Evaluation of Questionnaires to Assess Dental Trauma And Anxiety of Children in Kosovo

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Abstract

Dental trauma relates to negative consequences that the child links to negative experience. The aim of this study was to assess the scale of dental anxiety in children with dental trauma and to evaluate the questionnaires as measurement scales which handle the trauma and anxiety parameters. Study included 505 patients, aged 7 to 14 years of whom 254 children experienced dental trauma and 251 children were without dental trauma experience. The subjects came for dental appointment from 2015 to 2016 and filled out the questionnaires about anxiety. The following questionnaires were used: CFSS-DS, CDAS, CMFQ, S-DAI and DVSS-SV. The Cronbach alpha was used to check the reliability and validity of the questionnaires.

Larger percentage of cases had lower scale of dental anxiety. Meanwhile high scale dental anxiety was proportionally higher in the group with dental trauma for all questionnaires. Dental visit satisfaction scale was higher in the group without dental trauma. Female patients showed higher scores for all tests. In the group of patients with dental trauma, the mean values of anxiety scale were also higher in females. Also, dental visit satisfaction scale was higher in females. According to the age of children the only significant correlation between the patient's age and dental anxiety was ascertained in S-DAI test in the group without dental trauma (r=-0.137, p=0.03). All questionnaires were evaluated as reliable and valid for anxiety determination. In children with dental trauma the highest Cronbach alpha coefficient was found for S-DAI (0.991) and CFSS-DS (0.974). In children without dental trauma the highest Cronbach alpha coefficient was found for S-DAI (0.966), CFSS-DS (0.959) and CDAS (0.914).

The mean anxiety score was higher in children with dental trauma, as well as in the girls and children who are more afraid of medical interventions (CMFQ). All tests showed good reliability of estimating anxiety and could be used in every day practice.
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Introduction

Dental anxiety results from stressful dental situations, whereas the distinction of dental fear concept is that it is not real and presents intensive psychological and physiological symptoms.[1] Clinical signs are increased sweating, discomfort, heart beating, nausea, fatigue etc. As the intensity increases, dental anxiety becomes dental phobia.[2] Dental phobia is unconscious and autonomous reaction of the body by which the individual attempts to protect himself from the existing risk in the specific moment.[3] Fear variations have different features. The children with dental anxiety have a negative dental experience that is displaced in dental situation, which means the model of anticipatory anxiety. Whereas the child who has dental phobia has a present anxiety (not necessarily dental anxiety) that is displaced and is identified with dental

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treatment and results in such intensity that it can be determined as dental phobia. Sport activities in children and adults are the leading cause of outdoor head and neck trauma, there are diverse findings about the incidence and prevalence of dental trauma in various sports ranging between 10 and 37 % depending on the type of activity and either professional or amateur level of the athlete.[4] Dental trauma relates to negative consequences that the child links to negative experience. Consequences are psychological trauma caused for instance by broken teeth most often during the development of psychological stage of child.[5,6,7]

Psychodynamic theory attempts to explain the presence of dental fear in a certain number of patients, depending on the intensity of dental anxiety and respectively individual ability to confront the intensity of anticipatory anxiety.[5,6,7,8] So far, the studies have argued in favour of multiple factors in aetiology of dental fear. Psychological constitution of a child and external factors are mostly linked to the pain and experience of medical trauma, and together contribute to the onset of dental fear. Therefore, there are intrinsic (internal) and extrinsic (external) factors.[8,9,10] Negative thoughts about dental treatment and fear from unknown situations help increase the level of anxiety. Most dramatic by its nature are the cases with premature loss of permanent teeth due to occurred traumatic avulsion, therefore as clinicians our imperative is to treat the dental trauma with reimplantation of the lost tooth and use of appropriate space maintainers should not be neglected.[10] The characteristics related to the gender, also influence the distinction in development of dental anxiety. Therefore, for example girls are more prone to the mood of restlessness, because by nature they are more vulnerable and fragile, and psychological constitution itself is predisposition for the onset of dental fear.[1,6,12] In them anxiety is proportionally linked to the age and internal psychological factors, whereas in boys, external factors are crucial.[9,12]

Children that are emotionally or intellectually immature are more prone to easier acceptance of dental fear.[10,12,15] The tendency towards extremely negative thoughts reinforces dental fear and in these children negative thoughts dominate.[7,9,14] The level of general fear is very important in formation of dental anxiety, either in relation to the fear of dental procedure or dental environment. Emotional status in general is important for perception of trauma. The attention is increasingly being focused on the fact that the temper and psychological moment certainly plays a significant role in onset of dental fear.[14,15]

According to multifactorial theory, traumatic dental experiences have primary and secondary effects.[16] Primary are experienced as very negative, dental treatments have negative implications in situations to follow, which means that in secondary manner provoke similar or same negative memories.[17] Present dental fear is so called residual fear which in certain situation affects the fear from unknown (dental procedure or treatment) and results in so called anticipatory anxiety which in this case is combination of initial fear from unknown and existing fear related to previous traumatic medical experience.[17,18]

The aim of this study was to assess the scale of dental anxiety in children with dental trauma and to evaluate the questionnaires as measurement scales which handle the trauma and anxiety parameters.

Materials and methods

Subjects
A total of 505 patients, aged 7 to 14 years, participated in this research. 254 children experienced dental trauma and 251 children were without dental trauma experience. The subjects came for dental appointment from 2015 to 2016 at Department of Pediatric and Preventive Dentistry of University Dentistry Clinical Centre of Kosovo.

Procedure
Children and their parents were informed about the study and asked to participate in the study. They fulfilled and gave consent agreement in writing for inclusion into the study. Those who accepted to participate in the study filled out the questionnaires. Questionnaires were filled by children or parents, if children were too young and were not able to answer the questions by themselves.

The following questionnaires were used for psychometric measuring: CFSS-DS (Children's Fear Survey Schedule – Dental Subscale), CDAS (Child's Corah Dental Anxiety Scale), CMFQ (Broome's Child Medical Fear Questionnaire), S-DAI (Dental Anxiety Inventory

– short version) and DVSS-SV (Dental Visit Satisfaction Scale-Swedish Version) (Table 1).

Questionnaire	Measurement	# questions	Value range	Category of fear
CFSS-DS	Children's dental anxiety	15	15-75	<31=low 31-39=average >39=high
CDAS	Children's dental anxiety	4	4-20	4-8=low 9-12=average 13-20=high
CMFQ	Child's medical treatment fear	12	12-36	<26=low 26-30=high
S-DAI	Children's dental anxiety	9	9-45	<12=low 12-33=average >33=high
DVSS-SV	Child's satisfaction with the dentist	10	10-50	<35=low 35-50=high

Table 1. Questionnaires about anxiety and fear that were used in the current research.

Children's Fear Survey Schedule – Dental Subscale (CFSS-DS) is test that relates to the fear linked to the dentist, doctor, injections, checking the teeth, touch or look of a stranger, opening the mouth, tooth preparation and watching the procedure of tooth preparation, the sound of turbine, manipulation with instruments, choking, going to hospital, white uniform and the procedure of cleansing the teeth in the dentist practice. Based on final values, the interviewees are divided into two categories based on dental anxiety intensity in fact those who scored 45 and more points are children with high scale of dental anxiety.

Corah Dental Anxiety Scale (CDAS) is the test that evaluates children's and parental dental fear, and is very practical for use for extensive studies, because it can be filled out in just a few minutes. The questions are related to subjective fear of the patient related to the check up at the dentist, waiting at the waiting area and concrete dental intervention in the mouth of the patient. The possible answers are evaluated based on the intensity of dental fear and vary from pleasant experience (a), indifference (b), concern (c) concern and fear from eventual pain (d) and exaggerated fear (e). Low score shows very low level of dental fear, whereas high score shows high level of dental fear, in fact dental anxiety.

Broome's Child Medical Fear Questionnaire (CMFQ) is the test that evaluates the intensity of the medical treatment fear. This research is used only to assess children's fear from medical treatment, because there is assumption that the child who had a very bad experience in the doctor's practice and those who fear medical procedures and doctor's appointment, are in general more inclined to present with dental fear and dentist phobia. The questions are related to the fear of going to hospital, injections, doctors, dentists, puncture of the finger, white coat, blood, ear and throat exam, heart auscultation, taking temperature, laying on the couch in doctor's practice.

Dental Anxiety Inventory Test (S-DAI) relates to specific dental treatment and dental situations, while considered relevant only for the evaluation of dental anxiety. It refers to evaluation of the fear related to going and sitting on the dental chair, tooth extraction, sound of turbine, knowledge about what is done in patient's mouth, injections and tooth preparation using turbine. Three different tests are included in this research that are relevant and reliable for evaluation of dental fear, for the purposes of obtaining objective results that tell us how much are children frightened from the dentist and which are the most stressful treatments children are the most afraid of when at dental practice.

Dental Visit Satisfaction Scale –Swedish Version (DVSS-SV) is the test that is used to evaluate the patient-therapist (dentist) relationship and it is filled by the child. Test consists of three sets of questions that are in relation to information/communication (A1-A3), understanding/acceptance (B4-B6) and technical competence (C7-C10).

Statistical analysis

Statistical analyses were performed using SPSS version 21 (IBM, New York, USA) statistical package. The one-way analysis of variance (One-WAY ANOVA) or T-test were used to test the continual data with normal distribution, whereas Kruskal–Wallis test was used for those data with abnormal distribution. Fisher's exact test and Pearson's χ^2-test was used for testing categorical data. Pearson's correlation analysis was used for estimation of regression between the variables. The statistical significance was set at $p<0.05$. Cronbach alfa was used to test the reliability analysis of questionnaires' internal consistency.

Results

A total of 254 patients with dental trauma and 251 patients without previous dental trauma participated in the study. Basic characterictis of children and their scores of fear are presented in Table 2. Groups of patient children with or without dental trauma varied in gender and age. Children with trauma were a bit older and were mainly males.

According to the results of questionnaire test categories, the larger percentage of cases had lower scale of dental anxiety, the difference being that this percentage was lower in the group with prior dental trauma, in comparison to the group without dental trauma. High scale dental anxiety was proportionally higher in the group with dental trauma for all questionnaires (Table 2). Only CMFQ showed no statistical difference between the children with and withour dental trauma (p=0.093). However according to mean value of questionnaires scores, for all test statistical differences were observed between the comparative groups (Table 3). Children with dental trauma had higher mean values of scores, except for DVSS-SV.

Comparisons between gender also showed statistically significant differences between the groups (Table 4). Female patients showed higher scores for all tests. Therefore, we have perforemd furher analysis of comparing males and females with and without dental trauma (Table 5). In the group of patients with dental trauma, the mean values of anxiety scale were higher in females. Also, dental visit satisfaction scale was higher in females. Mean values of the tests used in the research were higher in the group of patients with prior dental trauma, except for dental visit satisfaction scale which was higher in the group without dental trauma.

According to the age of children the only significant correlation between the patient's age and dental anxiety was ascertained in S-DAI test in the group without dental trauma (r=-0.137, p=0.03). In children with dental trauma the highest Cronbach alpha coefficient was found for S-DAI (0.991) and CFSS-DS (0.974); the lowest value of Cronbach alpha coefficient was found for DVSS-SV (0.733). In children without dental trauma the highest Cronbach alpha coefficient was found for S-DAI (0.966), CFSS-DS (0.959) and CDAS (0.914); the lowest value of Cronbach alpha coefficient was found for DVSS-SV (0.817). All tests had appropriate scale of reliability and validity (Table 6).

Average anxiety scale was significantly higher in children with prior dental trauma experience, in comparison to the children without dental trauma for CFSS-DS (p=0.001), CDAS (p=0.01), CMFQ (p<0.001), and S-DAI (p=0.048). Average scale of DVSS-SV was significantly higher in children without dental trauma (p<0.001). Average anxiety scale was higher in females, in comparison to males in all analyzed questionnaires.

	Children with dental trauma (N=254)	Children without dental trauma (N=251)	p-value
Gender			
M/F	150/104	117/134	0.007
Mean age [years]	11.76±1.76	11.10±2.01	<0.001
Age categories			0.006
7-9	35 (13.8%)	55 (21.9%)	
10-12	111 (43.7%)	120 (47.8%)	
13-14	108 (42.5%)	76 (30.3%)	
CFSS-DS			0.014
Low	232 (91.3%)	244 (97.2%)	
Average	10 (3.9%)	2 (0.8%)	
High	12 (4.7%)	5 (2.0%)	
CDAS			0.002
Low	176 (69.3%)	207 (82.5%)	
Average	63 (24.8%)	37 (14.7%)	
High	15 (5.9%)	7 (2.8%)	
CMFQ			0.093
Low	238 (93.7%)	244 (97.2%)	
High	16 (6.3%)	7 (2.8%)	
S-DAI			0.050
Low	197 (77.6%)	211 (84.1%)	
Average	46 (18.1%)	37 (14.7%)	
High	11 (4.3%)	3 (1.2%)	
DVSS-SV			<0.001
Low	168 (66.1%)	124 (49.4%)	
High	86 (33.9%)	127 (50.6%)	

Table 2. Basic characteristics of patients included into the study with the evaluated scores from fear questionnaires.

	Mean value	Children with dental trauma (N=254)	Children without dental trauma (N=251)	p-value
CFSS-DS	19.25±7.47	20.44±8.49	18.04±6.05	<0.001
CDAS	6.94±2.86	7.26±3.23	6.61±2.39	0.010
CMFQ	16.25±3.39	16.90±3.96	15.58±2.53	<0.001
DVSS-SV	35.68±3.11	35.00±3.00	36.36±3.07	<0.001
S-DAI	11.92±6.61	12.50±7.73	11.33±5.20	0.048

Table 3. Mean value of questionnaires according to comparative groups.

	Male (N=267)	Female (N=238)	p-value
CFSS-DS	18.63±6.42	19.94±8.46	0.050
CDAS	6.73±2.47	7.17±3.23	0.086
CMFQ	15.93±2.86	16.61±3.88	0.024
DVSS-SV	35.39±3.03	35.99±3.17	0.030
S-DAI	10.97±4.71	12.98±8.12	<0.001

Table 4. Mean value of questionnaires according to comparative groups.

	Male trauma (N=150)	Female trauma (N=104)	p-value	Male NO trauma (N=117)	Female NO trauma (N=134)	p-value
CFSS-DS	19.23±6.30	22.17±10.72	0.006	17.86±6.51	18.20±5.64	0.660
CDAS	6.81±2.62	7.91±3.87	0.007	6.63±2.27	6.59±2.50	0.890
CMFQ	16.29±3.02	17.79±4.90	0.003	15.46±2.58	15.69±2.50	0.480
DVSS-SV	34.69±2.93	35.45±3.07	0.047	36.29±2.94	36.42±3.19	0.740
S-DAI	11.31±5.35	14.22±10.01	0.003	10.55±3.72	12.02±6.14	0.025

Table 5. Mean value of questionnaires according to the gender and comparative groups.

	With dental trauma (N=254)	Without dental trauma (N=251)
CFSS-DS	0.974**	0.959**
CDAS	0.943**	0.914**
CMFQ	0.906**	0.863**
DVSS-SV	0.733*	0.817**
S-DAI	0.991**	0.966**

Table 6. Reliability of the tests used in the research evaluated by Cronbach alpha coefficient.

Discussion

Fear is usually defined as the response of the individual against the actual threatening event or dangerous situation to protect human life.[18] Dental anxiety refers to specific reaction of the patient to stress linked to dental treatment, where stimulus is unknown, unclear or not present at that moment.[19] Most people may live with the anxiety of going to the dentist and to avoid the visit, they accept to live with periodontal disease, pain, even broken and ugly teeth. This fear forces the patients to postpone or cancel dental visit or avoid the treatment entirely.[20] Therefore, dental anxiety is a serious problem with negative impact on oral health.[21] It was confirmed that anxious patients have more teeth extracted and less teeth filled compared to the patient who are not anxious.[22]

Numerous different measuring instruments of fear have been evaluated to measure dental fear and dental anxiety. It is very difficult to evaluate the true nature of dental anxiety, because it is the multifactorial complex phenomena.[7,23-26] In the current study we have measured children anxiety with various measuring instruments for different aspects of dental anxiety. In order to provide more accurate and full assessment for dental anxiety of children, it is necessary to combine various questionnaires scales of evaluation. The purpose was to evaluate the role of constitutional and psychosocial factors, respectively past negative medical experiences in the onset of dental anxiety. Thus we tested psychometric parameters for assessment of anxiety scale in children and show the differences in anxiety scale according to the gender and age.

The study by Do Nascimento et al revealed that people with past traumatic dental experience have shown higher levels of fear and dental anxiety.[27] Obtained finding is consistent with the results of our study. Average scale of CFSS-DS test was significantly higher in children without dental trauma (20.44±8.49 vs. 18.04±6.05, p<0.001). The mean value of CFSS-DS for the patients with dental trauma in our study was in coincide with previous studies, however was lower than the findings from Holland (23.20),[28] Serbia (26.47)[29], and Croatia (26.65)[30].

The results of CMFQ questionnaires in children with dental trauma revealed that children's fear from medical treatment shows high correlation with dental anxiety evaluated by CFSS-DS questionnaire (r=0.869), similar to CDAS (r=0.841), S-DAI (r=0.832). Similar results were obtained from the group of cases without dental trauma. All tests used in this research are proven to be quite reliable. The highest value of Cronbach alfa coefficient was calculated for S-DAI (0.991) and CFSS-DS (0.974). According to the author Majstorović et al children who are more frightened of the doctor (CMFQ) will also be very anxious during dental visit (S-DAI, CDAS).[34] This supports theory, which states that fear depends on prior medical experience. Children without dental trauma had lower scale of fear and more trustful in relationship patient-dentist according to the results of DVSS-SV.

In some previous studies it was reported, that gender, age, education and social class influence dental anxiety. Humphris et al in their study determined the link between social- demographic factors of patients (age, gender) and results of fear.[19] The results of the study did not show any significant statistical difference in anxiety level depending on age groups. Similar was established in our research, where we did not find any significant correlation between patient's age and anxiety level in most of the tests for anxiety evaluation, except from S-DAI test and only for the group of patients without prior dental trauma (r=-0.137, p=0.030). However, the report by Do Nascimento et al have shown strong link between the age and dental anxiety; younger subjects were more concerned than the older ones.[27]

Peretz et al has found higher anxiety scale in females.[2] Many other authors have found that dental anxiety is more common in females.[29] Leal in his research did not find significant difference in average anxiety between genders.[32] Kanegane et al showed similar results.[33] Tumen et al. demonstrated that most children with a traumatic dental injuries experienced traumatic injuries to one tooth (3.81%), while 1.21% had two traumatized teeth and 94.9% had no traumatic dental injuries; the most common crown fracture was in enamel only (65.9%), followed by discoloration teeth (14.6%), showing that the prevalence of dental injuries in Turkish preschool children was very low.[34]

In a study carried out by Ozen et al, at the Faculty of Dentistry of Karadeniz Technical University in Trabzon, Turkey, trauma was found to occur most frequently in girls aged 8 years and boys aged 10 years. The majority of injured teeth

were permanent teeth (77.2%). Most trauma occurred in the maxillary arch (89.6%), with the maxillary central incisors the most affected tooth in both primary (69.6%) and permanent (83.5%) dentition. Single-tooth injury was predominant in all age groups (64.2%).[35]

According to the results obtained from our research average scale of dental anxiety was higher in females, for all levels of anxiety. The mean CFSS-DS result for males was 19.23±6.30 and for females 22.17±10.72 (p=0.006). Our findings are similar to the findings of Ten Berge et al, Lalić et al, Majstorović et al, and Nakai et al.[28,29,30,36] Moreover the mean scale of dental anxiety according to CFSS-DS test in all males, in comparison to all females was 18.63±6.42 vs.19.94±8.46 (p=0.050), and 10.97±4.71 vs. 12.98±8.12 (p<0.001) for S-DAI test. The average scale of fear from medical treatment according to CMFQ test was higher in females than in males (16.61±3.88 vs. 15.93±2.86, p=0.024). The average scale of patient's satisfaction with dental visit according to DVSS-SV test was lower in males than in females (35.39±3.03 vs. 35.99±3.17, p=0.030).

According to the knowledge of many authors, negative past medical experience of the child creates negative thoughts and expectations regarding dental treatment and are expressed with highest level of dental fear and anxiety.[23-28,37] According to the study of Lalić and collegues, Pearson's correlation coefficient was significant between CFSS-DS scale and gender (r=0.163, p=0.013), daily consumption of sugar (r=0.2, p=0.003), frequency of dental visits (r=0.162, p=0.014), oral health in relation to self (r=0.209, p=0.001).[29] According to Alsarheed invasive procedure cause highest scale of anxiety, therefore except for needles, the instruments that cause the highest scale of anxiety are use of forceps, dental exploration and strokes.[38]

Dentists usually do not evaluate dental fear. A study from England showed that only 20% of dentists were interested to treat patients with dental fear, so they used a review method to evaluate the level of their patients' fear.[39] CFSS proved to be most reliable test. The test is designed to be used for the purposes of registering the variations of dental fear assessment between experimental and control group of interviewees and to assess the prevalence of dental fear in children, and to differentiate the anxious and non-anxious group

in general. So far, psychometric research shows that the test is reliable and realistic in evaluation of intensity of dental fear.

Our study had some limitations. We should emphasize more measurement scales and characteristics of children and parents. With such analysis we could be able to find the associations between the dental fear development and real etiological factor.

Conclusions

Standard questionnaires used in our study are reliable and valuable psychometric instruments for dental anxiety evaluation. Average dental anxiety was significantly higher in children with dental trauma and in females and children that much more fear from medical treatment (CMFQ). Children with dental anxiety had also lower values of average scale of DVSS-SV. There was no significant correlation found between patient's age and anxiety scale, except for S-DAI test in group without dental trauma, therefore age could not influence on the development of dental anxiety.

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