

RELATIONSHIP BETWEEN DENTAL ANXIETY AND PAIN PERCEPTION DURING SCALING IN PERIODONTALLY HEALTHY SUBJECTS

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ABSTRACT

Background: Dental pain, anxiety and fear experience are the factors that discourage the demand for treatment. Dental treatment influences patients by causing stress and reminding them of unpleasant memories which often leads to the postponement of dental treatment deteriorating the periodontal health. Research showed that dental anxiety, fear and apprehensive anticipation of potential threats cause patients to cancel, miss, or arrive late for dental appointments. The aim of the study was to evaluate patients' pain perception during scaling and its relationship with dental anxiety.

Methods: A cross sectional study was conducted in 200 dental patients from March 2021 to June 2021 at Kist Medical College and Hospital. Pain levels after scaling were assessed with a visual analog scale (VAS) and an anxiety questionnaire consisting of seven questions, each with five possible answers. Data analysis was done with SPSS 21 using descriptive and inferential statistics.

Results: The mean VAS score for the entire group was 26.70±17.73 and for women and men were 28.68±17.70 and 24.75±17.64, respectively. The difference in mean VAS scores between women and men was statistically significant ($p=0.000$). The mean anxiety score for the whole study population was 12.21±4.32. The questionnaire score was similar in women 13.46±4.55 and 10.99±3.71 in men ($p=0.117$).

Conclusions: An understanding of the presence of the anxiety and fear helps dentists to grasp what patients feel about dental treatment procedures and aid dentist efforts to enhance patients care.

INTRODUCTION

Dental pain, anxiety and experience of fear represent significant problems in dental practice. These are the factors that discourage the demand for treatment which affect the use of health care services, treatment decision-making, and responses to periodontal treatment. Dental treatment influences patients by causing stress and reminding them of unpleasant memories, which often leads to the postponement of dental treatment deteriorating the periodontal health. Rhudy and Meagher¹ evaluated the effect of fear and anxiety on pain reactivity in humans and the results supported the fact that emotional states modulate human pain reactivity.

Dental treatment is usually associated to strong negative feelings like dental anxiety and dental fear. Within the dental literature the concepts of dental fear and dental anxiety are often used interchangeably. Klingberg and Broberg² described dental anxiety as a state of apprehension that something dreadful might happen during dental treatment or certain aspects of dental treatment.³ Dental anxiety and fear may avoid patients from seeking aid,³⁻⁵ which progresses to poor oral health.⁶ The

experience of pain during preventive treatments, like probing and scaling, also may discourage patients who do not have periodontitis.⁷ It is well documented that patients' perceptions of pain and discomfort associated with debridement differ. Patients' perceptions of pain and dental anxiety differ with periodontal procedures⁸ and individual characteristics, like gender, age, education levels, income, smoking status, and oral health status. Thus, this study aimed to evaluate patients' pain perception during scaling and its relationship with dental anxiety along with the differences in pain perception between genders and its relationship with age.

METHODS

A cross-sectional study was conducted in two hundred patients, reporting to the Department of Periodontology, from March 2021 to June 2021 at Kist Medical College and Hospital. Sample size was calculated by $Z^2\sigma^2/d^2$ Where: $\sigma = 13.8^3$ with maximum permissible error 2.5 and confidence interval 95%. The study was conducted after receiving the ethical clearance from Institutional Review Committee (Ref. no: 2078/79/3) and only those patients who provided consent were included in the study.

Patients' age ranging from 30 to 50 years, with supragingival calculus on the mandibular anterior teeth, with no dentin sensitivity to air stimulation, with gingivitis with deepened periodontal sulcus <4 mm and with mandibular anterior teeth without any restorations (root canal treatment, composite, amalgam, aesthetic or prosthetic restorations) or orthodontic treatment were included. Exclusion criteria included refusal to get consent, a medical or psychological disorder that can affect pain thresholds, use of pain or anxiety medication, smoking habit and/or alcoholism, presence of acute periodontal pain, pulpitis, abscesses or other acute infections, attachment loss and/or gingival recession, and/or root hypersensitivity.

All procedures were performed by an experienced periodontist with patients sitting on the same dental chair. The calculus index⁹ was recorded on the anterior six mandibular teeth as follows: none, discontinuous flecks, non-continuous band on parts of tooth, and continuous band around tooth.

All patients underwent supragingival scaling of the anterior six mandibular teeth using the same piezoelectric ultrasonic handpiece and tips without local anesthesia. The patients were asked to point their level of pain on a 100-mm horizontal Visual Analog Scale (VAS) where zero would mean 'no pain and discomfort' and 100 would mean 'the worst possible pain and discomfort'.

During this study, the patients were asked to finish a questionnaire

consisting of only these seven questions, as was done previously by Chung et al. and Guzeldemir et al.^{9,10} The anxiety questionnaire scores ranged from 7 to 35. After completing the questionnaire, complete scaling was carried out for each patient followed by proper periodontal care and treatment.

The data was grouped by age (in years): 30 – 34, 35 – 39, 40 – 44 and ≥45. Mean and standard deviations were calculated for all the quantitative variables in relation to the entire group, for males, for females and for the various age groups. Student's unpaired t test was conducted to compare gender differences between Anxiety Scores and VAS. One-way ANOVA was carried out to compare age differences between Anxiety Scores and VAS. Spearman's rank correlation coefficients were calculated to analyze the relationship between VAS and every question of the dental anxiety questionnaire (Q1, Q2, Q3, Q4, Q5, Q6, Q7) along with total Dental Anxiety Scores. p values <0.05 were considered statistically significant.

RESULTS

Two hundred dental patients (99 women and 101 men; mean age, 26.70±17.73 years; age range, 30 – 50 years) participated in the study. The mean calculus index for the complete subjects was calculated to be 1.78±0.79 (Table 1). The mean VAS score for the entire group was 26.70±17.73. The mean VAS scores for women and men were 28.68±17.70 and 24.75±17.64, respectively. The difference in mean VAS scores between women and men was statistically significant (p =0.000) (Table 2).

Table 1: Age and calculus index of subjects by gender

	Male	Female	TOTAL
Age (in years; Mean ± SD)	24.75±17.64	28.68±17.70	26.70±17.73
Calculus index	1.75±.80	1.80± 0.78	1.78±0.79

Table 2: Evaluation of Dental Anxiety Scores (DAS) and Visual analog scale (VAS) scores for each gender and the entire group

	DAS	VAS
Overall	12.21±4.32	26.70±17.73
Male	10.99±3.71	24.75±17.64
Female	13.46±4.55	28.68±17.70
p	.117	.000

VAS scores were evaluated among the following age groups: 30–34 years, 35–39 years, 40–44 years and ≥45 years. There were no statistically significant differences in VAS scores among these age groups (Table 3). The mean anxiety score for the whole study population was 12.21±4.32. The questionnaire

score was similar in women 13.46±4.55 and 10.99±3.71 in men (p =0.117) (Table 2). Anxiety scores with different age groups showed no statistically significant differences (Table 3). There was a correlation noted between VAS and total anxiety score (Tables 4–6).

Table 3: Evaluation of Dental Anxiety Scores (DAS) and Visual Analog Scale (VAS) according to different age groups

Age Groups (in years)	30-34	35-39	40-44	≥ 45	p	total
VAS (mean ± SD)	27.66±19.86	28.65±18.08	23.91±14.69	24.20±15.79	.468	26.70±17.73
DAS (mean ± SD)	12.75±3.96	12.55±4.63	11.21±3.45	11.58±4.62	.306	12.21±4.32

Table 4: Correlation between DAS and VAS for the entire group

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	DAS
Correlation Coefficient	.261	.301	.297	.184	.204	.275	.204	.302
Significance level (>0.000)	.000 (S)	.000 (S)	.000 (S)	.009 (S)	.004 (S)	.000 (S)	.004 (S)	.000 (S)

S = Significant; NS = Not significant

Table 5: Correlation between DAS and VAS for male

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	DAS
Correlation Coefficient	.323	.342	.368	.149	.207	.310	.226	.320
Significance level	.001 (S)	.000 (S)	.000 (S)	.136 (NS)	.038 (S)	.002 (S)	.023 (S)	.001 (S)

S = Significant; NS = Not significant

Table 6: Correlation between DAS and VAS for female

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	DAS
Correlation Coefficient	.174	.244	.165	.163	.174	.196	.140	.219
Significance level	.085 (NS)	.015 (S)	.102 (NS)	.106 (NS)	.085 (NS)	.052 (NS)	.167 (NS)	.030 (S)

S = Significant; NS = Not significant

DISCUSSION

The present study provides information about patients' pain perception and level of dental anxiety during routine periodontal care. VAS is taken into account as a robust, sensitive and reproducible method of expressing pain severity.¹¹ This is an easy, reliable, and valid pain measurement scale that has been used for evaluating dental pain, like in previous studies that evaluated pain from periodontal therapies.¹²⁻¹⁴

Dental anxiety was measured by using two anxiety measurement scales. Amongst them one questionnaire was the Corah's Dental Anxiety Scale (DAS), which consists of 4 questions to assess dental anxiety,¹⁵ probably the foremost well-known adult questionnaire designed to assess dental anxiety.¹⁶ The other was the Dental Fear Survey (DFS), which consists of 20 questions.¹⁷ Karadottir et al. evaluated the DAS and DFS and noted that only three of the twenty DFS questions and all four DAS questions significantly correlated with patients' responses to instrumentation.¹⁸ Most of the patients experienced limited pain during scaling which is consistent with previous research.^{18,19} Perception of pain varies among individuals because it is a multifaceted emotional and sensory experience that is associated and exaggerated with previous experience, expected stress, clinical situation and anxiety.²⁰ Although the patients experienced limited pain, the variability of VAS scores was high, which is understandable because pain measurement is subjective and rely on individual's perceptions. Assessment and screening of pain is difficult because it has both physical and psychological aspects.²¹ In our study, an experienced periodontist treated all patients in the same dental chair using the same piezoelectric ultrasonic handpiece and tips as a standardized and controlled environment was essential for pain assessment. Systemic factors were shown to influence an individual's response to noxious stimuli and the threshold of pain perception could be site- and subject-specific.²² In the present study, to reduce interpatient variability, medically healthy patients with the presence of supragingival calculus on the lower anterior six teeth were included. The density of nerve endings are seen more in the anterior region of the mouth than in the posterior regions and also due to the openings of the submandibular salivary glands, lingual aspects of the lower incisors and canines present with more supragingival calculus formation.^{8,14} To reduce exaggerated responses and bias, patients were asked to participate in this study only after scaling of the involved teeth had been finished, but before full-mouth

scaling. Patients were aware that treatment had not ended; so it was believed that they were not yet relieved of their anxiety or fear.

In the present study, the mean VAS score for the whole study group was 26.70±17.73. According to Chung et al.,¹⁰ these scores were 22.3 and 19.5. Guzeldemir et al.,⁹ reported a mean VAS of 19.91. The mean VAS score obtained in our study was similar as these scores. The mean VAS scores for female and male were 28.68 ± 17.70 and 26.70 ± 17.70 respectively. The pain responses were higher in female than in male, which is in disagreement with other studies.^{8,18,21} However, previous results in relation to gender and pain perception were consistent.^{1,18,23,24} A potential reason behind the observed differences in pain between the genders could also be sexually dimorphic pain modulation systems or factors that activate these systems.²⁵ However, a study on Turkish patients' pain perception explained differences in pain between genders by cultural and gender-role differences between the populations.²⁶ There were no significant difference in dental anxiety scores between the genders unlike previous studies^{9,19,22} where women reported more dental anxiety than did men. However, Eli et al.²⁴ reported that men were more anxious than women. In the present study, there was no information about the recruited patients' previous emotional status or experiences; which could have influenced their anxiety level. The results of the present study reflected the pain and anxiety levels on the day of the procedure. In the present study question number 2 (i.e., "How much anxiety/fear or discomfort has having your teeth cleaned caused you?") was a statistically significant to predict patients' pain responses to scaling which was consistent with previous study.¹⁰ This correlation was helpful for recognizing anxiety in periodontally healthy subjects during scaling because it reflected the patients' anxiety and pain perception on the day of the procedure. Since anxiety, fear, and pain are highly subjective and are exaggerated by numerous factors, few questions might not adequately assess all aspects, and it is not reasonable to expect an ideal correlation.

In our study, question no 6 ("When you are in the dentist's chair waiting while she gets the drill ready to begin working on your teeth, how do you feel?") was correlated with pain for male and had an inclination to be significant for experiencing pain for female. Thus, the more pain the patient experiences, the more fear the patient will have at the following visit. This can be a vital finding of which dentists should be alert and such question may be informative for practitioners. In the present study,

there was no significant difference among the various age groups. There are mixed results observed by various studies making it difficult to conclude which procedures will lead to painful experiences. These different results may be explained by increase in treatment duration⁸ or by operator abilities,^{7,18} or treatment modalities,⁹ inter- and intra-patient pain perception,^{7,22} dental anxiety,²² or cultural differences.^{27,28}

Higher levels of dental anxiety can cause the avoidance of dental treatment and might change a patient's perception of pain. Screening patients' previous dental experiences and histories for more information would enable dentists to acquire additional precautions that will improve therapist-patient interactions and treatment results. However, large-scale epidemiologic studies in various age groups are needed for precise results. An understanding of the occurrence of the anxiety and fear helps dentists to grasp what patients feel about dental procedures and

guide their efforts to enhance patients care.

CONCLUSION

Clinicians should determine individual treatment approaches to patients' fear, pain, and anxiety associated with scaling. Hence, dentists should seek to alleviate or reduce pain and anxiety associated with treatment not only to successfully complete the treatment, but also to sustain and carry the patients into successful maintenance and patient recall. They ought to treat patients to avoid fear, anxiety and discomfort in their patients caused by the treatment.

CONFLICT OF INTEREST: None

FINANCIAL DISCLOSURE: None

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