

Full Length Research Paper

Dental anxiety in middle school children and their caregivers: Prevalence and severity

Sumer Alaki^{1*}, Alanoud Alotaibi¹, Eman Almadadi² and Ebtehal Alanquri¹

¹Faculty of Dentistry, King Abdul-Aziz University, Jeddah, Saudi Arabia.

²Faculty of Dentistry, Taibah University, Almadnah Almunawarah, Saudi Arabia.

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This study was aimed at assessing the prevalence and severity of dental anxiety among middle school children and their caregivers in Jeddah city, Saudi Arabia. A cross-sectional study was conducted with 518 middle school children aged 11 to 15 years and 88 caregivers in the city of Jeddah. The Norman Corah's Dental Anxiety Scale (DAS) was used to measure dental anxiety among the study group as well as a questionnaire asking about specific dental procedures. Nearly 34% of participating children had high and severe dental anxiety. There was a positive correlation between DAS in caregivers and that in their children ($r = 0.34$, $p = 0.001$). Children were mostly anxious about teeth extractions while caregivers were anxious about root canal treatment. Dental anxiety was significantly associated with gender and school type ($p = 0.05$ each). Female children demonstrated significantly greater DAS compared to males ($p = 0.05$) and were also more anxious about most specific dental procedures in the provided questionnaire. Children in public schools showed more severe anxiety than those in private schools ($p = 0.05$). Dental anxiety in middle school children is high and correlated with that of their caregivers and is associated with gender and school type.

Key words: Anxiety, children, caregivers.

INTRODUCTION

Fear is generally defined as an individual's response to a real threatening event or dangerous situation to protect his or her life (Bay and Algase, 1999). Dental fear has been ranked fourth among common fears (Milgrom and Weinstein, 1993). Its intensity varies from nervousness and anxiety to dental phobia. Dental fear has been also reported as one of the most important reasons for avoidance and negligence of regular dental care (Chellappah et al., 1990). Avoidance of dental care may lead to a vicious circle with the patient's dental problems mounting and leading to more unpleasant dental visits (Ingersoll, 1982). Anxious individuals are generally uncooperative during dental visits, cancel more dental appointments, and develop lower pain threshold (Ingersoll, 1982). Non-anxious adolescents have been

reported to have lower caries severity and incidence (Kruger et al., 1998).

The prevalence of dental anxiety has been reported to range from 5 to 20% in various countries (Ter-Horst and Wit, 1993). Several studies have demonstrated that dental anxiety in children was significantly associated with parental anxiety (Wigen et al., 2009) and it has been found that women tend to report more dental fear than men (Ter-Horst and Wit, 1993) and younger people being more dentally fearful than older individuals (Ter-Horst and Wit, 1993; Rowe, 2005). People tend to report being more fearful of more invasive procedures, such as tooth extractions and oral surgery treatment (Wong and Lytle, 1991). The assessment of dental fear is an extremely useful tool to dentists to customize behavioral management techniques for their patients (Ter-Horst and Wit, 1993; Corah, 1969). The aims of this study were to:

*Corresponding author. E-mail: sumeralaki@msn.com. Tel: (+966) 569342754.

1. Assess the prevalence and severity of dental anxiety among middle school students and their caregivers in

Table 1. The distribution of children by socio-demographic variables.

Variable		Frequency	Percent	
Age (years)	12	33	6.4	
	13	208	40.2	
	Others*	277	53.5	
Gender	Male	317	61.2	
	Female	201	38.8	
Grade	7 th	257	49.6	
	8 th	261	50.4	
Type of school	Public	Male	179	34.6
		Female	147	28.4
	Private	Male	138	26.6
		Female	54	10.42
Total		518	100	

Jeddah City, Saudi Arabia.

2. Assess the correlation between children's dental anxiety and that of their caregivers.
3. Assess which dental procedures elicited the most anxiety in children and their caregivers.

METHODS

This study was approved by the Deanship of Scientific Research at King Abdul-Aziz University, Jeddah, Saudi Arabia. The participation of each subject was voluntary and informed consent was obtained from all participants.

Study design

This cross-sectional study was conducted between May and July 2010, in four middle schools in Jeddah. The schools were chosen so that two were for females and two for males (male and female schools are segregated in Saudi Arabia). One public and one private school were chosen for each gender. Letters explaining the nature of the study along with consent forms and questionnaires were sent to participating students and their caregivers through their schools. Reminder letters were sent to non-responders two weeks later. The questionnaires contained questions about a variety of demographic variables as well as the Dental Anxiety Scale (DAS).

Measuring dental anxiety

Dental anxiety in children was measured using the Dental Anxiety scale (DAS), also known as the Norman Corah scale which was developed in 1969⁽¹⁰⁾. Participants answered four questions with each having five multiple choice items. The questions asked about various situations or procedures which can be encountered at the dental office. The multiple choice items were scored as A = 1, B = 2, C = 3, D = 4, E = 5; with (A) being a level of no anxiety and (E)

representing the maximum level of anxiety possibly felt towards the specific dental situation or procedure. The total score for the Norman Corah scale ranges from 4 to 20 and anxiety ratings are classified as: 4 to 8 = no anxiety, 9 to 12 = moderate anxiety, 13 to 14 = high anxiety and 15 to 20 = severe anxiety.

Dental anxiety in both children and their caregivers was also assessed using a second questionnaire which included a set of 26 items also asking about various situations and procedures which can be encountered at the dental office. Copies of the questionnaire were distributed to all participating children and their caregivers. All 7 and 8th graders of the selected schools were included in the study. The investigators explained the nature of the study to students in their classrooms as well as the questionnaires before the commencement of the study including dental procedures unknown to some children. Also, another copy of the questionnaire was sent to each child's caregiver to fill. Only 88 copies were returned by caregivers after sending another reminder letter.

Statistical analysis

The data was analyzed using SPSS version 14 software for Windows. Descriptive statistics, non-parametric statistics (Pearson chi square) were performed. Regression models were done with the independent variables being age, gender, class and school type and the dependent variable being the Norman Corah's dental anxiety SCALE. The level of significance was set at < 0.05.

RESULTS

The sample contained a total of 518 children aged 11 to 15 years; 317 males (61.2 %) and 201 females (38.8 %) who attended 7 and 8th grades (49.6, 50.4% respectively). The distribution of children by their demographic variables is shown in Table 1.

Out of 1036 questionnaires distributed to children and caregivers, 606 were returned (a total response rate of 58.5%). Of the total number of distributed questionnaires 85.5% were turned in by the children and 14.5% by their caregivers. Table 1 show that the sample contained more males than females, more 13 year old children than other age groups and more children from public schools.

Our results show that nearly 34% of participating children suffered from high and severe dental anxiety. Table 2 shows the association between dental anxiety and socio-demographic variables based on the ranges of the Norman Corah's total score. No significant association was found between DAS and the child's age or grade ($p = 0.84$, $p = 0.795$, respectively). Female children demonstrated significantly greater DAS compared to males (37.8 versus 11.4, $p = 0.05$). More females scored severe and high DAS compared to males. The DAS was also found to be significantly associated with the type of school with 30.4% of children in public schools having severe anxiety compared to only 6.8% in private schools ($p = 0.05$). Results even show significant variations between male and female children with regards to specific dental procedures (Table 3). Females were significantly more anxious about nearly most individual dental procedures compared to males with the exception of periodontal charting where males

Table 2. The association between dental anxiety and socio- demographic variables based on the range of the Norman Corah's total score.

Norman Corah's scale	Child age (Years)			Child gender		Type of school		Total n (%)
	12 n (%)	13 n (%)	Others n (%)	Male n (%)	Female n (%)	Public n (%)	Private n (%)	
4 - 8 No anxiety	11 (33.3)	72 (34.6)	85 (30.7)	140 (44.2)	28 (13.9)	76 (23.3)	92 (47.9)	168 (32.4)
9 - 12 Moderate anxiety	12 (36.5)	64 (30.7)	96 (34.7)	115 (36.3)	57 (28.4)	101 (31)	71 (37)	172 (33.2)
13 - 14 High anxiety	2 (6.1)	26 (12.5)	38 (13.7)	26 (8.2)	40 (19.9)	50 (15.3)	16 (8.2)	66 (12.7)
15 - 20 Severe anxiety	8 (24.2)	46 (22.1)	58 (20.9)	36 (11.4)	76 (37.8)	92 (30.4)	13 (6.8)	112 (21.6)
χ^2		2.782			90.018		59.634	
p value		0.836			0.000**		0.000**	

***Statistically significant at p = 0.05.

Table 3. Dental procedures eliciting the highest dental anxiety by gender.

Dental procedure	Number of children fearful of dental procedure		χ^2	p-value
	Male {n (%)}	Female {n (%)}		
Sound of hand piece	45 (14.2)	85 (42.3)	55.4	0.000**
Insufficient anesthesia	80 (25.3)	67 (33.7)	5.61	0.133
Unpleasant feeling after anesthesia	51 (16.1)	42 (21.6)	3.97	0.265
Needle injection	76 (24.0)	98 (50.5)	38.26	0.000**
Periodontal charting	37 (11.7)	19 (9.6)	57.9	0.000**
Sound of scaler	74 (23.3)	78 (39.2)	35.65	0.000**
Impression	49 (15.5)	30 (15.5)	55.75	0.000**
X-ray	18 (5.7)	11 (5.6)	23.15	0.000**
Rubber dam	23 (7.3)	13 (6.7)	1.23	0.000**
Prolonged procedure (mouth opening)	70 (22.1)	73 (37.6)	17.1	0.001
Cold air during treatment	54 (17)	43 (21.9)	2.25	0.523
Insufficient information about treatment	57 (18.0)	70 (35.5)	22.10	0.000**
Root canal treatment (RCT)	116 (36.6)	98 (49.5)	32.92	0.000**
Extraction	138 (43.5)	124(64.6)	22.95	0.000**
Injury	99 (31.2)	86 (43.9)	9.97	0.019**
Getting frightened	46 (14.5)	54 (27.6)	19.63	0.000**
Inability to stop the dentist	58 (18.3)	79 (39.7)	32.7	0.000**
Unable to ask questions	45 (14.2)	58 (29.4)	26.44	0.000**
Not listening to the patient	43 (13.6)	65 (33.0)	28.26	0.000**
Insulting the patient	37 (11.7)	56 (28.6)	39.16	0.000**
The need for further treatment	49 (15.5)	59 (29.9)	17.62	0.001**
The smell of dental office	54 (17.0)	86 (44.1)	45.54	0.000**
The cost of treatment	37 (11.7)	31 (15.7)	7.48	0.06
The need for further appointments	36 (50.0)	36 (50.0)	6.34	0.096
Embarrassment about the condition of the mouth	50 (15.8)	29 (14.7)	10.12	0.018**
Feeling restraint and loss of control	42 (13.2)	50(25.6)	16.84	0.001**

** Statistically significant at p = 0.05.

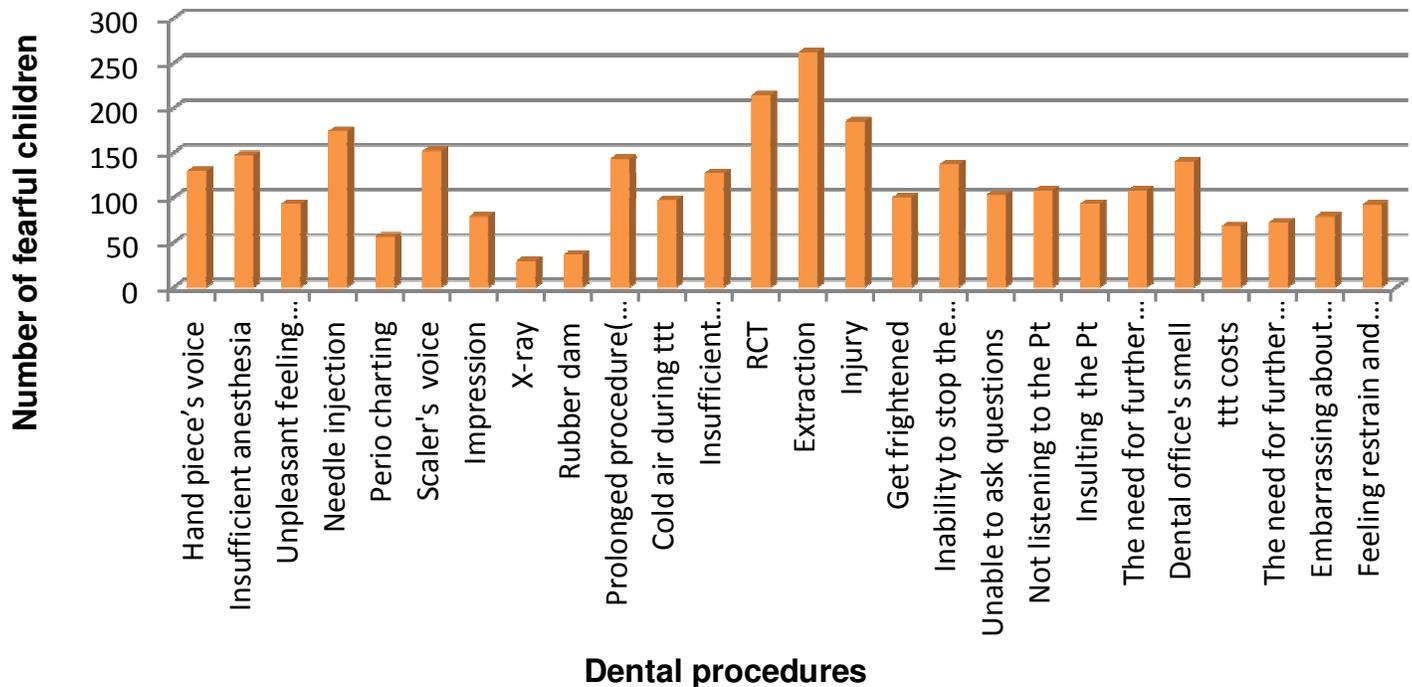


Figure 1. Dental procedures eliciting the highest anxiety in children.

were more anxious ($p = 0.000$).

When children and caregivers were asked about dental procedures which elicited the most anxiety results showed that children were more anxious about dental extractions (43.5% of males and 64.6% of females), followed by root canal treatment (RCT) (36.6% of males and 49.5% of females), fear of dental injury (31.2% of males and 43.9% of females), then dental injections (24.0% of males and 50.5% of females), (Figure 1). Caregivers however were more anxious about root canal treatment, followed by extractions then the cost of dental treatment (Figure 2). There was a significant positive correlation between DAS in caregivers and that in their children ($r = 0.34$, $p = 0.001$).

The regression model with the independent variables being age, gender, class, and school type showed that none of these variables was a significant predictor of DAS in children or their caregivers.

DISCUSSION

Review of literature indicates shortage of information on the prevalence of dental fear in Saudi children. This study shows that a big percentage of middle school children suffered from high and severe dental anxiety. This is higher than that found in other countries such as the United Kingdom (7.1%) or Singapore (20.8%) for example (Bedi et al., 1992; Teo et al., 1990). This may be due to the fact that Saudi children do not get exposed to

dentistry at an early age; a fact that has been shown to reduce dental anxiety (Schwarz, 1990).

The lack of association between the child's age and dental anxiety is not surprising because participating children were relatively close in age. This finding is in accord with previous literature (Hagglin et al., 1999). The results of this study reveal that females have more dental anxiety which has been found by other studies (Weinstein et al., 1973; Al-Madi and AbdelLatif, 2002; Humphris et al., 1995; Taani, 2002). This link may be due to the fact that females are more prone to having higher levels of neuroticism and anxiety is positively associated with neuroticism (Stecher, 2004; Freeman, 1999; Freeman, 1998).

The fact that children in private schools demonstrated less anxiety levels can be explained by the fact that these children and their caregivers were more aware of oral health and that their dental needs were generally less complex and involved less invasive procedures. The positive correlation between dental anxiety in children and their caregivers has been reported by previous studies (Themessl-Huber et al., 2010).

Teeth extractions were found to be the highest cause of dental anxiety among participating children and this finding is not surprising in comparison to the literature (Manju et al., 1988). This can be due to many factors namely, lack of confidence in providing a painless treatment, fear of injection and fear of tooth loss (Manju et al., 1988). On the other hand, root canal treatment was the most feared procedure by caregivers which can be

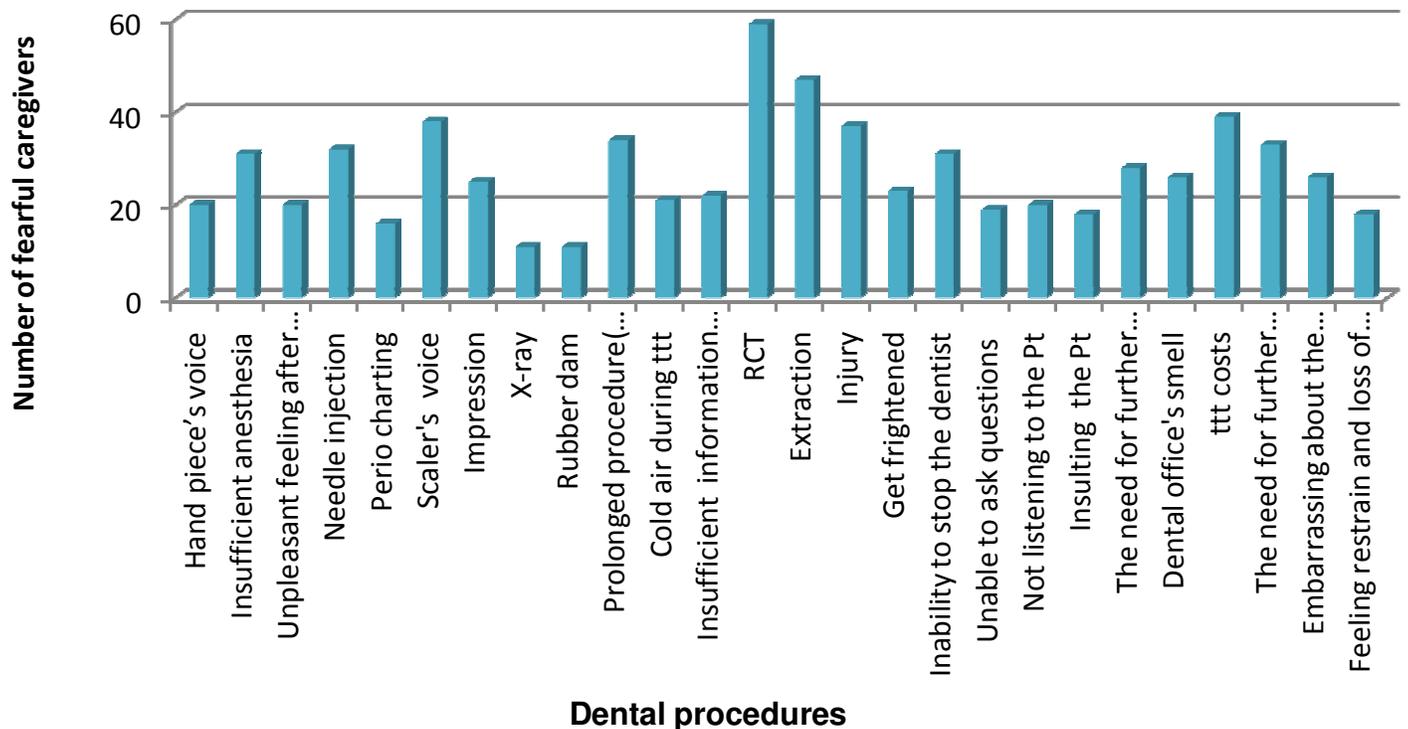


Figure 2. Dental procedures eliciting the highest anxiety in caregivers.

explained by the fact that at the age of caregivers there is generally more root canal treatments provided compared to extractions.

This study supports the need for more dental training on the management of dental anxiety in patients especially children. It also draws the attention to the effect which caregivers' anxiety may have on their children and that controlling it might be the first step in reducing children's dental anxiety. The anxious patient needs special attention and using tools, such as the Norman Corah's dental anxiety scale may help the clinician decide if the patient's needs can be met in the dental practice or if he or she might need further management techniques such as sedation or even hospitalization.

Conclusions

The results of this study show that:

1. A significant percentage of middle school children suffered from high and severe dental anxiety.
2. Dental anxiety in middle school children is associated with gender and type of school.
3. Children are mostly anxious about teeth extractions while caregivers are anxious about root canal treatment.
4. Caregivers' anxiety is positively correlated with that of their children.

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