

Gender Differences in Dental Anxiety and Medical Fear in Croatian Adolescents

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Objectives: The aim of this study was to differentiate anxious from nonanxious adolescents and evaluate gender differences in anxiety with respect to previous negative dental and medical experiences. The purpose was also to evaluate a causative relationship between child medical fear and dental anxiety. **Study Design:** This study sampled 113 Croatian adolescents from 15 to 18 years of age. Children's Fear Survey Schedule – Dental Subscale (CFSS-DS) was used for the assessment of child dental anxiety regarding visits to the dentist and receiving dental treatment. A modified version of Child Medical Fear Questionnaire (CMFQ-M) was used for evaluation of child medical fear related to medical treatment and doctors in general. **Results and Conclusion:** The results showed significantly higher dental anxiety (CFSS-DS) and medical fear (CMFQ-M) in adolescent girls ($p < 0,001$) as compared to adolescent boys. A significantly strong correlation between medical fear and dental anxiety in adolescent girls was proved by Pearson's correlation coefficient ($p < 0,01$). In this study, CMFQ-M and CFSS-DS questionnaires were standardized in the Croatian adolescent population and proved reliable in the estimation of anxious behaviour with respect to specific medical and dental situations.

Key words: adolescent behavior, dental anxiety, medical fear

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INTRODUCTION

Fear generally is caused by a real, specific, and unpleasant source, which in the context of defining dental fear, refers to a specific dental situation.¹ Conditions that cause extreme fear or psychomotor and inner tension generally result in manifesting anxiety.¹

Unlike fear, anxiety is caused by an anticipated event.¹ Dental anxiety relates to impending dental visits and procedures.¹ Moderate and high levels of anxiety can result in individual reactions characterized by restlessness, tremor, difficulty breathing, sweating, tics, and muscle twitching.^{1,2} Children and adolescents with a high level of general anxiety are predisposed to increased levels of dental anxiety and sometimes phobia.²

It is generally difficult to diagnose certain phobias among individuals, particularly during adolescence. According to relevant data, phobias have been diagnosed in 5% of the population, out of which 15–20% have been related to dentistry.^{2,3,4} It has been proven that the occurrence of certain phobias is most likely linked to age, where younger populations are more likely to suffer from extreme fear and sometimes phobia.⁴ In addition, previous traumatic experiences have proven to be one of the most important factors in the etiology of non-cooperative behavior in the dental setting.^{4,5,6} Negative medical experiences, which are potentially threatening to the physical integrity of the patient or result in anticipated pain and stress, evoke the sense of helplessness and manifest an elevated fear of the dentist.³

The aim of the study was to estimate gender differences and differentiate non-anxious from anxious adolescent patients. The purpose was to also determine a causative relationship between negative medical experience, which results in elevated medical fear, and subsequent dental anxiety.

MATERIALS AND METHOD

In order to evaluate the level of dental anxiety and medical fear, psychometric tools were applied to the subjects. The psychometric tools that were used in this study were Children's Fear Survey Schedule-Dental Subscale (CFSS-DS) and a modified version of Broome's Child Medical Fear Questionnaire (CMFQ-M), which helped measure the degree of adolescent medical fear and dental anxiety. Both tools were standardized for the Croatian adolescent population.

Children's Fear Survey Schedule-Dental Subscale (CFSS-DS), which was used to evaluate dental fear and anxiety in these adolescents, consists of fifteen items. These items are standardized and relate to fear of dentists and doctors, and various aspects of dental treatment, including the use of injections, dental handpieces, and oral manipulation.^{4,7,8} The questionnaire requests the subject to rate their level of fear on a scale from 1 to 5, with 1 being 'Not Afraid,' and 5 being 'Strongly Afraid.' The score of this questionnaire ranges from 15 to 75 points. Subjects who score 45 points or greater are classified as being highly anxious.^{4,5,7,8} This questionnaire helps assess the level of dental fear in adolescents, as well as differentiating non-anxious patients from highly anxious patients.^{4,5} Psychometric measurements have shown CFSS-DS to be highly reliable and objective in assessing the intensity of fear or anxiety as documented by Cronbach coefficient values.^{4,6,7,8}

Broome's Child Medical Fear Questionnaire (CMFQ) is a standardized questionnaire used to measure fear of doctors and medical procedures.^{9,10} These questions relate to the intensity of fear with certain medical settings and situations. Some of these unpleasant scenarios include receiving injections, stitches, the presence of blood, and an ear and throat examination.^{9,10} CMFQ asks the subject to select their level of fear from three options, which pertains to a particular score: a = not afraid (1 point), b = afraid a little (2 points) c = very afraid (3 points). In this study, a modified version of the questionnaire was used (CMFQ-M), consisting of twelve items instead of fifteen. The final score is calculated by the summation of each question, ranging from 12 to 36 points. Subjects with a score of 19 points or greater are categorized as having medical fear.^{9,10}

Adolescents from 15 to 18 years of age who sought treatment in the dental clinic of the University of Zagreb, School of Dental Medicine, were included in this study. The subjects were volunteers and consent was obtained after having received a detailed explanation regarding the study's protocol, purpose, and methods. Informed consent was obtained from the adolescents prior to beginning the study. For participants under 18 years of age, additional consent was obtained from the subjects' parents. Both questionnaires were completed by the subjects after their operative procedures were completed at the School of Dental Medicine.

Patients who were included in the study had at least two previous dental visits at the School of Dental Medicine, during which operative treatment was performed. This included restorations with glass ionomer or composite, and/or endodontic treatment of teeth. All patients who participated in the study had experienced local anesthesia and had received an injection in the dental office at least once prior to this visit.

Subjects who were not included in the study were new patients who presented for an initial visit, patients presenting for emergency treatment, and patients who had previously been diagnosed with a psychological disorder, psychiatric disorder, and/or mental disability. Patients with past medical experiences, such as hospitalization, surgeries, or intense medical care were also excluded from the study.

The study was approved by the Ethical Board of the School of Dental Medicine at the University of Zagreb, Croatia. Reliability of the psychometric tests was evaluated by Cronbach α coefficient and based on the internal consistency of the measuring instruments. For statistical analysis of the acquired data, a software package STATISTICA for Windows, Release 5.5 A * and SPSS for Windows, Release 7.5 ** was used.

RESULTS

A total of 113 subjects were included in this study. The average age for boys and girls were 16,6 years and 16,2 years, respectively. The validity of the questionnaires – CMFQ-M for the evaluation of child medical fear and CFSS-DS for evaluation of child dental anxiety – was standardized for these Croatian adolescents and was estimated by Cronbach α coefficients. The values obtained for CMFQ-M and CFSS-DS were 0,6652 and 0,8906, respectively. Pearson's correlation coefficients showed a statistically significant causative relationship between medical fear and dental anxiety in both boys and girls ($p < 0,01$).

According to the results of CFSS-DS, the boys achieved an average score of 23,4 and the girls a significantly higher value of 29,9. The results of this questionnaire confirmed a significant statistical difference in dental anxiety between boys and girls ($p < 0,001$). Child's medical fear, as represented by CMFQ-M, further confirmed a statistically significant difference between boys and girls. According to the results represented by t-test, boys scored 16,48, as opposed to girls who scored 18,06 ($p < 0,001$). These values are presented in Table 1.

From the results of CMFQ-M, there was a statistically significant difference between boys and girls in relation to three items: fear of going to hospital, fear of visiting the doctor, and fear of visiting the dentist. For "fear of going to the hospital," 65,6% of boys vs. 34,4% of girls were "not afraid at all," as opposed to 25% of boys vs. 75% of girls who were "afraid a lot" ($\chi^2=6,40$; $p=0,041$). These values are represented in Table 2. In regards to the item "fear of visiting the doctor," 62,5% of boys vs. 37,5% of girls were "not afraid at all," as opposed to 34,8% of boys vs. 65,2% of girls who were "a little afraid" ($\chi^2=8,24$; $p = 0,016$). These results

Table 1. Gender differences in manifesting dental anxiety as measured by Children’s Fear Survey Schedule-Dental Subscale (CFSS-DS) and Child Medical Fear Questionnaire-Modified (CMFQ-M)

Variable	Male (N ^a =62)		Female (N=50)		t-statistics		
	\bar{x} ^b	s ^c	\bar{x}	s	t ^d	df ^e	p
CFSS-DS	23.40	7.69	29.90	10.96	-3.70	111	<0,001
CMFQ	16.48	1.73	18.06	2.58	-3.89	111	<0,001

^a Number of cases, ^b Average value ^c Standard deviation, ^d t value ^e Degrees of freedom

Table 2. Contingency table representing gender differences in adolescents expressing fear of going to hospital (CMFQ-M)

I am afraid of going to the hospital		Gender		Total
		Male	Female	
Not at all afraid	n ^a	42	22	64
	rp ^b	65.6%	34.4%	100.0%
	cp ^c	66.7%	44.0%	56.6%
A little afraid	n	20	25	45
	rp	44.4%	55.6%	100.0%
	cp	31.7%	50.0%	39.8%
Afraid a lot	n	1	3	4
	rp	25.0%	75.0%	100.0%
	cp	1.6%	6.0%	3.5%
Total	n	63	50	113
	rp	55.8%	44.2%	100.0%
	cp	100.0%	100.0%	100.0%
c ² -test	c ² = 6.40, df=2, p = 0.041			

^a Number of cases, ^b row percent, ^c column percent

Table 3. Contingency table representing gender differences in adolescents expressing fear of visiting the doctor (CMFQ-M)

I am afraid of visiting the doctor’s office		Gender		Total
		Male	Female	
Not at all afraid	n ^a	55	33	88
	rp ^b	62.5%	37.5%	100.0%
	cp ^c	87.3%	66.0%	77.9%
A little afraid	n	8	15	23
	rp	34.8%	65.2%	100.0%
	cp	12.7%	30.0%	20.4%
Afraid a lot	n		2	2
	rp		100.0%	100.0%
	cp		4.0%	1.8%
Total	n	63	50	113
	rp	55.8%	44.2%	100.0%
	cp	100.0%	100.0%	100.0%
c ² -test	c ² = 8.24, df=2, p = 0.016			

^a Number of cases, ^b row percent, ^c column percent

are represented in Table 3. Finally, for “fear of visiting the dentist,” 66,2% of boys vs. 33,8% of girls were “not afraid at all,” as opposed to 31,3% of boys vs. 68,8% of girls who were “afraid a lot” ($\chi^2=7,78$; $p = 0,021$). These values are represented in Table 4.

With regards to CFSS-DS, the following scenarios showed statistical significance with greater levels of dental anxiety in boys and girls, in order of most feared to least: fear of choking, fear of being hospitalized, fear of being observed by an unknown person, fear of being touched by an unknown person, fear of opening the mouth, and fear of doctors. These results are represented in Table 5. When comparing gender differences, girls proved to be more afraid of being observed by an unknown person ($p=0,002$; $\chi^2 = 16,740$), and showed greater fear than boys when they needed to open and show their mouth ($p=0,04$; $\chi^2 = 6,247$), or being hospitalized $p=0,004$; $\chi^2=15,294$) (Table 5). These values were statistically significant and indicated higher dental anxiety in girls as measured by CFSS-DS. The obtained scores for the remaining items as obtained by the CFSS-DS questionnaire did not show statistically significant gender differences with respect to dental anxiety.

Table 4. Contingency table representing gender differences in expressing fear of visiting the dentist (CMFQ-M)

I am afraid of going to the dentist		Gender		Total
		Male	Female	
Not at all afraid	n ^a	43	22	65
	rp ^b	66.2%	33.8%	100.0%
	cp ^c	68.3%	44.0%	57.5%
A little afraid	n	15	17	32
	rp	46.9%	53.1%	100.0%
	cp	23.8%	34.0%	28.3%
Afraid a lot	n	5	11	16
	rp	31.3%	68.7%	100.0%
	cp	7.9%	22.0%	14.2%
Total	n	63	50	113
	rp	55.8%	44.2%	100.0%
	cp	100.0%	100.0%	100.0%
c ² -test	c ² = 7.78, df=2, p = 0.021			

^a Number of cases, ^b row percent, ^c column percent

Table 5. Fisher Exact Test Representing Gender Differences in Dental Anxiety With Respect to Specific Items as Measured by the Child Fear Survey Schedule (CFSS-DS)

CFSS-DS	χ^2	df	<i>p</i>
Fear of dentist (S1)	8.672	4	0.070
Fear of doctor (S2)	9.346	3	0.025
Fear of injection (S3)	6.661	4	0.155
Fear of having the teeth checked (S4)	8.231	4	0.083
Fear of opening the mouth (S5)	6.247	2	0.044
Fear of being touched by an unknown person (S6)	10.538	4	0.032
Fear of being observed by an unknown person (S7)	16.740	4	0.002
Fear of having the teeth drilled (S8)	6.284	4	0.179
Fear of seeing the drill (S9)	6.970	4	0.137
Fear of the sound of the drill (S10)	7.304	4	0.121
Fear of having the instruments in the mouth (S11)	8.645	4	0.071
Fear of choking (S12)	20.272	4	<0.001
Fear of being hospitalized (S13)	15.294	4	0.004
Fear of the white coats (S14)	3.239	1	0.136 ^a
Fear of having the teeth cleaned (S15)	6.794	4	0.147

DISCUSSION

The etiology of dental anxiety has proven to be multifactorial and includes several factors, among which are previous negative medical and dental experiences, parental (particularly maternal) anxiety, peer pressure, level of psychological and intellectual development, psychosocial factors, gender, and age.^{6-8,11-13} Previous negative medical experiences, in the form of so-called residual fear, may evoke similar negative memories in a dental situation later in life.^{14,15} Negative memories from past traumatic experiences in combination with fear of the unknown can result in what has been described in the literature as anticipatory fear.^{6,16,17}

Children at an early age, between 6 and 8 years, are rather sensitive and often exhibit increased tendency towards adopting fearful behaviour.¹⁸ As they grow, they gradually acquire self-control and self-confidence, and thus become more secure and independent. By the age of 11 or 12 years, they are already rather independent and therefore less susceptible to environmental conditions, which gradually results in gradual psychosocial strengthening over time.^{7,19} Anticipatory fear, however, significantly influences their ability to cope with unpleasant external factors, which tend to enhance negative behavior in medical or dental situations into adolescence.¹⁹

In the majority of cases, dental anxiety has been related to previous unpleasant experiences in a dental setting.²⁰ Medical fear has been shown to be the result of anticipated fears related to hospitalization and existing medical problems, which again date to a previous experience.²⁰ Unpleasant previous medical experiences, which were deemed painful, seem to

be the most crucial factor in forming and manifesting dental anxiety and fear of the dentist.²⁰ These negative experiences from the past have been regarded as anticipatory anxiety.^{21,22}

The internal consistency and reliability of the CFSS-DS questionnaire as estimated by the Cronbach alpha coefficient was rather high for the sample of Croatian adolescents (0,8906), which has been supported by similar results from past studies.²³ This was the opposite for CMFQ-M, which had a lower Cronbach alpha coefficient than previous studies.⁹ The reason for this low value was likely due to the modification of the survey.

In this study the mean dental anxiety scores as obtained by the CFSS-DS questionnaire were found in accordance with the range of the anxiety scores which were previously reported in the literature.^{9,24,25,26,27} Our results as obtained by the Fischer test show that the highest CFSS-DS scores were found to be with a fear of opening the mouth, fear of doctors in general, fear of choking, fear of being hospitalized, and fear of being touched and observed by an unknown person. The highest CFSS-DS scores in a previous study of Japanese children were found with respect to specific dental treatments, the highest being the injection and drilling of a tooth.²⁸ This was followed by fear of the dentist, looking at the procedure of drilling a tooth, the sound of the drill, and the sense of instruments in the mouth.²⁸ Injection and drilling of a tooth were statistically significant.²⁸ Studies from other countries have shown that the most fearful and pain provoking dental procedures were needle puncture, the drill, and curettage or scaling of a tooth.^{29,30,31} Apart from cultural differences, a likely reason for the difference of these findings is the variation in age among these studies which included younger children, as compared to our age limitation of 15-18 years.

As for results obtained by CMFQ-M, which was used exclusively for the evaluation of medical fear in adolescents, girls proved to be more anxious about doctors and medical procedures than boys, with the estimated value being statistically significant for the Croatian adolescent population. More specifically, the significant gender difference was found with regards to going to the hospital, visiting the doctor, and visiting the dentist (Tables 2, 3, and 4). The CMFQ-M results showed that the most stressful and fear provoking situations for adolescent girls were mostly anticipated as general fear about doctors and did not seem to be related to a specific medical situation. This is opposed to research data from previous studies, which shows no gender differences in regards to medical fear.¹⁰

The results of this study showed that greater fear in certain medical situations could generate greater fear in dental situations. This causative relationship can be proven by the strong correlation between the intensity of medical fear and the level of dental anxiety, as represented by the Pearson's correlation coefficients obtained from this study. The results of this study further support previous assumptions, which have emphasized unpleasant medical situations as being the most important causative factor in intensifying the level of fear in adolescence, consequently leading to anxious behavior in the dental setting.³²

Although gender differences in dental anxiety have been shown among primary school children in previous studies, there have been no reported differences among adolescents.^{4,8,12} The findings of this study refute this. A significant gender difference in dental anxiety scores from CFSS-DS proved that adolescent girls were more anxious about the dentist and dental visits than adolescent boys. Although girls were more prone to anxiety in a number of situations, the CFSS-DS scores showed that the majority of these situations resulting in fearful behavior were mostly medical in nature. The average values of dental fear and anxiety in adolescent girls in our study were generally higher than previous studies and research data, which reported no gender differences.^{26,27,33,34,35} However, some studies have shown females to be more anxious than males, with female anxiety increasing over the years as they grew older.⁸ The level of dental anxiety reaches its highest peak in females from 35 to 44 years of age.³⁶

A confounding factor of this study may be self-serving bias by the adolescents. The questionnaires were completed by the adolescents themselves, and these results may not have accurately reflected the true nature of the subjects' fear and anxiety. For example, adolescent boys may have under reported their level of fear and anxiety due to societal norms and cultural expectations. Furthermore, subjects completed the questionnaires after dental treatment was performed, which could have impacted their response to dental anxiety and medical fear.

The results of this study apply to the Croatian adolescent population and at this point cannot be generalized to other populations. Therefore, more studies are mandatory to establish further etiologic factors and causative relationships of medical fear and dental anxiety among this age group.

CONCLUSIONS

Based on the results of this study, the following conclusions can be drawn:

1. Dental anxiety and medical fear were significantly higher in adolescent girls as compared to adolescent boys.
2. Both questionnaires (CFSS-DS and CMFQ-M) were standardized for the sample of Croatian adolescents, and as such proved to be reliable in estimating anxiety parameters in the Croatian adolescent population.
3. The higher level of medical fear in girls, which was accumulated based on past experiences in the doctor's office, proved to be an important causative factor in generating elevated stress and greater anxiety in a dental setting later in life.

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