Prevalence and Predictive Factors of Dental Anxiety in Brazilian Adolescents

Ricardo Wathson Feitosa de Carvalho, DDS, MSc Paulo Germano de Carvalho Bezerra Falcão, DDS, MSc Gustavo José de Luna Campos, DDS, MSc Emanuel Sávio de Souza Andrade, DDS, MSc, PhD Belmiro Cavalcanti do Egito Vasconcelos, DDS, MSc, PhD Maria Auxiliadora da Silva Pereira, DDS, MSc

ABSTRACT

Purpose: The purpose of this study was to determine the prevalence and predicitve factors of dental anxiety among Brazilian adolescents.

Methods: This was a cross-sectional study of a random sample of 340 Brazilian adolescents, done between 2005 and 2010. Corah's Dental Anxiety Scale and an objective questionnaire were used to determine the degree of dental anxiety.

Results: The prevalence of moderate to severe dental anxiety was approximately 18%. Dental anxiety was correlated with the following factors: gender (P<.05), age group (P<.001), degree of schooling (P<.001), access to newspapers and/or the Internet (P<02), oral hygiene frequency (P=.005), visits to the dentist (P<.02), reason for last visit to the dentist (P<.001), and experience with dental pain (P=.002).

Conclusions: Dental fear and anxiety in Brazilian adolescents are associated with lack of economic resources, negligence of oral health, low educational level, female gender, and younger age. (J Dent Child 2013;80(1):41-6)

Received August 4, 2011; Last Revision October 5, 2011; Revision Accepted February 5, 2012.

Keywords: dental anxiety, dental care, adolescent, child, prevalence

ver the centuries, the expectation of pain during dental treatment has been a source of fear and anxiety.¹ While the scientific literature has demonstrated significant progress in dental treatment,² patients often exhibit a high degree of anxiety. Fear seems to be a natural reaction, as dental treatment may cause pain.

Despite advances in the control of pain throughout the world, data on the prevalence of dental treatment anxiety in adults remain at 10% to 15%.^{2,3} Studies involving children report a prevalence of approximately 7% to 15%.^{4,5} The lack of studies on the prevalence of dental anxiety, specifically among adolescents, remains a significant obstacle to a consistent portion of the population, leading to the avoidance of dental care.⁶

Considering the negative impact anxiety exerts on dental care and the lack of data on adolescent dental anxiety, the present study intended to determine its prevalence among adolescents in Brazil and to find predictive factors in this population.

METHODS

The primary sampling places for the study were 2 dental schools in Aracaju, Brazil. Aracaju is the state capital with the highest level of quality of life in Brazil⁷ and has 2 universities (1 federal and 1 private) that offer free

Drs. Carvalho, Falcão, and Campos are researchers, Department of Oral and Maxillofacial Surgery; Dr. Andrade is a professor and associate dean; and Dr. Vasconcelos is director of the PhD program and dean, all at the Pernambuco School of Dentistry, University of Pernambuco, Recife, Brazil; and Dr. Pereira is a professor, Department of Social and Public Health Dentistry, School of Dentistry, Federal University of Sergipe, Aracaju, Brazil.

Correspond with Dr. Carvalho at wathson@ig.com.br

dental services of quality to the local community with a combined average of 100 appointments per day. These schools have outpatient care in all dental specialties with a varied demand for each clinic. Random selection by lots was performed for the independent determination of the days of the week and times of the day in which data collection would be carried out.

For each day of the study, a maximum of 10 patients were invited to participate (10% of average number of daily appointments). All patients were approached individually by a single examiner. Only patients between 12 and 18 years of age were included. The exclusion criteria were: patients younger than 12 years and older than 18 years, females in a period of gestation/lactation/menstruation, patients who were unaccompanied by legal guardians, those who had systemic diseases and/or special needs; patients or legal guardians who were unable to understand the objectives of the study; who didn't agree with the methodology and who filled out the questionnaire incompletely. A legal guardian, signed the informed consent to participate in the study, which received approval from the ethics committee of the Tiradentes University, Aracaju, Brazil (Project n° 001/10/04). A questionnaire was used to elicit socioeconomic, demographic, and behavioral variables as well as factors related to oral health and dental services. This questionnaire was administered by a single examiner and filled out completely while the patients awaited treatment.

ASSESSMENT OF DEGREE OF ANXIETY

Different means of assessing dental anxiety have been employed. The present study used Corah's Dental Anxiety Scale (Figure 1), which has been the most widely used measure for assessing dental anxiety since the 1970s.^{8,9} This scale provides an objective determination of the degree of anxiety through the sum of answers provided for multi-item questions. The measure has been validated for the Portuguese language¹⁰ and has demonstrated adequate internal consistency and test-retest

,,,	a had to go to the dentist tomorrow, now would you reen
1.	Fine. It wouldn't bother me.
2.	I would be slightly worried.
3.	I would be uneasy about it.
4.	I would be afraid of what might happen.
5.	I would be very apprehensive. I wouldn't be able to sleep well.
Whe	n you are in the waiting room waiting for the dentist to call you, how do you feel?
1.	Calm, relaxed.
2.	A little uneasy.
3.	Tense.
4.	Anxious or afraid.
5.	So anxious or afraid that I break out in a sweat and feel almost physically sick.
Whe	n you are in the dentist's chair waiting for the dentist to begin the local anesthesia
proc	edures, how do you feel?
1.	Calm, relaxed.
2.	A little uneasy.
3.	Tense.
4.	Anxious or afraid.
5.	So anxious or afraid that I break out in a sweat and feel almost physically sick.
You	are in the dentist's chair, already anesthetized. While you are waiting for the
dent	ist to get the instruments to begin the procedure, how do you feel?
	Online realistics of

Figure 1. Multi-item Questions on Corah's Dental Anxiety Scale.8

reliability. For the interpretation of the degree of dental anxiety, patients scoring fewer than 5 points were considered nonanxious, 6 to 10 points were considered mildly anxious, 11 to 15 points were considered moderately anxious and over 15 points were considered highly anxious.⁸

A second examiner, who had no contact with the patients in the data collection phase and no knowledge regarding the days and times of day in which the data were collected, stored the questionnaire answers in a databank using Microsoft Office Excel 2010 software (Microsoft Corp, Redmond, Wash.)

STATISTICAL ANALYSIS

A multivariate logistic regression model was used to explain each of the independent variables, patient characteristics, and degree of dental treatment anxiety. A model was first adjusted for each response variable, considering all independent variables with a 5% level of significance (P<.05). The final model was adjusted using the backward stepwise procedure, with variables having up to a 5% level of significance (P<.05) remaining in the model. The SPSS 14.0 software (SPSS Inc., Chicago, Ill.) was used for statistical analysis.

RESULTS

A total of 340 adolescents were surveyed between March 2005 and March 2010. The sample was predominantly female, with approximately 15% more girls than boys (197 girls and 143 boys). Most of the study patients were between 12 and 14 years old (mean=13.8±2.4 years old). Approximately 70% of the sample resided in Aracaju. The predominant degree of schooling was elementary school (complete or not). The predominant monthly family income ranged from 260 to 520 Brazilian reais, which classifies them as low-income. Only approximately 6% of the sample belonged to the middle and upper classes. Most participants (58%) reported having access to newspapers and/or the Internet. Almost 70% of the patients brushed their teeth twice a day. The majority experienced dental pain at least once (58%) and did not know anyone who had experienced pain during dental treatment in their lifetime (59%) (Table 1).

When asked about previous experience with dental treatment, 3 in each 7 adolescents reported never having been to the dentist before. The most common reason for the last previous dental appointment was to obtain curative treatment, i.e., urgent care, restoration, extraction and/or root canal treatment. Three out of 4 adolescents reported they knew the type of dental treatment they would be undergoing. Most arrived to the dental office prior to the scheduled time (94%), most frequently 30 minutes (Table 2). Approximately 18% of the participants exhibited a moderate to severe degree of dental anxiety (Figure 2).

In the bivariate analysis of the variables that exhibited a 15% level of significance, the odds ratios revealed that

Table 1.	Distribution and Correlation According to Patient
	Characteristics and Degree of Dental Anxiety

Patient characteristics		Degree		Total	P-value			
	Very mild (%)	Mild (%)	Moderate (%)	Extreme (%)	n (%)			
Gender								
Female Male	61 39	56 44	76 24	47 53	197 (58) 143 (42)	<.05*		
Age group (years)								
12-14 14-16 16-18	47 40 13	45 41 14	63 30 7	67 23 10	169 (50) 116 (34) 55 (16)	<.001*		
Place of residence								
Interior Capital	35 65	25 75	47 53	24 76	107 (32) 233 (68)	<.06		
Degree of schooling								
Illiterate/semi-illiterate Elementary (complete or not) High school (complete or not) Other	17 73 5 5	29 65 3 3	41 55 0 4	15 85 0 0	14 (4) 244 (72) 65 (19) 17 (5)	<.001*		
Monthly household income (Brazilian reais)								
<260 260-520 521-1,000 >1,000	35 47 11 7	22 57 13 8	50 22 24 4	21 47 22 10	44 (13) 152 (44) 125 (37) 19 (6)	<.13		
Access to newspapers and/or In	ternet							
No Yes	34 66	40 60	67 33	62 38	143 (42) 197 (58)	<.02*		
Oral hygiene frequency (per day	y)							
1x 2x 3x >3x	11 84 5 0	19 78 1 2	13 74 9 4	15 55 15 15	15 (4) 232 (68) 71 (21) 22 (7)	.005*		
Previous dental pain experience								
No Yes	46 54	48 52	27 73	22 78	143 (42) 197 (58)	.002*		
Knowledge of someone who rej	ported pain du	iring den	tal treatment					
No Yes	50 50	42 58	76 24	53 47	202 (59) 138 (41)	<.13		
Total	100	100	100	100	100 (340)			

* Statistically Significant at 5%.

Table 2. Distribution and Correlation According to Patients' Dental Experience and Degree of Dental Anxiety

Dental experiences	Degree of anxiety				Total	P-value			
	Very mild (%)	Mild (%)	Moderate (%)	Extreme (%)	n (%)				
Have you ever been to the dentist before?									
No	41	48	72	74	32	<.02*			
Yes	59	52	28	26	68				
Reason for last appointment									
Prevention	33	40	33	39	42				
Curative treatment	67	60	67	61	58	<.001*			
Do you know what treatment you will undergo?									
No	16	22	14	19	17	. 64			
Yes	84	78	86	81	83	<.04			
What time did you arrive for the appointment?									
30 mins before	60	48	50	85	60				
30-60 mins before	12	16	9	4	12	<.09			
>60 mins before	21	30	36	7	22				
Other	7	6	5	4	6				
Total	100	100	100	100	100				

* Statistically Significant at 5%.

the likelihood of dental anxiety in the present sample was greater among females (P<.05), those between 12 and 14 years old (P<.001), those with a lower level of schooling (P<.001), those with no access to newspapers or the Internet (P<.02), those with a low frequency of oral hygiene (P=.005), those who had never been to the dentist (P<.02), those for whom the reason for the last visit to the dentist was curative treatment, dental pain, or another problem other than a checkup (P<.001), and those with a history of dental pain (toothache; P=.002).

DISCUSSION

Anxiety is an important obstacle to health care and constitutes a serious epidemiological challenge to oral health care professionals.¹¹ The impact that dental anxiety can have on an individual's life is broad and dynamic,⁶ leading to the avoidance of dental care and unwanted effects, such as sleep disorders, low self-esteem, and psychological problems.^{12,13} Fear of visiting the dentist is common, even among adults, and is one of the most important issues for dentists regarding child and adolescent patients.¹⁴ It is not yet clear why some children and adolescents become anxious when facing treatment, while others do not.¹⁵

Klingberg and Broberg¹⁶ estimated a 9% prevalence of dental anxiety worldwide. The present study showed high levels of dental anxiety among adolescents, revealing a prevalence similar to that reported for adults^{2,3} and higher than that reported for children.^{4,5}

The female gender is often considered to be more concerned with health in terms of both maintenance and curative treatment. In the present study, female adolescents sought dental treatment more often than males and were significantly more likely to report a high level of anxiety (P<.05), which is consistent with findings by Klingberg and Broberg.¹⁶ A study involving children, however, reported no statistically significant difference in anxiety scores between boys and girls.⁵

This study found a greater frequency of dental anxiety among 12- to 14-year-olds (P<.05) and those who had never been to the dentist (P<.05). This shows that the prevalence of dental anxiety diminishes with age and as a consequence of early visits to the dentist, which has also been reported for the child population.^{4,5} In adults, there appears to be a positive association between an increase in age and increased anxiety. This may be explained by the fact that dentists currently treat adults who, as children, visited dental offices lacking technology that enabled stress-free dental care, which is quite different from the situation today's teenagers face.

There was no statistically significant correlation between dental anxiety and place of residence (capital vs. interior). Anxiety scores were higher, however, among those with a lower level of schooling (P<.05), a low household income (P<.13), and no access to newspapers and/or the Internet (P<.05). These findings suggest that level of schooling, social class, and lack of economic resources in developing countries, such as Brazil, may increase the degree of stress, unlike what is seen in developed societies.

The majority of participants reported performing dental hygiene only twice a day, demonstrating that the key factor in the maintenance of adequate oral health is often neglected. A significant association was found between a low frequency of tooth-brushing and higher levels of anxiety (P<.05), likely due to the fact that individuals with poor oral hygiene habits are more prone to caries and toothaches.¹⁷ Cinar and Murtomaa¹⁸ reported that an adequate frequency of oral hygiene (i.e., after meals), a diet low in cariogenic foods, and high self-esteem exert a positive influence over dental anxiety.

In Brazil, dental care is becoming demystified as a privilege of the higher social classes and is currently more accessible to individuals with low income levels. This was evident in the present study, as most patients reported having been to the dentist previously. Moreover, a significant correlation was found between dental anxiety and never having been to the dentist (P<.05), demonstrating that dental visits starting at an early age may have a positive effect on combating anxiety.

In the present sample, the reason for the last visit to the dentist proved to be significantly associated with dental anxiety (P<.05). Patients for whom the last dental appointment was due to pain, need for curative treatment (urgent care/restoration/extraction/root canal treatment), or another problem that required the use of local anesthesia had higher anxiety scores than those whose last dental appointment was for a checkup. Curative dental care commonly involves a high degree of sensitivity and requires measures for controlling pain. Thus, anesthesia is usually needed, which has been associated to a high probability of avoidance of treatment.^{19,20} The results of a Canadian study revealed that fear was a common reason for canceling dental appointments.²



Figure 2. Degree of anxiety among Brazilian adolescents.

Fear emerges in 2 forms, which may appear separately or combined: (1) through personal experience, and (2) through the expectations and experiences of others. In other words, individuals experience their own fear and/ or find it already established and assimilate it. Past traumatic dental situations experienced by patients affect their current attitudes toward oral health care professionals. Most participants in the present study (58%) reported past experience with dental pain, causing a high degree of anxiety during each dental appointment (P<.05). This result corroborates evidence that dental anxiety is related to poor oral health.^{20,21} The association between the fear of individuals who accompany the patient and the anxiety of the patient himself has long been studied. A literature review confirmed an association between parental and child fear, leading to an intergenerational perpetuation of the problem.^{20, 22}

Among the adolescents studied, knowing someone who experienced pain during dental treatment did not prove to be significant (P<.13), showing that access to means of current information counteracts negative information transmitted by acquaintances. Studying the dental fear that parents and children recognize in each other, Luoto et al.²³ reported that neither can be used as a reliable proxy for the determination of fear in the other.

Most participants reported having knowledge regarding the type of treatment they would be undergoing. Unlike findings reported in previous studies,^{24,25} prior knowledge of clinical or invasive dental procedures did not have a significant association with anxiety (P<.64), thereby demonstrating the benefits of full clarification on the part of the dentist regarding what to expect for the appointment. Arriving before the scheduled time had no statistically significant influence over the degree of anxiety (P<.09).

CONCLUSIONS

Based on this study's results, the following conclusions can be made:

- 1. Dental fear and anxiety exist among Brazilian adolescents.
- 2. Lack of economic resources, negligence of oral health and schooling, female gender, and a younger age group may increase the degree of dental anxiety.

The findings of the present study could be employed to guide health education programs aimed at combating dental anxiety, with a focus on strategies directed toward patients who avoid treatment due to dental fear.

REFERENCES

- 1. Bregstein SJ. Psychology in dentistry. Dent Digest 1923;29:387-9.
- 2. Chanpong B, Haas DA, Locker D. Need and demand for sedation or general anesthesia in dentistry: A national survey of the Canadian population. Anesth Prog 2005;52:3-11.

- 3. Skaret E, Raadal M, Berg E, Kvale G. Dental anxiety among 18-year-olds in Norway: Prevalence and related factors. Eur J Oral Sci 1998;106: 835-43.
- 4. Klingberg G. Dental fear and behavior management problems in children: A study of measurement, prevalence, concomitant factors, and clinical effects. Swed Dent J Suppl 1995;103:1-78.
- 5. Akbay Oba A, Dülgergil CT, Sönmez IS. Prevalence of dental anxiety in 7- to 11-year-old children and its relationship to dental caries. Med Princ Pract 2009;18:453-7.
- 6. Cohen SM, Fiske J, Newton JT. The impact of dental anxiety on daily living. Br Dent J 2000; 189:385-90.
- The Brazilian Institute of Geography and Statistics (IBGE). Census. 2010 November. Available at: "http://www.ibge.gov.br/english/estatistica/populacao /censo2010/default.shtm". Accessed January 10, 2011.
- 8. Freeman RE. Dental anxiety: A multifactorial etiology. Br Dent J 1985;159:406-8.
- 9. Newton JT, Buck DJ. Anxiety and pain measures in dentistry: A guide to their quality and application. J Am Dent Assoc 2000;131:1449-57.
- 10. Hu LW, Gorenstein C, Fuentes D. Portuguese version of Corah's Dental Anxiety Scale: Transcultural adaptation and reliability analysis. Depress Anxiety 2007;24:467-71.
- 11. Shapiro M, Melmed RN, Sgan-Cohen HD, Eli I, Parush S. Behavioral and physiological effect of dental environment sensory adaptation on children's dental anxiety. Eur J Oral Sci 2007;115:479-83.
- 12. Carvalho RWF, Santos CNA, Oliveira CCC, Gonçalves SRJ, Novais SMA, Pereira MAS. Psychosocial aspects of teenager in Aracaju, Sergipe State, related to oral health perception. Cien Saude Colet 2011;16:1621-8.
- 13. Armfield JM. A preliminary investigation of the relationship of dental fear to other specific fears, general fearfulness, disgust sensitivity, and harm sensitivity. Community Dent Oral Epidemiol 2008; 36:128-36.
- 14. Singh P, Pandey RK, Nagar A, Dutt K. Reliability and factor analysis of children's fear survey scheduledental subscale in Indian subjects. Indian J Dent Prev Soc Pedod 2010;28:151-5.
- 15. Krikken JB, Ten Cate JM, Veerkamp JS. Child dental fear and general emotional problems: A pilot study. Eur Arch Paediatr Dent 2010;11:283-6.
- 16. Klingberg G, Broberg AG. Dental fear/anxiety and dental behavior management problems in children and adolescents: A review of prevalence and concomitant psychological factors. Int J Paediatr Dent 2007;17:391-6.

- Nicolas E, Bessadet M, Collado V, Carrasco P, Rogerleroi V, Hennequin M. Factors affecting dental fear in French children aged 5-12 years. Int J Paediatr Dent 2010;20:366-73.
- 18. Cinar AB, Murtomaa H. A comparison of psychosocial factors related to dental anxiety among Turkish and Finnish pre-adolescents. Oral Health Prev Dent 2007;5:173-9.
- 19. Vika M, Skaret E, Raadal M, Ost LG, Kvale G. Fear of blood, injury, and injections, and its relationship to dental anxiety and probability of avoiding dental treatment among 18-year-olds in Norway. Int J Paediatr Dent 2008;18:163-9.
- 20. Armfield JM, P Milgrom, Armfield J. A clinician guide to patients afraid of dental injections and numbness. SAAD Dig 2011;27:33-9.
- 21. Xia B, Wang LH, Ge CL. Factors associated with dental behavior management problems in children

aged 2-8 years in Beijing, China. Int J Pediatr Dent 2011;21:200-9.

- 22. Themessl-Huber M, Freeman R, Humphris G, MacGillivray S, Terzi N. Empirical evidence of the relationship between parental and child dental fear: A structured review and meta-analysis. Int J Paediatr Dent 2010;20:83-101.
- 23. Luoto A, Tolvanen M, Rantavuori K, Pohjola V, Lahti S. Can parents and children evaluate each other's dental fear? Eur J Oral Sci 2010;118:254-8.
- 24. Oosterink FM, de Jongh A, Aartman IH. What are people afraid of during dental treatment? Anxietyprovoking capacity of 67 stimuli characteristic of the dental setting. Eur J Oral Sci 2008;116:44-51.
- 25. Hermes D, Matthes M, Saka B. Treatment anxiety in oral and maxillofacial surgery: Results of a German multi-centre trial. J Craniomaxillofac Surg 2007;35:316-21.

Copyright of Journal of Dentistry for Children is the property of American Academy of Pediatric Dentistry and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.