

Validity and Reliability of the Romanian Version of a Modified Short Form of Fear of Dental Pain Questionnaire

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ABSTRACT: The study aimed to test the validity and reliability of the Romanian version of short form of Fear of Dental Pain questionnaire (s-FDPQ), modified by adding an item about dental implant insertion. Material and methods: The design of the study was cross-sectional. Data were collected through an online questionnaire completed by university students, administered from January to March 2024. The survey included information about past dental treatments, the Dental Anxiety Scale (DAS), and items of s-FDPQ. Results: 186 participants were included in the study. The Romanian version of the modified s-FDPQ had a good reliability Spearman-Brown coefficient is 0.878, and Cronbach alpha is 0.92. The questionnaire had a good convergent validity, with all items being moderately correlated with the DAS score. The one-factor model was tested and has a good fit according to the confirmatory factor analysis. The participants were afraid of pain mostly regarding having a wisdom tooth extracted or a dental implant inserted. A statistically significant higher fear of dental pain was observed in those who did not previously have a root canal treatment ($p=0.008$) and in those who had dental implants in the past ($p=0.046$). Those attending regular dental check-ups had lower levels of fear of dental pain. Conclusion: The Romanian version of s-FDPQ, modified by adding a question about dental implant insertion, has good reliability and validity. Fear of dental pain seemed to be influenced by features of dental procedures and previous dental experience.

KEYWORDS: Dental anxiety, dental treatment, pain.

Introduction

Dental fear and anxiety affect approximately 15.3% of adults worldwide [1], having negative consequences on dental attendance, and also possibly a negative impact on oral health and quality of life [2,3].

Pain is the most frequently reported anxiety-provoking stimulus for dental treatments [4,5], followed by others as needles or injections and the cost of dental treatment [5].

The dental anxiety level is distinct for different dental interventions in regard to their features. According to previous research, invasive treatments, such as surgical ones, are more frequently reported to be anxiety-provoking [6,7].

According to Lin et al., [6] dental anxiety could affect the perception of dental pain in different stages of the treatment, such as before going for the dental appointment, during the dental treatment, and also as perceived pain after the dental procedure.

According to Sylvers [8], the hypervigilance of patients with dental anxiety could increase the perception of pain.

Recognising and reducing dental anxiety was reported to have a positive impact on the patient's quality of life [9], furthermore, some authors consider that reducing dental pain could improve aspects such as dental treatment attendance patterns [4].

Therefore, exploring the fear of dental pain is important for dentists for a better understanding of the aetiology of dental anxiety, contributing to acquiring the information needed for its better control.

As far as we are aware no prior research tested the validity and reliability and explored the fear of dental pain about specific treatments in Romanian participants.

The aim of the study was to assess the reliability and fidelity of the Romanian version of the modified short-form of Fear of Dental Pain questionnaire (s-FDPQ), modified by adding an item on dental implant insertion.

Secondary, it was analysed if fear of dental pain, assessed by s-FDPQ, is different between patients with, respectively without a specific dental treatment in the past.

Material and Methods

The study has been approved by the Scientific Research Ethics Commission of “Carol Davila” University of Medicine and Pharmacy Bucharest (PO-35-F-03).

The design of the study is cross-sectional. Data were collected through an online questionnaire, distributed from January to March 2024 in Bucharest. Participants had to give their consent in order to be included in the study.

The participants were university students from the University of Economic Studies and from the “Carol Davila” University of Medicine and Pharmacy who were invited to fill out a questionnaire on the Google Forms platform. The invited students were asked to share the link of the online questionnaire with their colleagues. Participants who agreed to participate and who had been at least once at the dentists were included in the study.

The data collected in the study were: general characteristics, past dental treatments such as endodontic treatment, dental extraction of wisdom tooth or other tooth, dental filling, implants, and if they had anaesthesia as a procedure in the past. Was recorded also if they usually go for check-ups (yes/no), the dental anxiety level was measured by the Dental Anxiety Scale (DAS), and Fear of Dental Pain was recorded by a modified s-FDPQ.

DAS index has four questions, used for measuring the level of dental anxiety. Each question has five answers, and the score is calculated by adding the responses of the items [10].

The first two questions of the scale refer to the anticipation of dental anxiety in two distinct moments, one day and right before the dental treatment. The last two questions of the scale measure how the participants usually felt in the dentist's chair, right before two distinct procedures when waiting for the dentist to prepare the instruments [11].

FDPQ index was developed by Van Wijk and Hoogstraten in 2003 [12] and is an instrument with 18 questions that measure the fear of pain of

specific dental procedures. The short version (s-FDPQ) is a five-item scale, that measures fear of pain in the context of specific dental procedures such as anaesthesia, extraction, endodontic treatment and tooth drill. The answers are measured on a Likert scale with five levels, ranging from not at all to extreme [13], and coded from 1 to 5. We modified the short form of fear of dental pain by adding a question regarding implant placement, as being considered as associating a similar level of stress with the other procedures mentioned in s-FDPQ, and also considering previous research that highlights that dental anxiety could interfere with the decision of receiving the dental implant treatment [14].

Nonparametric tests were used for statistical analysis: the Fisher exact test, Mann-Whitney test and Chi-square test. For confirmatory analysis one-factor model was tested and, Root mean square error of approximation (RMSEA), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI) and Chi-square tests were performed. For testing reliability, the Split-half method and internal consistency Cronbach alpha were used. Spearman correlation was used for testing the convergent validity. Statistical analysis was conducted by SPSS and JASP software. A $p < 0.05$ was used as statistical significance level.

Results

General characteristics of the participants

A number of 186 participants were involved in the study. The mean age of the participants was 21.29 years. The majority of participants were female ($n=139$, 74.7%). Approximately half of the participants (54.3%) were dental students and 45.7% were students majoring in other fields. Approximately 75% of the participants were female students and 25% were male students, sex not being significantly different between groups of dental and non-dental students, $p=0.871$.

Dental students were slightly older than students majoring in other fields $p=0.001$ (Table 1).

Table 1. Participants' general characteristics.

	Dental students n=101		Non-dental students n=85		p
Age (mean)		21.63		20.88	0.001
Gender male	n	%	n	%	0.871
Female	26	25.74%	21	24.71%	
		75		64	
		74.26%		75.29%	

Assessment of validity and reliability of S-FDPQ

The Romanian version of modified s-FDPQ had a good reliability. According to the split-half method, Spearman-Brown Coefficient is 0.878

and the value of Cronbach alpha was 0.92, therefore it having a good internal consistency. If any item were deleted the Cronbach's alpha value doesn't increase. Inter-item correlation values range between 0.542 to 0.866 (Table 2).

Table 2. Inter-item correlation matrix and Chronbach alpha if item deleted for modified s-FDPQ.

	Inter-Item Correlation Matrix						Cronbach's Alpha if Item Deleted
	I1	I2	I3	I4	I5	I6	
I1	1.000	0.611	0.588	0.617	0.606	0.542	0.919
I2		1.000	0.714	0.610	0.642	0.543	0.914
I3			1.000	0.709	0.710	0.675	0.904
I4				1.000	0.866	0.749	0.896
I5					1.000	0.718	0.897
I6						1.000	0.909

In regard to its validity, according to the confirmatory factor analysis, the one-factor model (Figure 1) of the modified s-FDPQ has an adequate fit, as chi-square test is $p=0.026$, Comparative Fit Index is 0.999 and Tucker-Lewis Index is 0.998, and RMSEA is 0.077 (Table 3).

Table 3. Confirmatory factor analysis for modified s-FDPQ.

Chi-square test (p-value)	$p=0.026$
Comparative Fit Index	0.999
Tucker-Lewis Index	0.998
Root mean square error of approximation	0.077 (0.026; 0.126), $p=0.158$
RMSEA (90% CI), p-value	

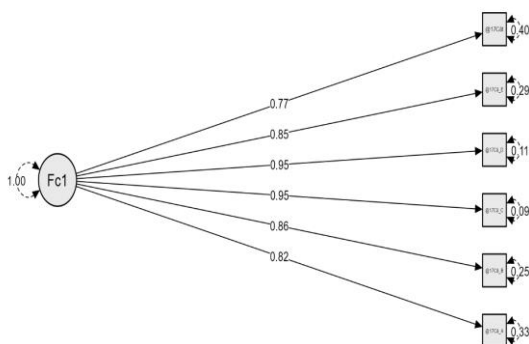


Figure 1. The path diagram of the modified s-FDPQ.

The questionnaire had a good convergent validity, all items being moderately correlated with the levels of dental anxiety, the correlation coefficient varies between 0.428 and 0.605, all values being statistically significant (Table 4).

Table 4. Association between items of modified s-FDP questionnaire and DAS.

Fear of dental pain for:	DAS	p
Anaesthetic injection (I1)	0.428	<0.001
Tooth drill (I2)	0.572	<0.001
Root canal treatment (I3)	0.605	<0.001
Tooth pulled (I4)	0.535	<0.001
Wisdom tooth extracted (I5)	0.574	<0.001
Dental implant inserted (I6)	0.450	<0.001

Fear of dental pain related to features of dental treatment and past dental experience.

Fear of dental pain, assessed by the responses to modified s-FDPQ, was different in regard to the specifics of dental intervention, in descending order being related to having the wisdom tooth extracted, having a dental implant and having a tooth pulled, followed by endodontic treatment, having a tooth drill and receiving an anaesthetic injection (Table 5).

Having in the past the specific dental procedure seems to have a good impact on the levels of fear of dental pain for endodontic treatment. Those who had root canal treatment in the past reported lower values of fear of dental pain (median=2) than those who didn't have (median=3), the results being statistically significant $p=0.008$. For implant placement the results were different as those who had in the past dental implants inserted had higher values (median=4) of fear of dental pain compared with those who did not have dental implant treatment in the past (median=3), the result being statistically significant $p=0.046$ (Table 5).

Table 5. Fear of dental pain for all participants and comparison between those who had or did not have the specific treatment in the past.

Fear of dental pain for:	All participants		Had the treatment in the past			Had the treatment in the past			p
	mean	median	mean	median	N	mean	median	n	
I1	2.16	2	2.15	2	150	2.17	2	36	0.655
I2	2.18	2	2.15	2	158	2.36	2	28	0.327
I3	2.52	2	2.16	2	63	2.7	3	123	0.008
I4	2.85	3	2.74	3	72	2.93	3	114	0.381
I5	2.99	3	2.85	3	59	3.06	3	127	0.368
I6	2.91	3	3.8	4	10	2.86	3	176	0.046

Moreover, those who had endodontic treatment in the past have lower values also for fear of receiving an anaesthesia injection and having a tooth drill, compared with those who did not have endodontic treatment in the past. For both items, fear of receiving an anaesthesia

injection and having a tooth drill, the median of those who had endodontic treatment was 1, and for those who didn't have endodontic treatment in the past the median was 2, the result being statistically significant (Table 6).

Table 6. Fear of dental pain for receiving an anaesthetic injection and having a tooth drill of those who had the endodontic treatment "Yes" and for those who didn't have "No".

	Yes (n=63)		No (n=123)		p
	mean	median	mean	Median	
Anaesthetic injection (I1)	1.81	1	2.33	2	0.015
Tooth drill (I2)	1.9	1	2.33	2	0.013
Root canal treatment (I3)	2.16	2	2.7	3	0.008

Participants who usually go for regular check-ups are less afraid of pain related to specific procedures for all items, compared with those who did not go for regular check-ups, the results being statistically significant. A major difference

was observed in fear of dental pain about having dental extraction, between those who go and do not go for regular check-ups (median of 2, respectively median of 4) (Table 7).

Table 7. Fear of dental pain for specific procedures of those with, respectively without periodical check-ups.

Fear of dental pain for:	Regular check-ups		Regular check-ups		p
	mean	median	Mean	median	
I1	1.88	1	2.46	2	0.005
I2	1.84	2	2.56	2	<0.001
I3	2.13	2	2.93	3	<0.001
I4	2.43	2	3.31	4	<0.001
I5	2.49	2	3.53	4	<0.001
I6	2.60	3	3.25	4	0.002

Discussion

According to our results, the Romanian-modified s-FDPQ is a reliable and valid index. The questionnaire had a good convergent validity, all questions of s-FDPQ were moderately correlated with DAS score. The dental anxiety scale was highest correlated with fear of pain about having a root canal treatment.

The level of fear of dental pain is highest for surgical procedures, followed by endodontic treatment, having a tooth drill and receiving an anaesthetic injection. Participants who had past endodontics treatment had lower levels of fear of dental pain than those who didn't, on the other hand, participants who had in the past dental implant treatment had higher levels of fear of dental pain compared with those who did not have.

The Romanian-modified version of s-FDPQ has a good convergent validity as items of the questionnaire are correlated with the DAS score, the result is in accordance with the scale tested for Chinese participants [15].

According to Huynh et al. [16], endodontic treatments are one of the most stressful treatments for patients and usually generate more stress than restorative and cleaning procedures, but not more than surgical procedures. Similarly, in our study, the fear of dental pain for endodontic procedures was lower than for surgical procedures (dental extractions, dental implants) and higher than for having a tooth drill and receiving anaesthesia.

Also, according to our results, the dental anxiety scale was highest correlated with fear of pain about receiving a root canal treatment. The previous suggests that endodontic treatment could be used as context when aspects related to fear and anxiety related to dental treatment are assessed.

In accordance with the Chinese version of the questionnaire [15], the lower level of fear of dental pain was for local anaesthetic injection. Regarding fear of dental pain about endodontic treatments the results were not in accordance with the Chinese version [15], as in their study, the level was similar to wisdom tooth extraction and had the highest values, in our sample fear of dental pain about endodontic treatment was lower than for extraction procedures. This difference could be explained by the different practices between countries or by the fact that our study included predominantly students, and the difference in perception could be due to different categories of age, and education levels.

According to previous studies [17,18] insertion of the dental implant compared with tooth extraction is a less painful procedure for patients. In our study, the level of fear of dental pain regarding implant placement, as ranked, is in between wisdom tooth extraction and tooth extraction. However, when compared to those who had dental implants in the past the level of dental pain was higher than for those who didn't have the dental implants inserted in the past and is possible that they perceived dental implant placement as a painful treatment. Adding a question about dental implant insertion could improve the information gained from s-FDPQ index.

Participants who did not have a specified dental procedure tend to perceive it as being more painful. Our results are consistent with Lin et al. [19], who claims that patients overestimate the

fear of dental pain if they did not experience the dental procedure. Wu et al. [15] found that the participants who had never been to the dentists, so witch never experienced those specific dental treatments, tended to overestimate the level of fear of dental pain, and they linked that with what the participants learned from other persons' bad experiences or how dentistry is viewed in the media.

In this research, the level of fear of pain was highest for the possibility of undergoing tooth extraction, it being moderately correlated with the dental anxiety level. Our results are in accordance with previous studies that reported pain expectation among dental extraction being associated with increased levels of dental anxiety [20].

Furthermore, negative emotions about dental treatment usually were related to dental pain and had negative consequences on the level of dental anxiety [21].

Although both patients, with and without anxiety, tend to recall or expect more dental pain than they report after the tooth extraction procedure, a bigger difference in the assessment between the two-time points is observed in those with dental anxiety [22,23].

Previous studies reported dental anxiety as an important barrier to accessing dental treatment, thus going to the dentist for check-ups was reported as more frequent among less anxious patients [24,25].

Furthermore, patients who usually go for check-ups are less anxious about painful procedures than those who go sporadically [26,27].

Participants who usually go for check-ups had lower levels of fear of dental pain about specific procedures included in the study, our results being consistent with previous studies [15].

Limitations of the study were that the study was conducted only on university students, further research should evaluate participants from dental patients and general populations with different ages and levels of education.

Conclusion

The Romanian-modified short version of the Fear of Dental Pain scale has good reliability and validity and adding an item about implant insertion is indicated. Having more information about dental treatment as having dental procedures in the past has a positive impact on the level of fear of dental pain.

Conflict of interests

None to declare

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