 41.2% still feared dental injections after the second step of therapy. Fear of dental injections has been studied previously and people report worrying about pain of dental injection and of bodily injury from injection[36]. Fear to dental drill noise/ rotatory instruments or ultrasonic scaler, before and after

therapy decreased significantly compared to baseline. As stated, participants that completed the study had never had subgingival instrumentation. Therefore, we assume these patients at baseline, feared an uncertain situation such as a new procedure related to dental therapy.

Most of our participants reported normal/slight anxiety to dental treatment. Similarly, Gufran et al., recruited fifty-two participants and forty-nine, were classified as not feeling anxious or feeling slight anxious before starting periodontal treatment[37]. Statistically significant higher scores were reported in the MDAS total as well as most sub-scores at baseline. Mean MDAS total score of all participants in our study was 10.8±5.03. This was alike that values reported by Bhattarai et al. (11.59±3.808) who found out the prevalence of anxiety among patients visiting for periodontal treatment at a tertiary care dental hospital[37]. MDAS sub scores in this study, before periodontal treatment, were comparable to the ones reported by these researchers [38].

Liu et al. found dental fear reduced after scaling and root planning in patients with stage III and IV periodontitis, but no differences were found between pre- and post-treatment in patients with stage I and II [10]. Likewise, in our study, we found statistically significant reductions in MDAS total scores and sub scores before and after treatment in Stage III and a tendency in Stage IV. Stage III indicates a more severe form of periodontitis, while IV advanced[39]. Thus, more attention should be paid to individuals with DA with stages III and IV periodontitis. These patients may be managed through good communication by the dental clinic staff.

Not all the recruited participants concluded the study, so our results may not be applicable to all patients that receive periodontal treatment at our clinic. The data obtained in this study represents a small sample of the population of patients treated at the Faculty of Dentistry of the University of Costa Rica, so it would be important to apply the same criteria and questionnaires to a larger sample of patients to get meaningful results in our clinical setting. It would be interesting to carry out a similar investigation in the different dental clinics of our dental school, to evaluate DA before and after different treatment necessities and modalities.

A strength of this study is that we used standardized and internationally validated questionnaires, the MDAS and the NRS. Another strength and novelty are we assessed staging according to the current classification of periodontal disease and implemented the new terminology proposed by the European Federation of Periodontology regarding periodontal therapy. The present study also addressed confounding factors such as demographics, smoking habits, and dental pain scores.

Finally, the present study was executed with the intention to validate research procedures and questionnaires for a recently published investigation from our research group[36]. We clarify the patients and results included in this manuscript were not considered in our published investigation which aim was to investigate DA and oral health related quality of life in patients with periodontitis.[40]

CONCLUSION

Within the limitations of our study, the clinical relevance of this research paper radicates in documenting the improvement of dental apprehension over the course of periodontal therapy. A decrease in the level of DA was found among participants after treatment.

Periodontal treatment at the Clinic of Periodontics of the Faculty of Dentistry of the University of Costa Rica, is provided by advanced dental students, with the supervision of dental instructors, most of them specialists in periodontology. Treatments are generally performed in several appointments. Therefore, patients go through multiple treatment sessions. With time, patients may realize that the situations in periodontal therapy cause low levels of pain and discomfort, thus reducing levels of DA.

The results of our investigation demonstrated substantial differences between pre- and post-periodontal treatment measures on DA. It is well known that periodontal treatment has a positive effect on patient's periodontal state, yet there are not many studies showing improvements in DA after the different steps of periodontal therapy. Although our results provide robust improvement in all scores of DA, it should be considered post-treatment scores were taken a short time after completion of the second step of periodontal therapy. Hence, it would be interesting to conduct a follow-up study in those patients that have not responded well to the second step of therapy and need the third step of therapy (repeated subgingival instrumentation or a surgical approach). Also, it would be of importance to investigate levels of DA pre- and post-supportive periodontal care. Future studies should include a larger and representative sample to make associations between sociodemographic data and clinical outcomes with DA levels, since more research is necessary to investigate the impact of various factors on DA. It would be important to compare and analyze the effect of different behavioral and pharmacological management strategies that may be employed for dentally anxious patients.

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CONFLICT OF INTEREST

The authors state that they have no conflict of interest.

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