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Reliability and validity of the Serbian version of Children's Dental Fear Questionnaire

Pouzdanost i punopravnost srpske verzije upitnika za procenu straha od stomatologa kod dece

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Abstract

Background/Aim. Dental anxiety leads to avoidance of dental treatment and could lead to impaired oral health. The aim of this study was to determine the reliability of the Serbian version of Children's Fear Survey Schedule Dental Subscale (CFSS-DS) and the relations between dental anxiety and oral health status in a sample of Serbian schoolchildren. Methods. The CFSS-DS scale was translated into Serbian and administered to 231 (12-year old) patients of the Pediatric Dental Department, Public Health Center Cukarica, Belgrade. The number of healthy, decayed, missing and filled teeth (DMFT score) in children was determined by a clinical exam. Results. The average CFSS-DS score was 26.47 ± 10.33 . The girls reported higher anxiety than the boys (p < 0.05). Most common fears were drilling, choking, going to the hospital and anesthesia. Lower CFSS-DS scores were recorded in children with all healthy teeth (p < 0.05). Children with higher CFSS-DS scores mostly visit the dentist due to pain or parental insistence, and those with lower anxiety scores more often visited dentist due to regular check-ups or non-invasive treatments (p < 0.01). A high value of the Cronbach's coefficient of internal consistency ($\alpha = 0.88$) was found in the entire scale. Conclusion. The Serbian version of CFSS-DS questionnaire is reliable and valid psychometric instrument for evaluation of dental fear in Serbian children. Dental anxiety negatively affects dental attendance and oral health of the examined schoolchildren.

Key words:

child; dental anxiety; questionnaires; serbia.

Apstrakt

Uvod/Cilj. Strah od stomatologa dovodi do izbegavanja stomatološkog lečenja što može narušiti oralno zdravlje. Cilj istraživanja bio je da se utvrdi pouzdanost Srpske verzije upitnika za procenu straha od stomatologa kod dece (CFSS-DS) i uticaj straha od stomatologa na oralno zdravlje u grupi školske dece iz Srbije. Metode. CFSS-DS upitnik je preveden na srpski i testiran na uzorku od 231 ispitanika (uzrasta 12 godina) u Odeljenju za dečju stomatologiju Doma zdravlja Čukarica u Beogradu. Kliničkim pregledom utvrđen je broj zdravih, karijesnih, ekstrahiranih i plombiranih zuba (KEP indeks). Rezultati. Prosečan CFSS-DS skor bio je 26,47 ± 10,33. Utvrđen je viši stepen anksioznosti kod devojčica nego kod dečaka (p < 0.05). Najčešći strahovi odnosili su se na bušenje, davljenje, odlazak u bolnicu i anesteziju. Niži CFSS-DS skor imala su deca sa svim zdravim zubima (p < 0.05). Deca sa višim CFSS-DS skorom najčešće su odlazila stomatologu zbog bola ili insistiranja roditelja, dok su deca sa nižim stepenom anksioznosti posećivala stomatologa radi redovne kontrole i neinvazivnog lečenja (p < 0,01). Visoka vrednost Kronbahovog koeficijenta interne konzistencije ($\alpha = 0.88$) utvrđena je na nivou celokupnog upitnika. Zaključak. Srpska verzija CFSS-DS upitnika pouzdan je i validan psihometrijski instrument za procenu straha od stomatologa kod dece. Strah od stomatologa negativno utiče na odlazak stomatologu i oralno zdravlje ispitanika.

Ključne reči: deca; anksioznost, stomatološka; upitnici; srbija.

Introduction

Dental fear is a phenomenon frequently encountered in dental practice. Anxiety may lead to avoidance of dental treatment or disruptive behavior during treatment^{1, 2}, which is stressful both for the patient and the dental team and negatively affects treatment outcomes³. People with high dental

fear are more likely to delay treatment, leading to more extensive dental problems and symptomatic visiting patterns which feeds back into the maintenance or exacerbation of existing dental fear⁴.

Dental fear (DF) and dental anxiety (DA) in children are proven to be of a multifactor etiology. The experience of pain and trauma during dental treatment has been suggested

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to play an important role in the onset of dental fear^{5,6}. Other factors such as the child psychological development, age, gender and social background are also important^{7,8}. No straight cause-consequence model in explanation of children's dental anxiety has been found, because its multifactorial etiology accounts for interaction of different dispositional and situational concomitant factors⁹.

In order to assess a child's anxiety from a more complex view prospective, various measurements are used, since different questionnaires might measure the different aspects of dental anxiety. One psychometric scale that is widely used in pediatric dentistry research is the Children's Fear Survey Schedule Dental Subscale (CFSS-DS), initially presented by Cuthbert and Melamed¹⁰. The CFSS-DS is a self-report or parental report 15item questionnaire intended to measure DF in children. Satisfactory reliability and validity of the scale has been reported^{11, 12}. CFSS-DS is commonly used in studies examining prevalence and possible predictors and concomitants of DF in children, and also of correlations between DF and dental behavior management problems¹³.

There is a lack of data on dental anxiety problems in Serbian children. Since the Serbian version of CFSS-DS has not been applied before, our aim was to asses dental anxiety in a sample of children using CFSS-DS, to explore its psychometric properties (the reliability and validity) and to assess the relationship between DF, oral health related behavior and dental status of children.

Methods

Subjects

The convenience sample consisted of 231 12-year old children (110 boys and 121 girls), who attended the Pediatric Dental Department, Public Health Center Čukarica, Belgrade. All the patients of this age, regardless their dental status, number of visits or types of treatment previously received, were invited to participate. Patients with symptoms of acute toothache or any other dental emergency (bleeding, swelling, dental trauma) were excluded from the sample. Children with systemic diseases or/and handicap was also excluded.

The parents of the children who participated signed an inform consent form. This research was in accordance with the Declaration of Helsinki and approved by the Ethical Committee of the Faculty of Stomatology in Pančevo, University Business Academy, Novi Sad, Serbia.

Instruments

We used two questionnaires in our study. The first one consisted of 14 questions which pertained to the sociodemographic characteristics of child (gender, family structure and child's grades in the previous academic year), oral hygiene habits (frequency and duration of brushing, use of fluoride supplements), sugar consumption pattern and dental visits behavior (frequency and reasons of dental visits, avoiding treatment, selfperceived treatment needs).

To assess dental anxiety and fear in children, we used the CFSS-DS. English version was translated into Serbian language (Addendum) and back translated by the two bilingual dentists (translation is available from the first author). We used selfreport version of a scale (children were filling the data, which is opposite to parental-report questionnaire, where parents answer to the same questions in behalf of their children). CFSS-DS consists of 15 items related to various aspects of dental treatment. Each item can be scored on a five-grade scale, from 1 (not afraid) to 5 (very afraid). The responses sums ranged from 15 to 75. The scores of 38 and over are used to be indicative of DF in children¹⁴, and scores of 32 and above of a risk range¹⁵. Accordingly, we classified the subjects into three groups (Table 1): children with low anxiety levels (with CFSS-DS score < 32), moderately anxious children (≥ 32 score ≤ 38), and anxious children (score > 38).

The children filled-in the questionnaires while sitting in the waiting room prior to receiving the treatment.

Table 1 Distribution of subjects according to the Childrens Fear Survey Schedule-Dental Subscale (CFSS-DS) score range, in relating to gender

Anviety levels	Boys	Girls	Total	
Allalety levels	n (%)	n (%)	n (%)	
Low (score < 32)	91 (82.0)	87 (72.5)	178 (77.1)	
Medium $(\geq 32 \text{ score} \leq 38)$	7 (6.3)	13 (10.8)	20 (8.7)	
High (score > 38)	13 (11.7)	20 (16.7)	33 (14.3)	
$r^2 = 3.03 \cdot df = 2 \cdot n = 0.22$	20			

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Clinical data

A single trained dentist recorded dental status of children (number of healthy, decayed, missing and filled teeth – DMFT score) under clinical conditions, using a dental mirror and probe, according to the World Health Organization (WHO) criteria.

Statistical analysis

We used the SPSS statistical software (SPSS for Windows, release 17.0, SPSS, Chicago, IL) for analysis. The data were analyzed regarding the questionnaire variables according to the age and gender and tested with the χ^2 test, Student's *t*-test and one-way ANOVA. Pearson's correlation coefficients were calculated among variables in the total group. The predetermined significance levels were set at 0.05. Cronbach's alpha was used to analyze internal consistency reliability. The exploratory factor analysis was carried out and rotated (Varimax rotation with Kaiser's normalization) to establish the statistical separation of the CFSS-DS items into factors. The decision on the final number of factors was based on the Kaiser's criterion (eigen value > 1).

Results

According to the CFSS-DS score, the majority of children expressed low to moderate dental anxiety (total average score = 26.47 ± 10.33). Only 33 (14.3%) subjects expressed

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Table 2

high dental anxiety with CFSS-DS score above 38 (Table 1). The girls had significantly higher (t = -2.35; df = 229;p = 0.019) mean anxiety score (27.98 ± 10.55) than boys (24.81 ± 9.86) .

The mean DMFT score was 3.42 ± 2.52 (with 1.54 ± 1.90 number of decayed, 0.27 ± 0.71 of missing and 1.60 ± 1.72 of filled teeth). The children with all healthy teeth had significantly lower total mean anxiety score (24.36 ± 8.10) than those with DMFT > 0 (mean anxiety score = 27.23 ± 10.91 ; p = 0.024).

Almost two thirds of the children (73.48%) were satisfied with their oral health at the moment of testing. Mean anxiety scores were higher in children who rated their oral health as "poor" or "very poor" than "good" or "excellent" (df = 3; F = 5.013; p = 0.002).

The majority of the children (79.48%) reported dental visit within last year. The children who reported dental visits within past 12 months had a lower mean anxiety score (25.36 ± 8.80) than those who did not visit the dentist for this period (29.08 ± 11.62) or could not remember $(31.24 \pm$ 15.43; df = 3; F = 3.435; p = 0.018). Most often, the children visited the dentist due to regular check-up (43.23%); 28.38% stated dental pain as main reason; 9.17% reported visits due

to parental insistence and 19.21% of the subjects stated "other reasons" of visits. Higher CFSS-DS scores were obtained in the group of children who mostly visited a dentist due to pain (29.11 ± 11.06) or parental insistence (29.76 ± 13.43) , compared with the children who went for regular check-ups (23.86 ± 7.50) or other non pain-related treatments (26.16 \pm 10.43; df = 3; F = 4.697; p = 0.003).

Table 2 shows the arithmetic means and standard deviations of the results of CFSS-DS components in the sample. The following CFSS-DS items had the highest mean values in our sample: 8) the dentist drilling, 12) choking, 13) having to go to the hospital and 3) anesthesia (injections), while the lowest mean value was recorded for item 4) having someone examines your mouth. The girls expressed significantly higher dental anxiety than the boys in relation to anesthesia (p < 0.01), strangers (p < 0.001), sound of a drill (p < 0.05)and choking (p < 0.05).

Reliability measures

Cronbach's alpha coefficient of internal consistency in the entire CFSS-DS scale was 0.88. The corrected values of item-total correlations are shown in Table 3. The lowest val-

Mean values and standard deviations of	Childrens Fear Su	rvey Schedule-Denta	al Subscale (CFSS-D	S) items
Item	Total	Boys	Girls	- n *
n = 231	mean (SD)	mean (SD)	mean (SD)	- p
1. Dentist	1.70 (0.98)	1.58 (0.93)	1.80 (1.02)	0.092
2. Doctor	1.34 (0.80)	1.24 (0.70)	1.43 (0.87)	0.061
3. Anesthesia (injections)	2.13 (1.20)	1.92 (0.20)	2.33 (1.17)	0.009
4. Having someone examine your mouth	1.21 (0.52)	1.20 (0.51)	1.21 (0.53)	0.925
5. Having to open your mouth	1.24 (0.712)	1.27 (0.78)	1.21 (0.65)	0.525
6. Having a stranger touch you	1.89 (1.10)	1.64 (1.03)	2.12 (1.12)	0.001
7. Having someone look at you	1.33 (0.69)	1.28 (0.68)	1.38 (0.70)	0.323
8. The dentist drilling	2.47 (1.38)	2.29 (1.40)	2.63 (1.34)	0.066
9. The sight of the dentist drill	2.05 (1.31)	1.89 (1.21)	2.20 (1.38)	0.074
10. The sound of the dentist drill	2.04 (1.33)	1.82 (1.24)	2.24 (1.37)	0.015
11. Having dentist put instruments in your mouth	1.84 (1.14)	1.71 (1.03)	1.96 (1.23)	0.097
12. Choking	2.44 (1.42)	2.19 (1.36)	2.67 (1.43)	0.011
13. Having to go to the hospital	2.35 (1.36)	2.23 (1.41)	2.46 (1.30)	0.197
14. People in white uniforms	1.28 (0.78)	1.17 (0.77)	1.28 (0.80)	0.868
15. Having the dentist clean your teeth	1.37 (0.89)	1.41 (0.95)	1.33 (0.82)	0.458
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*p value of independent samples (t-test was used to compare means between boys and girls).

		Table 3	
Corrected values of item-total correlations			
Item	R Item-Total	Cronbach's Alpha if Item Deleted	
1	0.616	0.865	
2	0.507	0.870	
3	0.508	0.870	
4	0.284	0.877	
5	0.569	0.869	
6	0.501	0.869	
7	0.408	0.874	
8	0.661	0.861	
9	0.734	0.857	
10	0.709	0.858	
11	0.658	0.862	
12	0.484	0.872	
13	0.454	0.874	
14	0.476	0.871	
15	0.556	0.868	

ues were found for item 4 ("someone examines your mouth") and item 7 ("someone is looking at you"). In factor analysis (principal component analysis and Varimax rotation with Kaiser normalization) the 3 groups of factors were extracted with eigen values above 1, which explained 59.11% of variance. The results of analysis are shown in Table 4. The first factor explain 22.91% of variance and a high correlation with CFSS-DS item related to the use of dental drill. The second factor explain 21.23% of variance and correlation with fear of doctors, opening the mouth, being watched by strangers, people in white uniforms. The third factor explain 14.97% of variance. It was related to the CFSS-DS items pertaining to the choking, being touched by the strangers and going to the hospital.

Factor analysis on CFSS-DS in studies of DF in children has been reported in the literature ¹⁹. In samples not selected for high DF, three factors of DF have been indicated: fear of highly invasive dental procedures, fear of less invasive aspects of treatment, and fear of medical aspects and strangers ^{18, 20, 21}. In a study of highly DF children, a stronger four-factor pattern explaining 60% of the variance was found: fear of general, less invasive aspects of dental treatment, fear of medical aspects, fear of drilling, and fear of strangers (including choking) ²².

The factor structure of Serbian version of CFSS-DS scale revealed 3 groups of factors that explained 59.11% of variance. Not a single factor precedes in explaining the total variance of results, which is similar to the study from Japan¹⁸. The first factor was related to the usual dental situations (the sight and sound

Rotated factorial matrix				
		Factors		
Components	1	2	3	
1. Dentist	0.471	0.521	0.170	
2. Doctor	0.184	0.762	0.083	
3. Anesthesia/injections	0.363	0.377	0.260	
4. Having somebody examine your mouth	0.190	0.499	-0.143	
5. Having to open your mouth	0.186	0.723	0.259	
6. Having a stranger touch you	0.167	0.160	0.762	
7. Having somebody look at you	-0.135	0.655	0.429	
8. The dentist drilling	0.882	0.150	0.111	
9. The sight of the dentist drilling	0.881	0.222	0.149	
10. The noise of the dentist drilling	0.854	0.144	0.240	
11. Having somebody put instruments in	0.644	0.235	0.331	
Your mouth				
12. Choking	0.224	0.068	0.774	
13. Having to go to the hospital	0.230	0.142	0.603	
14. People in white uniforms	0.077	0.595	0.345	
15. Having the dentist clean your teeth	0.354	0.661	0.067	
(%) of variance explained	22.91	21.23	14.97	
Eigen value	5.872	1.703	1.292	

Correlations

The Pearson's correlation coefficients showed a significant correlation between the CFSS-DS score and gender (r = 0.163, p = 0.013), daily frequencies of sugar intake (r = 0.200, p = 0.003), frequency of dental attendance (r = 0.162, p = 0.014), self-rated oral health (r = 0.209, p = 0.001) and DMFT (r = 0.185, p = 0.005).

Discussion

Although the topic clearly deserves close attention as the crucial dental public health issue¹³, little is known about dental fear among children in Serbia. As cultural and social norms of behavior can affect the development and expression of children's fear, and as dental care systems can vary considerably across cultures, normative data in each culture are needed. The Serbian version of CFSS-DS had high Cronbach's coefficient of internal consistency ($\alpha = 0.88$), which was in accordance with the findings of the authors from Croatia ($\alpha = 0.83$)¹², Bosnia ($\alpha = 0.86$)¹⁶, Greece ($\alpha = 0.85$)¹⁷, Japan ($\alpha = 0.91$)¹⁸ and Taiwan ($\alpha = 0.94$)¹³.

of a drill, and drilling) and explained 22.91% of variance. The factor II explained 21.23% of variance in our study and it correlated with the fear of doctors. This factor was also related to the non-invasive dental procedures and being looked at. The third factor explained 14.97% of variance and it was related to choking, strangers and going to the hospital. The similar three factors have been reported in other populations (the Netherlands²⁰, Finland²¹). The factor four was reported in the study on Chinese immigrants in Canada, and the additional factor was related to the fear of being looked at or touched²³. In a Bosnian version of CFSS-DS the fourth factor was also related to unusual situations that did not belong to usual experiences in dental office or hospital surrounding¹⁶.

In our study the girls had significantly higher anxiety scores than boys, which is similar to the findings of Majstorovic et al.²⁴ and Nakai et al.¹⁸. Children with irregular dental attendance pattern or those who needed dental treatment due to decay also expressed higher DF. In a study of Milsom et al.²⁵ DF was closely associated with asymptomatic, irregular attendance pattern, a history of extraction and having a dentally anxious parent.

We used a self-report version of CFSS-DS questionnaire in children aged 12, although the parental reports are more often used with children under 13 years of age ⁷. However, all the subjects were able to answer the questions, indicating that the questions were understandable and clear. The limitation of this study is the use of the suitable sample. Therefore, this study should be considered a prospective one, and the results regarding prevalence of high dental fear and DMFT score values could not be generalized to the entire population of Serbian twelve years old schoolchildren. On the other hand, the reliability and validity of Serbian version of CFSS-DS questionnaire could be considered satisfying. The cause and effect dynamics of relationships found between dental anxiety, dental status and visiting patterns need to be further investigated.

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Conclusion

Dental health professionals need to understand the dynamic nature of child dental anxiety in order to appreciate hidden feelings and underlying complexity associated with anxious child patients. Anxious children tend to avoid regular dental check-up, more frequently visit dentist due to pain or parental insistence and have more impaired teeth.

The Children Fear Survey Schedule Dental Subscale questionnaire is a reliable and valid psychometric instrument for dental fear evaluation in Serbian children, due to its further application for research of dental fear and numerous associated factors.

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Addendum

Zaokruži samo jedan broj (1, 2, 3, 4 ili 5) koji označava koliko se plašiš navedenih osoba ili situacija:					
1. Koliko se plašiš stomatologa?	1 – ne bojim se	2 - malo	3 – bojim	4 – mnogo	5 – veoma
		se bojim	se prilično	se bojim	mnogo se bojim
2. Koliko se plašiš lekara?	1 no hojim so	2 - malo	3 – bojim	4 – mnogo	5 – veoma
	1 – lie bojili se	se bojim	se prilično	se bojim	mnogo se bojim
 Koliko se plašiš injekcija / 	1 na hojim sa	2 - malo	3 – bojim	4 – mnogo	5 – veoma
anestezije?	1 – ne bojim se	se bojim	se prilično	se bojim	mnogo se bojim
 Koliko se plašiš kada ti neko 	1 – ne hojim se	2 - malo	3 – bojim	4 – mnogo	5 – veoma
pregleda zube?	1 – lie bojili se	se bojim	se prilično	se bojim	mnogo se bojim
5. Koliko se plašiš kada treba da ot-	1 – ne hojim se	2 - malo	3 – bojim	4 – mnogo	5 – veoma
voriš usta kod stomatologa?	1 – lie bojili se	se bojim	se prilično	se bojim	mnogo se bojim
Koliko se plašiš kada te dodirne	1 – ne hojim se	2 - malo	3 – bojim	4 – mnogo	5 – veoma
neko nepoznat?	1 – lie bojili se	se bojim	se prilično	se bojim	mnogo se bojim
7. Koliko se plašiš kada neko nepres-	1 – ne hojim se	2 - malo	3 – bojim	4 – mnogo	5 – veoma
tano gleda u tebe?	1 – lie bojili se	se bojim	se prilično	se bojim	mnogo se bojim
 Koliko se plašiš kada stomatolog 	1 no hojim so	2 - malo	3 – bojim	4 – mnogo	5 – veoma
radi sa bušilicom u tvojim ustima?	1 – lie bojili se	se bojim	se prilično	se bojim	mnogo se bojim
9. Koliko se plašiš kada vidiš stoma-	1 – ne bojim se	2 - malo	3 – bojim	4 – mnogo	5 – veoma
tološku bušilicu?	i në bojini se	se bojim	se prilično	se bojim	mnogo se bojim
10. Koliko se plašiš kada čuješ zvuk	1 – ne hojim se	2 - malo	3 – bojim	4 – mnogo	5 – veoma
stomatološke bušilice?	1 – lie bojili se	se bojim	se prilično	se bojim	mnogo se bojim
11. Koliko se plašiš kada stomatolog	1 – ne hojim se	2 - malo	3 – bojim	4 – mnogo	5 – veoma
unese instrumente u tvoja usta?	i në bojini se	se bojim	se prilično	se bojim	mnogo se bojim
Koliko se plašiš gušenja	1 – ne hojim se	2 - malo	3 – bojim	4 – mnogo	5 – veoma
(davljenja)?	1 – lie bojili se	se bojim	se prilično	se bojim	mnogo se bojim
 Koliko se plašiš kada treba da 	1 – ne hojim se	2 - malo	3 – bojim	4 – mnogo	5 – veoma
ideš u bolnicu?	1 – lie bojili se	se bojim	se prilično	se bojim	mnogo se bojim
14. Koliko se plašiš kada vidiš ljude	1 no hojim co	2 - malo	3 – bojim	4 – mnogo	5 – veoma
u belim mantilima?	1 – lie bojili se	se bojim	se prilično	se bojim	mnogo se bojim
15. Koliko se plašiš kada ti stomato-	1 – ne hojim se	2 - malo	3 – bojim	4 – mnogo	5 – veoma
log mašinski pere zube?		se bojim	se prilično	se bojim	mnogo se bojim

Serbian version of CFSS-DS questionnaire