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Fear Assessment in Brazilian Children: The Relevance of Dental Fear

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ABSTRACT – Fear frequently interferes with dental treatment procedures, producing delays and poor technical quality results. Patients exhibit avoidance and escape behaviors that may be related to aversive childhood experiences in dental treatment situations. The aim of this study was to identify the most frequent children's fears, including dental ones, using an adaptation of the FSSC-R. This instrument was used to assess 549 children divided in three groups: (G1) private school children, (G2) public school children and (G3) public school children who were surveyed during dental treatment. Results indicated higher dental fear scores for females when compared with male children. Considering all groups studied, "injection" was the 5th higher fear for the group G3, 8th for the group G1 and 14th for the group G2. Family relationship items such as "parents fighting", "parents yelling at you", "hearing my parents argue", were considered frequent fears, suggesting that family conflicts may contribute to children's emotional problems.

Key words: dental fear; pediatric dentistry; children; FSSC-R.

Avaliação do Medo em Crianças Brasileiras: A Relevância no Medo Odontológico

RESUMO – O medo de dentista pode aumentar a duração do tratamento odontológico e produzir resultados aquém do esperado. As crianças exibem comportamentos de fuga ou esquiva que podem estar relacionadas à situação de tratamento odontológico. Este estudo investigou as principais fontes de medo, inclusive medo de dentista, em crianças, utilizando-se uma versão adaptada do FSSC-R. O instrumento foi aplicado a 549 crianças divididas em três grupos: G1 – crianças de escola particular; G2 – crianças de escola pública e; G3 – crianças de escola pública que foram avaliadas durante tratamento odontológico. Observaram-se escores mais elevados de medo para meninas, quando comparados a meninos. Considerando todos os grupos, a "injeção" foi o quinto estímulo de medo para G3, o oitavo para o G1 e o décimo quarto para o G2. Itens de relações familiares, como "discussão entre pais", "pais gritam com você" e "ouvindo meus pais discutindo", foram considerados geradores de medo, sugerindo que conflitos familiares podem contribuir para o desenvolvimento de transtornos emocionais das crianças.

Palavras-chave: medo de dentista; odontopediatria; crianças; FSSC-R.

Several authors report that fear and anxiety are closely-related but not interchangeable concepts (Locker, Liddel & Shapiro, 1999; Muris, Merckelbach, Ollendick, King & Bogie, 2002). A learning paradigm has been used to understand these concepts, suggesting fear as a variant of anxiety (Bowlby, 1973/1984; Moraes & Pessotti, 1985; Ten Berge, Veerkamp & Hoogstraten, 2002). Specifically, fear is an emotional reaction caused by particular external stimuli such as parental divorce or distance, animals, darkness, and invasive medical and dental procedures (Pavuluri, Henry & Allen, 2002). Besides, fear may be defined as a normal reaction to threats and often has survival values (Ollendick, Yule & Ollier, 1991).

Fear onset in young children might be related to different contexts, being the dental setting one of them. (Pavuluri *et al*., 2002). In this case, dental fear frequently influences patients' behavior, delaying treatment and producing unsatisfactory technical results. Fearful patients postpone dental treatment until it becomes extremely necessary. Dental treatment avoidance may be the result of aversive painful childhood experiences (Milgron, Fiset & Melnick, 1988).

Though there are many dental and non-dental reports of the relationship between fear and pain, the literature is still not clear about the distinction between psychological and physiological factors that may influence the patient's behavior during dental routines, as the procedure of dental injection. Factors such as fear are clearly capable of influencing patient response to painful or other stimuli applied after administration of local anesthetic. Such factors may contribute to inadequate anesthesia. Moreover, the relationship between these variables may be reciprocal: fear leading to inadequate anesthesia and being treated with inadequate anesthesia serves to increase fear (Milgrom, Weinstein, Kleinknecht & Getz, 1980; Possobon, 2003).

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In a previous study, Dental Fear Survey (DFS) has been used to assess 374 Brazilian University students (mean age of 23), showing high fear scores for 13 % of the subjects (Cesar, Moraes, Milgrom & Kleinknecht, 1993). There was no difference in fear scores for both genders, but older students reported higher fear scores when compared to younger students. On the other hand, another study has shown no correlation between fear level and age for Brazilian high school students (15 to 20 years), but fear score records for female students were observed to be seven times higher than for male students (Moraes, Milgrom, Tay & Costa, 1994).

The difference between the constructs of fear and anxiety, coupled with the importance of differentiating between them, have resulted in the development of separate self-report instruments to assess anxiety and fear in children (Pavuluri *et al*., 2002). Most studies on children dental fear, for example, have been based on surveys listing a wide range of fear-evoking stimuli (Muris, Merckelbach, Meesters & Van Lier, 1997; Singh, Moraes & Ambrosano, 2000). The Fear Survey Schedule for Children – Revised (FSSC-R) may be considered as the most common instrument, in which children are asked to indicate their fear in a three-point scale – "none", "some" or "a lot" – considering 80 specific stimuli or situations (Muris, Merckelbach, Ollendick, King, Meesters & Kessel, 2002; Ollendick, 1983).

The FSSC-R scores correlated substantially with other childhood anxiety and fear measures and have been found to be useful in differentiating among various types of specific phobias, diagnosed in different countries (Weens, Silverman, Saavedra, Pina & Lumpkin, 1999). In addition, a consistent finding in FSSC-R previous studies have shown that children's fear is consistently related to death and physical injury. Some previous studies have reported the highest fear levels for the following items: not being able to breathe; bombing attacks; being run over by a car; getting burned by a fire; falling from high places; robberies at home; earthquakes; illness; death; and snakes (Ollendick & King, 1994; Ollendick *et al*., 1991; Scherer & Nakamura, 1968).

The aim of this study was to identify the most common fears, including dental fears in a sample of Brazilian children.

Method

Subjects

A modified version of the "Fear Survey Schedule for Children" (FSSC) was individually used for 549 subjects, 6 to 10 years of age, (52% female and 47% male), divided into three groups: G1 – private school children (n = 144); G2 – public school children (n = 251); and G3 – public school children who, unlike the others, were surveyed during dental treatment (n = 154). The public schools selected were inserted in a region of low social-economical level population. On the order hand, the private schools belonged to a high medium class area. Dental services were not available in the private school. Children were not submitted to a social demographic measurement instrument. Parental consent was obtained for 100% of the subjects through a consent form, detailing the project's purpose.

Procedures

One of the most widely used self-report instruments in the study of children's fears is the Fear Survey Schedule for Children-Revised (FSSC-R; Ollendick, 1983). The FSSC-R contains the original 80 items of the Fear Survey Schedule for Children (FSSC; Scherer & Nakamura, 1968) with a reduced 3-point item response scale ranging from *none* to *a lot*, and has acceptable internal consistency.

Of the 80 items in the original scale, one clinical psychologist and one experienced dentist selected 50

Box 1. Fear Survey Schedule for Children – Revised (FSSC-R)

Fear Items		
1. Dentists	18. Being away from your mother	35. Choking
2. Dogs	19. Having a stranger touch you	36. The sight of blood
3. Being laughed at	20. Having somebody look at you	37. Not being able to breathe
4. Doctors	21. Having the nurse clean your teeth	38. Rats
5. Dark	22. The dentist's drill	39. Having to go to the hospital
6. Lightning	23. The sight of the dentist's drilling	40. Ghosts
7. Thunder	24. The noise of a dentist's drilling	41. Having to eat the food I don't like
8. Strangers	25. Having somebody put instruments in your mouth	42. Getting lost
9. Loud noises	26. Crying in front of other children	43. Hearing my parents argue
10. Getting caught out in the rain	27. Parents yelling at you	44. Making mistakes
11. Being late for school	28. Hearing other children cry	45. People in white uniforms
12. Having to go up to the blackboard in front of the class	29. Being in a crowd	46. Getting a poor mark at school
13. Injections (Shots)	30. Doing Something new	47. Being alone
14. Losing at a game	31. Getting burned by a fire	48. Answering questions
15. Being called on in class	32. Parents fighting	49. Taking a test
16. Having somebody examine your mouth	33. Getting a haircut	50. Getting punished
17. Having to open your mouth	34. Spiders	

items that seemed more appropriate to Brazilian children. For each item the child was asked to choose one of the following possible choices: not afraid at all, a little afraid, fairly afraid, pretty much afraid and very afraid. To facilitate children's responding, it was also used a five different stylized drawings of faces that represented each possible choice of responding.

The selection of the five different drawings was made by testing other children that were not used as subjects of the present study. Besides drawings, colors and words related to each level of fear were also tested. However, most of the children, when asked about their preference chose the drawings and words that were used with all the research subjects.

Subjects were asked to indicate with one finger the fear they felt in a five-point scale as follows: not afraid at all, a little afraid, fairly afraid, pretty much afraid, and very afraid. Five different stylized faces (e.g. ☺, 😐, ☹), one for each point scale, were created to make it easier for the children to select their fear level. Experimenters marked with a pencil the fear level indicated (see Box 1).

Fear level scores range from 1 to 5 (1 = not afraid at all 5 = very afraid). Fear items were classified using central tendency measures (mean, median and mode). Mann-Whitney (α = 0.05) test was used to compare fear level between genders, between private and public school children, and between groups that were and were not under dental treatment during data collection. Spearman ($\alpha = 0.05$) correlation analysis was used to compare fear levels and age. Chi-Square e Mann-Whitney tests were used for statistical analysis.

Results

Fear intensity, concerning all fear items together (50 items), was observed to be significantly higher ($p < 0.01$) for female children. When these items were analyzed individually, 62 % also showed higher fear for girls ($p < 0.05$). Such items as "loud noise", "injection", "being away from mother", "a stranger touching you", "the sight of the dentist drilling", "the noise of a dentist's drilling", "choking", "blood", "not being able to breathe", "having to go to the hospital", and "people in white uniforms" may be related to dental treatment. There was no significant correlation between age and fear intensity for all groups (r = -0.09 and $p > 0.05$).

All tables (1, 2, and 3) show central tendency measurement scores, considering all groups: G1 – private school children; G2 – public school children; and G3 – public school children undergoing dental treatment during data collection.

Table 1 shows the 10 highest fear scores for all groups: The items "getting burned by a fire" and "choking" were the most frequent fears. Injection fear was ranked 8th for G1 and 5th for G3. Since injection fear for G2 was ranked 14th, it is not indicated in the table. Items related to family lifestyle, such as "parents fighting", "hearing my parents argue", "parents yelling at you" showed the highest fear scores.

Table 2 shows results for G1 and G2, concerning dental treatment related items. Public school children (G2) showed higher fear scores for the following items: "having to open your mouth", "being away from your mother", "having somebody put instruments in your mouth", "not being able to breathe", and "people in white uniform". On the order hand, Private school children (G1) showed higher fear score related to the item "having to go to the hospital" ($p < 0.05$).

Table 1. Mean, median, and mode of the 10 "highest" fears in decreasing order

Fear Classification		Fear	Media	Median	Mode
	G1	**Private School**			
	1st	Getting burned by a fire	4.08	5	5
	2nd	Choking	3.82	4	5
	3rd	Having a stranger touch you	3.52	4	5
	4th	Getting lost	3.30	3	5
	5th	Not being able to breathe	3.28	3	1
	6th	Strangers	3.13	3	2
	7th	Hearing my parents argue	2.80	3	1
	8th	Injection	2.63	2	1
	9th	Getting punished	2.56	2	1
	10th	Parents yelling at you	2.51	2	1
	G2	**Public School**			
	1st	Getting burned by a fire	3.99	5	5
	2nd	Choking	3.59	4	5
	3rd	Having a stranger touch you	3.51	4	5
	4th	Getting lost	3.22	4	5
	5th	Being away from your mother	2.99	3	5
	6th	Not being able to breathe	2.94	3	5
	7th	Hearing my parents argue	2.93	3	5
	8th	Strangers	2.89	3	2
	9th	Parents fighting	2.80	3	1
	10th	Making mistakes	2.73	2	1
	G3	**Public School (under dental treatment)**			
	1st	Getting burned by a fire	4.08	5	5
	2nd	Choking	4.03	5	5
	3rd	Parents fighting	3.81	5	5
	4th	Not being able to breathe	3.77	4	5
	5th	Injection	3.63	4	5
	6th	Getting lost	3.40	4	5
	7th	Hearing my parents argue	3.38	4	5
	8th	Having a stranger touch you	3.26	3	5
	9th	Being away from your mother	3.06	3	5
	10th	Ghosts	2.96	3	5

Table 3 shows fear scores for G2 and G3, concerning dental treatment fear related items. It is possible to observe that fear scores were significantly higher ($p < 0.05$) for G3, considering the following items: "doctors", "injection", "choking", "not being able to breathe" and "being alone".

There was no statistically significant difference ($p > 0.05$) among the groups concerning the item "having a stranger touch you", to which most of the children indicated the alternative "very afraid" (mode = 5).

A more comprehensive fear analysis revealed higher fear ($p < 0.05$) for G3 in 50% of the 50 items of the instrument.

Figure 1 shows that 16.7% of the girls and 5.3% of the boys that were under dental treatment (G3) and 8.2% of the girls and 6.0% of the boys not under dental treatment (G2) responded as "fairly afraid", "pretty much afraid", or "very afraid" in relation to the item "dentists".

Table 2. Dental treatment related items and results concerning public and private school children

Fear	School						P(Mann Whitney)
	Private (n=144)			Public (n=251)			
	Median	Mode	Rank means	Median	Mode	Rank means	
Dentists	1	1	196.5	1	1	196.5	0.99
Doctors	1	1	195.4	1	1	197.9	0.78
Strangers	3	2	208.2	3	2	188.3	0.08
Loud noises	1	1	189.4	1	1	201.3	0.28
Injection	2	1	205.5	2	1	192.2	0.24
Having somebody examine your mouth	1	1	187.4	1	1	201.6	0.11
Having to open your mouth	1	1	185.9	1	1	203.3	0.0028
Being away from your mother	2	1	174.3	3	5	209.8	0.0022
Having a stranger touch you	4	5	193.0	4	5	198.4	0.64
Having somebody look at you	1	1	194.5	1	1	198.4	0.78
Having the somebody clean your teeth	1	1	194.8	1	1	196.7	0.82
The dentist drill	1	1	190.8	1	1	195.0	0.67
The sight of the dentist's drilling	1	1	182.6	1	1	198.9	0.08
The noise of the dentist's drilling	1	1	195.3	1	1	191.7	0.69
Having somebody put instruments in your mouth	1	1	179.1	1	1	201.8	0.0248
Hearing other children cry	1	1	191.6	1	1	200.0	0.4
Choking	4	5	198.8	4	5	195.1	0.75
The sight of blood	1	1	193.0	1	1	197.6	0.08
Not being able to breathe	3	1	183.6	3	5	203.8	0.04
Having to go to a hospital	2	1	210.7	1	1	188.4	0.04
People in white uniforms	1	1	186.8	1	1	201.9	0.03
Being alone	2	1	204.1	2	1	192.2	0.28

Table 3. Dental treatment related items and results for children that were (yes) and were not (no) under dental treatment

Fear	Public School Children						P(Mann Whitney)
	Yes (n = 154)			No (n = 251)			
	Median	Mode	Rank means	Median	Mode	Rank means	
Dentists	1	1	195.4	1	1	204.4	0.56
Doctors	1	1	224.6	1	1	189.7	0.004
Strangers	2	2	192.2	3	2	208.0	0.18
Loud noises	1	1	204.2	1	1	202.3	0.86
Injection	4	5	251.7	2	1	173.1	0.0001
Having somebody examine your mouth	1	1	210.5	1	1	198.4	0.2
Having to open your mouth	1	1	211.4	1	1	197.8	0.15
Being away from your mother	3	5	206.2	3	5	201.0	0.065
Having a stranger touch you	3	5	188.6	4	5	211.8	0.062
Having somebody look at you	2	1	215.6	1	1	195.3	0.18
Having the somebody clean your teeth	1	1	209.7	1	1	197.3	0.15
The dentist drill	1	1	193.8	1	1	204.7	0.28
The sight of the dentist's drilling	1	1	207.5	1	1	195.3	0.22
The noise of the dentist's drilling	1	1	207.8	1	1	195.1	0.16
Having somebody put instruments in your mouth	1	1	191.1	1	1	205.6	0.16
Hearing other children cry	1	1	201.0	1	1	203.4	0.78
Choking	5	5	217.8	4	5	193.0	0.0026
The sight of blood	1	1	204.2	1	1	201.4	0.79
Not being able to breathe	4	5	226.2	3	5	187.9	0.0009
Having to go to a hospital	1	1	208.2	1	1	198.9	0.38
People in white uniforms	1	1	208.8	1	1	198.6	0.22
Being alone	2	1	218.7	2	1	192.5	0.0205

It was also observed that the girls under dental treatment, when compared to those not under dental treatment, indicated greater fear of dentists (Chi-Square, $p = 0.00443$). In relation to the boys, under the same conditions, no statistically significant difference was observed ($p = 0.9546$) according to Figure 1.

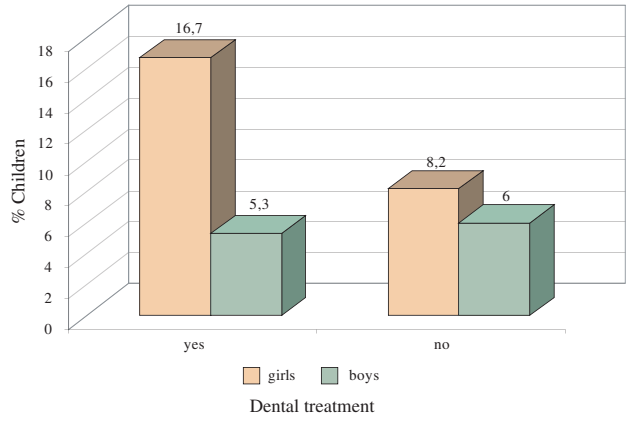

Figure 1. Relative frequency of children that were under dental treatment (yes) and were not under dental treatment (no) that chose "fairly afraid", "pretty much afraid" or "very afraid" alternatives to the item "dentists".

Considering the item "the sight of blood", 52.6% of the girls and 19.7% of the boys under dental treatment (G3) and 37.0% of the girls and 24.6% of the boys not under dental treatment (G2) responded as "fairly afraid", "pretty much afraid", and "very afraid" (see Figure 2). Girls that were under dental treatment showed to be significantly more fearful than those not under dental treatment ($p = 0.0245$). Among boys there was no significant difference ($p = 0.4407$).

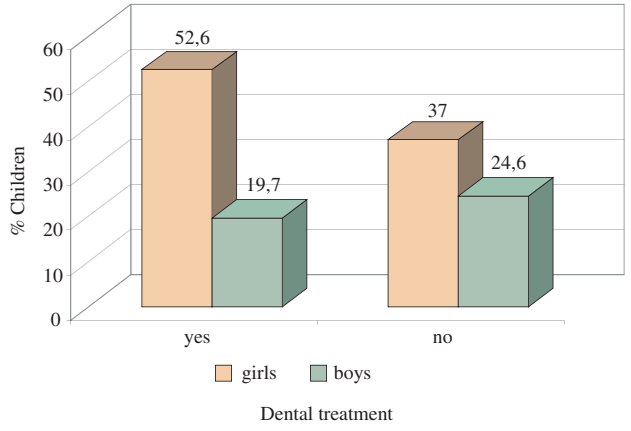

Figure 2. Relative frequency of children that were under dental treatment (yes) and were not under dental treatment (no) that chose "fairly afraid", "pretty much afraid" or "very afraid" alternatives to the item "blood".

Figure 3 shows results obtained through the question "When was your last visit to the dentist?", concerning all the children. Considering the data shown in Figure 3, it was observed that 8% of the private school children and 12% of the public school children had never gone to the dentist prior to data collection. However, 53% of the private school children and 39% public school children reported having gone to the dentist in the last 6 months before data collection

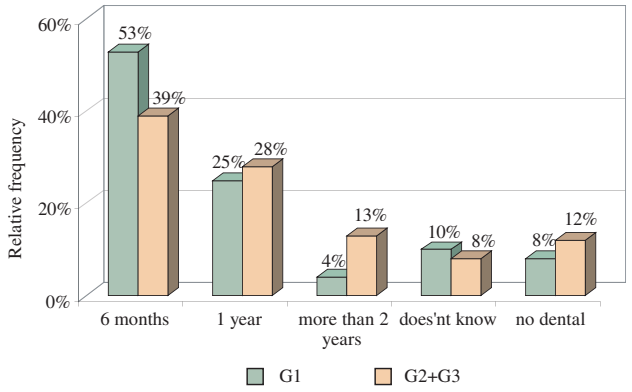

Figure 3. Relative frequency of private school children (G1) and public school children (G2+G3) that answered the question "When was your last visit to the dentist?".

($p = 0.0041$). In the present study, there was no significant correlation between "time from the last visit" and "dental fear" ($r = 0.009$ e $p = 0.1315$).

Discussion

A previous study with Brazilian high school students has revealed that dental fear level in female students was seven times higher than in male students (Moraes *et al*., 1994). Muris and Ollendick (2002) also noted that girls clearly displayed higher levels of trait anxiety and anxiety disorders symptoms in dental settings than boys did. Similar results were observed in the present study when all fear scores were added. Fear level difference concerning both genders was observed for 62% of the items, some of which were related to dental treatment situations.

There was no correlation between fear intensity and age in this study. Similar results were found for high school subjects (Moraes *et al*., 1994). However, a previous study using objective self-report measures has reported more prominent age differences in the prevalence and intensity rather than in the content of fear. In addition, younger children have reported greater fear intensity than older children (Shore & Mark, 1998).

In the present paper, the dental related items (according to Table 2 and Table 3) "choking" and "having a strange touch you" showed the highest fear level in relation to G1 and G2. In addition, Table 1 shows, among the 10 items for G3, four dental related items: "choking", "not being able to breathe", "injection" and "having a strange touch you". The item "not being able to breathe" also revealed one of the ten highest fears. In addition, high dental related fear scores were also observed for such items as "having a stranger touch you" and "not being able to breathe", except for the item "injection" which displayed high fear level for G1 and G3, but was ranked 14th in G2. Some previous studies, employing the FSSC-R, have also reported high fear levels for the items "not being able to breathe" and "getting burned by a fire" (Ollendick & King, 1994; Ollendick *et al*., 1991; Scherer & Nakamura, 1968).

In this study, it was also observed that 8% of the private school children and 12% of the public school children have never gone to the dentist. No significant correlation was observed between "time from the last visit" and "dental fear"

($r = 0.009$ and $p = 0.1315$). Data obtained by Geography and Statistics Brazilian Institute (IBGE, 1998), indicated that 25% of individuals (ages 5 to 19) have never had a dental treatment experience. Dental health may be considered an important aspect in general population and fear still represents a barrier to the achievement of optimal health indexes.

On the other hand, Cesar *et al.* (1993) reported that high fear levels were significantly related to great intervals since the last visit.

Items related to family lifestyle, such as "parents fighting", "hearing my parents argue", "parents yelling at you" were among the highest fears (see Table 1), suggesting that patterns of raising children or family conflicts may be more directly related to children's behavior. Therefore, the present study highlights the need for further studies on the correlation between family related affairs and dental fear.

Considering the obtained results, the main conclusions are:

1. In comparison to boys, girls showed higher total fear level concerning the whole sample studied.
2. There was no correlation between total fear score and age.
3. The most prevalent fears for all groups were: "getting burned by a fire", "choking", "having a strange touch you", "not being able to breathe", "getting lost", "hearing my parents argue", and "injection".
4. Children under dental treatment showed greater fear when compared to those who were not under dental treatment in 50% of the items.
5. Injection fear was ranked 5th for public school children under dental treatment (G3), 8th for private school children (G1), and 14th for public school children not under dental treatment (G2).
6. The items "parents fighting", "hearing my parents argue", and "parents yelling at you" were among the highest, suggesting that parents' behavior evokes children emotional disturbances.

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