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The relationship between the pain fear and oral health impact in patients attending the Teaching Dentistry Clinics in Iraq: A preliminary report

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Aim: This study aimed to identify the risk factors of fear of dental pain and show its relation to the oral health impact profile (OHIP-14) using the fear dental pain questionnaire (FDPQ) and its short version (s-FDPQ).
Materials and methods: This cross-sectional study was conducted at the Department of Dentistry at Al Hussein University College in Karbala, Iraq, from January 1, 2023, to June 30, 2023. The primary outcome of this study was the scores of the oral health impact profile (OHIP-14), the fear dental pain questionnaire (18-item FDPQ), and its short version (5-item s-FDPQ). The secondary outcomes were the demographic characteristics, gingival index, and decayed, missing, and filling teeth index.
Results: Sixty-eight participants (26 females and 42 males) in total completed the study. The baseline data showed that the median values of OHIP-14 and s-FDPQ scores were significantly higher in males compared with females and in currently smokers than non-smokers. There were significant correlations between OHIF-14 and FDPQ ($r = 0.421$, $p<0.001$) and s-FDPQ ($r = 0.369$, $p = 0.002$), while the DMFT index was significantly correlated with FDPQ ($r = 0.527$, $p<0.001$) and s-FDPQ ($r = 0.432$, $p<0.001$).
Conclusion: The oral health impact profile and the fear of dental pain in adults who attend dental clinics for dental treatment are significantly correlated. A more significant association was observed with applying FDPQ compared with s-FDPQ.

Keywords: Adults, Dental anxiety, Fear of dental pain, Oral health

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Introduction

The dental attendance rate is usually low because people visit dental clinics when they suffer from acute symptoms such as severe toothache, tender swelling, and periodontal symptoms.[1] In this situation, people who visit the dental clinics are usually anxious and suffer from fear even before the dental procedure is commenced.[2] Fear of dental pain occurs in anxious individuals who have had previous experience with pain. It has been reported that dental anxiety is the cause of pain during dental treatment.[3] A systematic review of 32 articles found that dental pain is a precipitating factor of dental fear anxiety anxiety, which is estimated to affect 10% of dental clinic attendees, more common in girls, and decreased with age.[4] Therefore, dental pain fear is more common in females, professional individuals with a history of bad experiences, and in the situation of dental extraction.[5,6]

It has been reported that dental fear is most commonly attributed to the drilling tooth device, followed by pain that occurs during dental procedures.[7] Triggers of fear are the perception of sensory cutaneous stimuli and sense organs (e.g., visual, olfactory, and auditory) during dental procedures.[8] Van Wijk et al constructed a fear dental pain questionnaire (FDPQ-18) in 2003 and later revised it as a short-form version of five items (s-FDPQ) in 2006 to assess pain perception in the dental clinic.[9,10]

Dental anxiety has the strongest psychological impact on the oral health quality of life compared with oral diseases, e.g., periodontitis. A systematic review found a score of 3.3 versus 0.8 in 23 articles that recruited 3884 patients.[11] Another study included 82 patients who underwent non-surgical periodontal treatment. It was shown that before treatment, higher dental anxiety was associated with a higher oral health impact profile-14 (OHIP-14) score, and they did not report a significant improvement in the OHIP-14 after treatment as with patients without dental anxiety.[12] Although the OHIP does not show a significant effect of dental treatment need on dental carries or trauma, it shows significantly higher scores in irritable people.[13]

In addition, postoperative dental pain is not related to the anxiety, but it is related to the pathological conditions, the appropriate use of anesthetic compounds, and the maneuver that is applied by the expert dentist to reduce the dental pain as much as possible.[14] The rationale for this work is that a bad experience with a dental visit and pain are the most common causes of fear of dental pain, which indicates an impairment of the oral health profile. Therefore, the relationship between the scoring of the fear dental pain questionnaire and the OHIP-14 score is worth trying in the assessment of fear in dental clinical practice. This study aimed to identify the causes of dental fear in a small sample size of people who visited dental clinics, taking into consideration the general and dental characteristics and features of the patients, and to relate the fear of dental pain to the oral health impact profile.

Materials and methods

Study design

This cross-sectional study was performed in the teaching dental clinics at the Department of Dentistry at Al Hussein University College (HUC) in Karbala, Iraq, from January 1, 2023, to June 30, 2023.

Study participants

People who visited the dental clinics seeking dental treatment were randomly recruited. The eligible participants for this study were both sexes, aged more than 18 years old. The criteria for inclusion are healthy people who present with oral and dental complaints and require dental treatment. Individuals with a previous history of psychiatric illnesses, those using psychotropic drugs, and pregnant women

were excluded from the study. 68 subjects (26 females and 42 males) with a median age of 30 years old were included in this study (Figure 1).

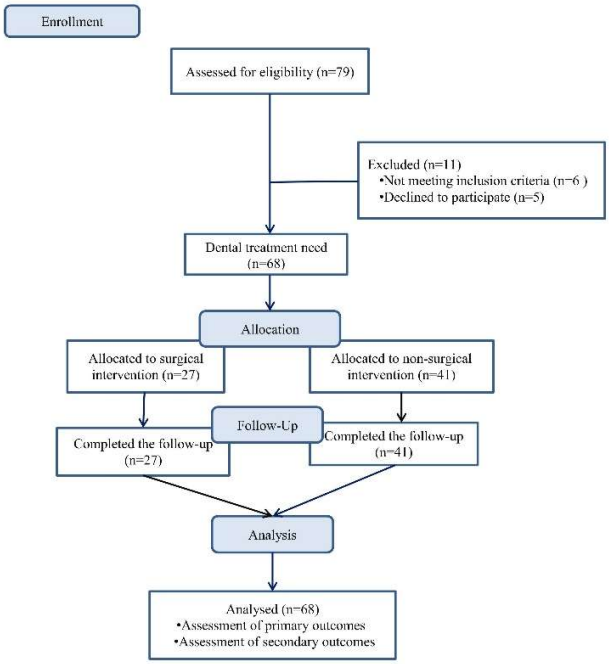

Figure 1: Flowchart of the participants enrolled in the study

Ethical Approval

This study was approved by the Institutional Ethical and Scientific Committees at Al-Amal College for Specialized Medical Sciences in Karbala, Iraq (No. 332, date: March 11, 2024).

Data Collection

Assessment of primary and secondary outcomes

The primary outcomes were the scores of the fear dental pain questionnaire (FDPQ), short-FDPQ (s-FDPQ), and OHIP-14, while the secondary outcomes were the characteristic features of the patients, the dental procedure, DMF, and gingival index. The FDPQ is an 18-item questionnaire,[9] assessing an individual's fear of a variety of stimuli that may produce pain. This questionnaire is based on the assumption that anxious people expect more pain, and vice versa, the more pain can make the individual anxious. The total score of the FDPQ ranged between 18 and 90. In addition, the s-FDPQ is a briefer 5-item version developed with a possible total score of 5–25,[10] which is used to screen patients for research and practice. This questionnaire included pain and fear associated with receiving an anesthetic injection in the mouth, root canal treatment, and having a tooth extracted. The OHIP-14 is a questionnaire of 14 items that considers seven dimensions: functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability, and handicap.[15] A score for each question was scored between 0 (no adverse impact) and 4 (impacts experienced very often). The authors reported the demographic characteristics, the oral examination findings, and then the decayed, missing, and filling teeth (DMFT) and gingival index scores. The authors interviewed each participant and explained each item of the FDPQ, s-FDPQ, and OHIP-14 in the native Arabic language because the available questionnaires were in English. Gingival index was calculated according to the clinical observations of the gingiva and categorized as score 1: mild inflammation appeared as slight change in color, slight edema, no bleeding on probing; 2 = moderate inflammation appeared as redness, edema, and glazing, or bleeding on probing; 3 = severe inflammation appeared as marked redness and edema, tendency toward spontaneous bleeding

Statistical analysis

Continuous variables are presented as median and interquartile (25th–75th percentiles) because the data are not normally distributed, and categorical variables are presented as frequencies and percentages. The Gpower software version 3.1 was used to estimate the sample size for the cross-sectional study. The principle of this program is to obtain the sample size by feeding the input parameters, which included two tails, alpha error (0.05),

and the power (1-beta power of 0.8). The sample size was computed, and it has been found to be 60 participants. The analysis of the data using the Shapiro-Wilk test has shown that the data were not normally distributed. The data was analyzed using a non-parametric (two-sided) across-median test. Data were tabulated and statistical analyses performed using SPSS-IBM compatible software version 24.0 (Chicago, IL, USA). The relationships between the dental and gingival indices were analyzed by using Spearman's correlation test. The effect of dental treatment needs on the OHIP-14 was illustrated as boxplots. A two-tailed level of statistical significance (α) was set at ≤0.05.

Results

Table 1 shows the characteristic features of the people who attended the dental clinics. The majority (69.8%) of participants were males and residents of urban areas, and 86.8% of them had experience with dental clinics. 27 out of 68 participants (9 females and 18 males) underwent surgical intervention.

Table 1: The characteristics of the participants

Characters	No. (%)
Sex	
Female	**26 (30.2)**
Male	**42 (69.8)**
Residency	
Rural	**24 (35.3)**
Urban	**44 (64.7)**
Race	
Black	**14 (20.6)**
White	**54 (79.4)**
Smoking	
No	**41(60.3)**
Current	**26 (38.2)**
Ex-smoker	**01(1.5)**
Previous attending dentistry clinics	
No	**09 (13.2)**
Yes	**59 (86.8)**
Teeth brushing	
No	**17 (25.0)**
Occasionally	**32 (44.1)**
Frequently	**19 (27.9)**
History of dental trauma	
No	**61 (89.7)**
Yes	**07 (10.3)**

The results are expressed as number (%).

Table 2 shows the median (interquartile) values of the decayed, missing, and filling teeth and the gingival index. Only 2.9% of the participants had a DMFT index of zero, while the majority of them (41.2%) had a DMFT score ranging between 6 and 10. Most of the patients (77.9) have clinical evidence of gingivitis, and the median value of the gingival index was one. Evidence of dental fluorosis was detected in 10.3% (7 out of 68) of the participants.

Table 2: The findings of dental examination

Findings	Results
Total number of Teeth	28 (26-30)
Decayed	3 (2-4)
Missing	2 (0-4.75)
Filling	2 (0.25-3.0)
Distribution of DMFT index score	
0	2 (2.9)
1-5	20 (29.4)
6-10	28 (41.2)
11-15	11 (16.2)
16-20	7 (10.3)
Evidence of gingivitis	53 (77.9)
Gingival index	1 (1-2)
Evidence of fluorosis	7 (10.3)

The results are expressed as number (%) and median (25th-75th percentiles)

Table 3 shows that a significantly higher median score of OHIP-14 was found in males compared with females (9.0 versus 5.5) and in participants who were currently smoking compared with non-smokers (8.0 versus 6.0). According to the characteristics of the participants, which included sex, residence, smoking habit, and teeth brushing, the median value of the FDPQ score did not show a significant difference in the interactions of these variables. The median score of s-FDPQ is significantly higher in males than females (8.0 versus 6.0, p = 0.016) and in smokers compared with non-smokers (8.0 versus 6.0, p = 0.002). The OHIP-14 score at the time of entry into the study did not show a significant difference between participants who needed surgical or non-surgical intervention, while the median scores of FDPQ and s-FDPS were significantly higher among participants who needed surgical intervention compared with

those assessed for non-surgical dental treatment. A higher significant score of OHIP-14 is correlated with a higher score of gingival index ($r = 0.596$, $p<0.001$), FDPQ ($r = 0.421$, $p<0.001$), and s-FDPQ ($r = 0.369$, $p = 0.002$) (Table 4). In addition, the total number of teeth is significantly and inversely correlated with FDPQ ($r = -0.287$, $p = 0.018$) and s-FDPQ ($r = -0.291$, $p = 0.016$). The DMFT values are significantly correlated with FDPQ ($r = 0.527$, $p<0.001$), s-FDPQ ($r = 0.439$, $p<0.001$), and inversely correlated with total tooth number ($r = -0.486$, $p<0.001$). **Figure 2** shows that the dental treatment significantly ($p <0.001$) reduced the scoring of OHIP-14, whether the intervention is surgical or not.

Table 3: The median (25th-75th percentile) of OHIP-14, FDPQ, and s-FDPQ score according to the demographic characteristics and dental treatment need.

Determinants	OHIP-14	FDPQ	s-FDPQ
Sex			
Male (n=42)	9.0 (4.75-12.0)	24.0 (21.75-27.0)	8.0 (6.0-9.0)
Female (n=26)	5.5 (3.0-10.25)	22.0 (20.75-24.25)	6.0 (6.0-7.25)
	P=0.040	P=0.280	P=0.016
Residency			
Urban (n=44)	7.0 (4.0-9.0)	23.0 (21.0-25.0)	7.0 (6.0-8.0)
Rural (n=24)	9.0 (1.25-16.25)	24.5 (21.0-27.0)	8.5 (6.0-10.0)
	P=0.665	P=0.427	P=0.329
Smoking			
None (n=42)	6.0 (2.75-10.25)	22.0 (21.0-25.0)	6.0 (6.0-8.0)
Current (n=26)	8.0 (5.75-12.5)	24.0 (23.0-27.0)	8.0 (6.75-9.25)
	P=0.053	P=0.185	P=0.002
Teeth brushing			
No/occasionally	8.0 (4.5-11.0)	23.0 (21.5-26.0)	7.0 (5.5-9.0)
Frequently	7.0 (4.0-11.0)	23.0 (21.0-25.0)	7.0 (6.0-8.0)
	P=0.489	P=0.528	P=0.949
Dental treatment need			
Surgical (n=27)	9 (5-17)	26 (24-27)	9 (7-10)
Non-surgical (n=41)	6 (3-9.5)	22.0 (20.5-23.5)	6 (5.5-7.0)
	P=0.235	P<0.001	P<0.001

The results are presented as median (25th-75th percentiles). The p-values were calculated using a non-parametric test (across median test). OHIP: oral health impact profile, s-FDPQ: short version fear dental pain questionnaire.

Table 4: The inter-relationships between the dental and gingival indices assessed by Spearman's correlation test.

Indices	OHIP-14	FDPQ	s-FDPQ	DMFT	Total teeth
Gingival index	0.596 (p<0.001)	0.259 (p=0.033)	0.181 (0.139)	0.121 (p=0.325)	-0.113 (p=0.359)
OHIP-14		0.421 (P<0.001)	0.369 (p=0.002)	0.065 (p=0.598)	0.003 (p=0.982)
FDPQ			0.848 (p<0.001)	0.527 (p<0.001)	-0.287 (p=0.018)
s-FDPQ				0.439 (p<0.001)	-0.291 (p=0.016)
DMFT					-0.486 (P<0.001)

The results are presented as correlation factors and the significant levels.). OHIP: oral health impact profile, s-FDPQ: short version fear dental pain questionnaire, DMFT: decayed, missing, and filling teeth.

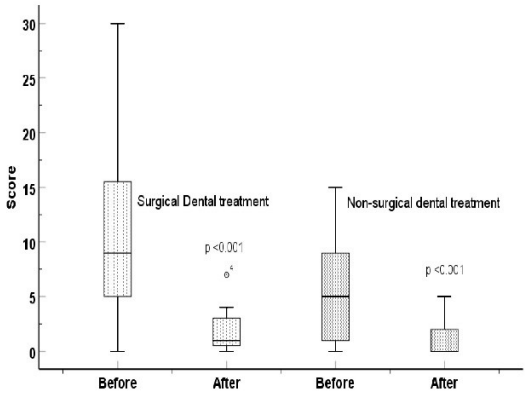

Figure 2: The significant effect of dental treatment need on the oral-health impact profile-14.

Discussion

The results of this study showed a significant association between the fear of dental pain and the oral health of people who need dental treatment. In addition, demographic characteristics are involved in this association. The majority of the participants (86.8%) had previous experience with dental treatment care, which is explained

by a lower score of FDPQ or s-FDPQ. So it is expected that those people were provided with measures or techniques that alleviated the anxiety and dental pain compared with those who faced the dental treatment for the first time.[16,17]

In addition, this study was carried out on adults (> 18 years old) who tolerate the pain better than children or adolescents.[18] Most studies found that females rated higher scores of anxiety and dental pain fear compared with males, while our study demonstrated that males had a significantly higher s-FDPQ.[5] The explanation for this discrepancy is related to the tools of assessment of dental pain fear, the type of dental treatment needed, the experience of dentists, etc.[19-21] Smoking impacted positively on the s-FDPQ score, a finding agreed with in other studies that found that there is an association between dental anxiety and smoking and recommended smoking cessation for reducing dental anxiety.[22] The people who were subjected to the dental surgical need had significantly higher FDPQ and s-FDPQ scores. This finding agreed with other studies that patients subjected to surgical procedures showed a significantly higher level of anxiety and dental pain fear.[23]

In addition, the OHIP-14 scores are significantly higher in currently smoker males. In a small sample size observational clinical pilot study, it was found that cessation of smoking resulted in an improvement in the oral health quality of life,[24] which explained why smokers have higher OHIPF-14 scores.[25] Table 4 shows the significant correlations between FDPQ, s-FDPQ, OHIP-14, gingival index, and DMFT, which filled the research gap in the associations between these indices. The significant correlations between gingival index and FDPQ or OHIP-14 indicate that it is necessary to use FDPQ in the assessment of fear instead of s-FDPQ, and the score of the OHIP-14 score is influenced by the severity of gingival disease.[26,27]Although s-FDPQ is valid and reliable for practice and research, it is necessary to apply both s-FDPQ and FDPQ in looking for the association between dental anxiety and oral health profile, as this study showed a discrepancy in the significant level of using each questionnaire.[28,29] The OHIP-14 is significantly correlated with both FDPQ and s-FDPQ, irrespective of the DMFT score of the number of teeth, indicating that this association is not related to the status of teeth at the time of needing dental treatment.

Levin et al reported that a multivariate regression analysis revealed a non-significant association between OHIP-14 and DMFT in patients with aggressive periodontitis.[26] As shown in Figure 2, all the subjects were satisfied with dental treatment (surgical or non-surgical) because the evidence decreased the OHIP-14 score. Non-surgical treatment need showed a lower median score compared with surgical treatment, which could be related to significantly higher scores of FDPQ among surgically treated participants. One of the limitations of the study is the small sample size of the participants, which makes for an improper statistical analysis of each OHOP-14 domain.

Conclusion

The oral health impact profile is significantly correlated with the fear of dental pain in adults who attend dental clinics for dental treatment. It is necessary to apply both the fear dental pain questionnaire and its short version to look at the associations among different oral indices.

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Data availability: The data is available according to the request from the correspondence.

Declarations: This study was conducted according to the regulations and guidelines of

the Department of Dentistry at Al-Amal College for Specialized Medical Sciences in Karbala, Iraq.

Ethics approval and consent to participate: This study was approved by Institutional Ethical and Scientific Committees at Al-Amal College for Specialized Medical Sciences in Karbala, Iraq (No. 332, date: March 11, 2024).

Competing interests: The authors declare no conflict of interest

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