



Fear and anxiety in children treated at the dental surgery of the University of Cartagena

Ansiedad y miedo en niños atendidos en consulta odontológica de la Universidad de Cartagena

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ABSTRACT

Objective: To determine fear and anxiety levels with respect to dental treatment of children treated at the University of Cartagena.

Material and methods: By means of a cross-sectioned design, 284 children aged 3-8 years were selected; children with cognitive and motor disabilities as well as syndromes were excluded. Combined fear scale was applied to children ages 6-8 years, children aged 3-5 received modified Corah scale directed to the parents. Descriptive statistical tests were applied; to establish comparison among groups t-Student, ANOVA and Kruskal-Wallis test were applied, assuming 0.05 significance level. **Results:** High levels of fear and anxiety were found during anesthesia administration, noise elicited by rotary instruments and tooth isolation. Differences were observed related to age during consultation ($p = 0.03$) and tooth isolation ($p = 0.02$) and with gender during prophylaxis ($p = 0.02$). **Conclusion:** High levels of fear and anxiety when confronted to a dental appointment were observed in children treated at the University of Cartagena. It is suggested these levels differ according to age, gender and dental procedures.

Key words: Anxiety, fear, children, pediatric dentistry, dental consultation (MeSH).

Palabras clave: Ansiedad, miedo, niños, odontopediatría, consulta odontológica (DeCS).

RESUMEN

Objetivo: Determinar los niveles de ansiedad y miedo a la consulta odontológica en niños atendidos en la Universidad de Cartagena.

Material y métodos: Mediante un diseño transversal se seleccionaron 284 niños entre tres y ocho años, excluyendo a niños con discapacidades motoras, cognitivas y síndromes. A los niños entre seis a ocho años se les aplicó la escala combinada de miedo y a los de tres a cinco años la escala de Corah modificada dirigida a los padres. Se aplicaron pruebas de estadística descriptiva y para la comparación entre los grupos las pruebas t-Student, ANOVA y Kruskal-Wallis; asumiendo un límite de significancia de 0.05. **Resultados:** Se encontraron altos niveles de miedo y ansiedad durante la colocación de anestesia, ruido de equipos rotatorios y aislamiento dental. Se observaron diferencias en la edad durante la consulta ($p = 0.03$) y el aislamiento dental ($p = 0.02$) y con el sexo en la profilaxis ($p = 0.02$). **Conclusión:** Existen altos niveles de miedo y ansiedad ante la consulta odontológica en niños atendidos en la Universidad de Cartagena, se sugiere que estos niveles difieren de acuerdo con la edad, sexo y procedimientos odontológicos.

INTRODUCTION

Dental treatment can be perceived as a painful and agonizing experience, it can exert influence in the behavior of human beings, especially in children. This could be due to factors such as anxiety, and fear,¹ which, together with anguish generated during dental treatment, can turn a rapid and successful visit into negative experience.² Likewise, general health is also affected, all physical, psychological and social dimensions are altered, sleep is perturbed, thus interfering with work-related activities and interpersonal relationships.³ Moreover, these negative experiences might affect the children's behavior once they become adults,^{4,5} since there is greater probability that an adult might experience fear and anxiety with respect to dental treatment in cases when he was previously exposed to negative dental experiences

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during his childhood. In this sense, knowledge of factors determinant to anxiety and fear enables the implementation of preventive strategies for the child's apprehensive behavior.⁶⁻⁹

Anxiety is considered a psychological disorder of human beings characterized by subjective feelings of tension and apprehension, as well as hyperactivity of the autonomous nervous system, varying with time and being of fluctuating intensity.¹⁰ More specifically, anxiety prompted by dental treatment is called dental phobia or excessive fear of the dentist.^{11,12}

On the other hand, fear is considered as the response of a subject when facing a threatening situation, whose cause is of a real nature. It can be a part of the person's character or of the social organization to which he belongs; fear is considered inherent to human nature and individuals in general.^{13,14} Fear can be focused on objects, animals or situations, among them attendance to a dental office. Oftentimes, fear of a special situation arises from a traumatic experience; this justifies control of the situation in order to decrease the probability of developing negative behavior patterns which might perpetuate up to the subject's adult age. Likewise, reactions of the subject in the dental office and the attempts of the dentist to handle these reactions, affect dentist-patient relationship becoming stress-generating sources for both of them.^{3,15}

Fear and anxiety seem to be related to the child's temperament, mother's anxiety, mother's emotional intelligence, parent's support and low educational level. All the aforementioned factors can derive into internal adaptation problems originated from behavioral disorders linked to health and family education the subjects might have received.^{4,16-19} Nevertheless, Caycedo² suggests that within this behavior, training and control capacity of the professional to early detect these psychological disorders is of utmost importance so as to implement support strategies which will trigger a feeling of confidence.

Bearing in mind all the aforementioned facts, the target of the present research was to determine levels of anxiety and fear with respect to dental treatment in children treated at the University of Cartagena.

MATERIAL AND METHODS

A cross section-descriptive study was conducted in 284 children ages 3-8 years, who had sought care at the comprehensive care children's clinic of the Graduate Dental Program and dental pediatrics clinics of the University of Cartagena; 157 children who attended undergraduate program care and were

aged 6-8 were included, the remaining 127 children were aged 3-5 years, 40 of them were treated in the undergraduate program and 87 in the clinics of the graduate program. Children excluded were those afflicted with motor disability, syndromes and cognitive problems reported during history taking. Participating children had to count with authorization of parents or responsible guardian, this authorization had to be under the form of a written informed consent from parents or guardians as well as children's acquiescence. The present study was submitted for approval to the Ethics and Research Committee of the University of Cartagena.

Several instruments were used to assess fear and anxiety such as modified dental anxiety scale (MDAS) which is an instrument developed by Humpris²⁰ based on Corah's dental anxiety scale (DAS). This scale comprises five basic items that can be answered by parents in cases when the child is too young. This instrument was always applied some days before the dental treatment appointment. Scale reliability and validity had been previously assessed and qualified as satisfactory.^{12,21} Upon addition of total scale points, a figure lower than 13 is considered without anxiety, 13-15 points is considered anxious, 16-19 points very anxious and over 19 points as patient phobic to dental treatment. When children were aged 3-5 years, this scale was applied to their parents.

Another instrument used was the combined fear scale (CFS). In the present study, a combination facial image scale²² of children's fear survey schedule-dental subscale (CFSSDS)²³⁻²⁸ was used. Facial image scale comprises a row of five images of expressive faces, ranging from very happy to very unhappy, a value of one is granted to the most positive effect and five is granted to the most negative effect.²² Moreover, CFSSDS scale is especially suited to assess children; this scale measures anxiety levels into five points, going from 1 (devoid of anxiety) to 5 points (very anxious). Total score can vary from 15 to 75 points, 45 points is the landmark from where onset of anxiety is interpreted.

A pilot test was conducted in order to validate the combined instrument, so as to be able to analyze possible differences among results expected from original and modified fear surveys. In the pilot sample, 50 children from a Cartagena educational institution were included. Test was conducted in two consecutive days, in two different moments in time, homogeneity to given answers was evaluated. A new cut-off point was established at 24 points, with minimum 10 and maximum 40 points. Once data were collected, reliability of this combined fear scale

through Cronbach alpha was estimated, it revealed acceptable results ($\alpha = 0.71$). This was the instrument used in children aged 6-8 years, who selected a facial image contained in the format when responding to each item, bearing in mind its relationship with the child's emotional state at that moment.

Statistical analysis. Verification of normality assumptions of data distribution was conducted with Shapiro-Wilk test. For mean comparison according to socio-demographical circumstances of interest, t Student test and variance analysis (ANOVA) tests were applied in those cases that followed normal distribution. Otherwise, Kruskal-Wallis tests were applied. STATA™ v. 11.0 statistical package was used.

RESULTS

Average age of all participants was 5.87 years (SD = 1.6), 53.9% were male and 46.1% were female. Out of the 127 participants in the group of 3 to 5 year old children, 52.1% were male, with average age of 4.29 years (SD = 0.84), in the 6 to 8 year old group, 53.9% were male, with average age of 7.15 years (SD = 0.79).

CFS result analysis reflected that questions with greater average in fear and anxiety scale were: How do you feel when they are giving you an injection?, how do you feel when hearing high speed turbine or hand-piece? and, are you afraid of tooth isolation procedures? (Table I).

In global analysis according to gender, no statistically significant differences were found among averages of responses provided by boys (18.34 ± 4.95) and girls (17.7 ± 4.57) ($p = 0.80$), likewise, no differences according to age were found (6 years: 18.04 ± 4.7 ; 7 years: 18.12 ± 4.8 and 8 years: 18.09 ± 4.8) ($p = 0.33$).

According to analysis of items with respect to age and gender, averages for each question were obtained along with their standard deviation, statistically significant differences were observed; this would tend to indicate that older children suffer lower levels of fear and anxiety when they are going to the dental practice ($p = 0.03$). With respect to the item how do you feel when the dentist is cleaning your teeth, boys reported greater levels of fear and anxiety than girls ($p = 0.02$), on the other hand, girls expressed greater levels of fear and anxiety during preoperative dental isolation procedures ($p = 0.02$) (Table II).

With respect to levels of fear and anxiety in 3 to 5 year old children, global analysis showed that the question with higher average was: how would you feel when they are about to give you an injection?; when relating fear levels and anxiety to gender, statistically significant differences were found according to age group, where greatest levels of fear were expressed by younger children ($p = 0.01$) (3 years: 15.41 ± 4.8 , 4 years: 12.52 ± 3.3 and 5 years: 12.41 ± 3.28). No statistically significant differences were found according to gender ($p = 0.88$). With respect to age, statistically significant differences were found when children were asked: «if a burr were to be used in your mouth, how would you feel?» ($p = 0.001$) and «how would you feel if instruments were to be placed in your mouth?» ($p = 0.001$) (Table III).

With respect to levels of fear and anxiety and type of clinic where participants were treated, statistically significant differences were found in the following items: a) «If you had to go to the dentist tomorrow, how would you feel?» (undergraduate clinic 2.17 ± 1.21 , graduate clinic 1.72 ± 1.08) ($p = 0.03$) and b) «How do you feel when you are in the waiting room of the dental office or clinic?» (undergraduate clinic 2.45 ± 1.13 and graduate clinic 1.78 ± 1.09) ($p = 0.00$).

Table I. Global analysis of fear combined scale.

Items	Mean	SD
How do you feel about going to the dentist?	1.18	0.59
How do you feel about going to a doctor?	1.73	0.96
How do you feel when you are going to get an injection?	2.89	1.15
How do you feel when the dentist cleans your teeth?	1.41	0.76
How do you feel when you hear the high speed burr?	2.31	1.06
How do you feel when the dentists brings instruments into your mouth?	1.69	0.90
Are you afraid of choking during dental treatment?	1.84	1.00
How do you feel when you go to the Children's dental clinic?	1.12	0.34
How do you feel when you see medical personnel clad in white?	1.12	0.44
How do you feel when they place the blue cloth and the butterfly in your mouth?	2.44	1.11

SD = Standard deviation.

DISCUSSION

Among limitations of the present study we can count the fact that anxiety and fear levels in children when facing dental consultation is crosswise, this does not allow prediction of results changes and can only indicate an approximation, nevertheless, selection, validation and instrument calibration processes, allow us to obtain valid and reliable results, with decreased bias possibility.

Global results of used scales indicated that fear and anxiety levels in children when facing a dental appointment are moderate in the range of 6-8

years, irrespective of age and gender, this concurs with reports of other authors.^{11,26,29-31} Nevertheless, when analysis per item was conducted, differences according to gender and age were found, this would indicate that there are greater scores in fear and anxiety related to dental visits when children are younger. With respect to how children feel when the dentist performs prophylaxis, boys experienced greater levels of fear and anxiety than girls; on the other hand, girls experienced greater levels of fear and anxiety during tooth isolation procedures. Bearing in mind these facts, it could be suggested that

Table II. Anxiety and fear in children ≥ 6 years according to sociodemographic factors of each item.

Combine scale	6 years		7 years		8 years		p	Female		Male		p
	X	SD	X	SD	X	SD		X	SD	X	SD	
How do you feel when going to the dentist?	1.18	0.60	1.19	0.61	1.19	0.78	0.63	1.19	0.60	1.19	0.60	0.51
How do you feel when going to the doctor?	1.73	0.96	1.77	0.98	1.17	0.57	0.03*	1.74	0.96	1.73	0.97	1.90
How do you feel when they are going to give you an injection?	2.90	1.16	2.88	1.18	1.72	0.97	1.92	2.71	1.18	3.06	1.10	1.37
How do you feel when the dentist is cleaning your teeth?	1.41	0.77	1.42	0.78	2.88	1.17	1.36	1.41	0.77	1.42	0.77	0.02*
How do you feel when hearing a high speed hand-piece?	2.31	1.06	2.31	0.50	1.43	0.78	1.05	2.31	1.06	2.31	1.06	0.35
How do you feel when the dentists puts instruments in your mouth?	1.69	0.90	1.70	0.78	2.28	1.07	0.30	1.83	0.92	1.56	0.85	1.73
Are you afraid of choking during dental treatment?	1.85	1.00	1.18	0.58	1.68	0.89	0.69	1.85	1.00	1.82	0.98	1.94
How do you feel when you go to the children's dental clinic?	1.12	0.44	1.73	0.95	1.78	0.97	1.31	1.12	0.44	1.12	0.45	1.21
How do you feel when you see medical personnel dressed in white?	1.41	0.78	2.88	1.17	1.13	0.79	0.62	1.41	0.78	1.42	0.78	1.13
How do you feel when they put that blue cloth and the butterfly clip in your mouth?	2.45	1.11	1.44	0.79	1.43	0.79	0.23	2.45	1.11	2.43	1.12	0.02*

X = Average, SD = Standard deviation, p = Significance value, * = Statistically significant (p < 0.05).

Table III. Anxiety and fear in children aged 3-5 years according to sociodemographic factors in each item.

Items	Age group (years)							Gender				
	Three		Four		Five		p	Female		Male		p
	X	SD	X	SD	X	SD		X	SD	X	SD	
Go to the dentist	1.80	1.08	1.71	1.00	1.87	1.14	0.06	1.87	1.14	1.8	1.13	0.83
In the waiting room	1.92	1.11	1.91	1.05	1.99	1.14	0.28	1.99	1.14	1.98	1.14	0.30
Drill in your mouth	2.86	1.35	2.97	1.27	2.92	1.37	0.007*	3.30	1.37	2.89	1.35	0.26
Instruments in your mouth	2.95	1.36	3.08	1.3	2.99	1.34	0.001*	2.99	1.34	2.98	1.35	0.39
Injection	3.48	1.44	3.77	1.31	3.52	1.42	0.14	3.52	1.42	3.50	1.42	0.76

X = Average, SD = Standard deviation, p = Significance value, * = Statistically significant (p < 0.05).

these behaviors vary according to gender and age, according to procedures to be conducted.

With respect to age, it has been reported that this variable is related to fear and anxiety levels, it has been suggested that children of lesser age express higher levels of fear when faced to a dental consultation.^{13,18}

In some studies conducted in child population, Klingberg found that levels of fear to dental consultation was influenced by age, he found that 4-6 year old children were more fearful than children aged 9-11 years.³² Likewise, in Taiwanese children aged 2-10 years, higher levels of fear to dental appointments were found in the four year olds.³³ Influence of age could be explained by psychological development immaturity, which would approximate us to Piaget's (1970) development of cognitive theory, where small children, in preoperative period, generally aged 2-7 years, are still unable to face dental procedures, and are therefore more prone to acquire fears and behavior handling problems during visits to the dentist.^{34,35} Nevertheless, Rantavuori³⁶ points out that fear and anxiety are not lower in older children, rather, they fluctuate among different ages. Above any other aspect, fear is influenced by psychological development immaturity of each individual, this could be explained through the theory of the origins of fear,³⁷ in this theory it is suggested there are three ways for acquisition of fear: direct conditioning (exposition to negative experiences), vicarious learning (fears modeled on other experiences) and information channel (negative information that could lead to fear). Likewise, fear could be explained through the children's cognitive capacity and their verbal skills, since these increase with age,³⁸ bearing in mind the aforementioned factors will lead to easier handling of children's fear and anxiety to any dental treatment.

With respect to gender, some authors point out that, irrespective of age, girls express greater levels of anxiety than boys,³⁹⁻⁴³ it has additionally been suggested that even though boys are less cooperative than girls when facing dental treatment, in general, levels of fear and anxiety in girls are slightly higher than those expressed in boys, although no statistically significant differences were found with exception of the question dealing with the possibility of being touched by strangers.¹¹ These authors propose that girls express higher levels of fear and anxiety when asked about visiting the dentist on the morrow, followed by fear to anesthesia administration, the lowest anxiety level was expressed when asked about waiting in the office. These findings exhibited similar values for girls and boys, thus suggesting there are no differences, nevertheless, it is still unclear whether this is caused

by acquisition of fear and anxiety behavior when facing dental treatment, or whether small differences can be explained by the greater fear experienced by girls of being victim of abuse or aggression from strangers, as part of already received education.¹¹ Moreover, girls can show greater ease to express their emotions than boys, due to general social acceptance for females to express their anxiety more freely, based on different social roles and expectations.^{2,44}

On the other hand, according to items assessed in fear scales, involving specific procedures, greater values in the fear and anxiety scales were observed when asking about anesthesia injections, fear of the noise caused by rotary instruments used by the dentist, and fear of pre-operative dental isolation. Items exhibiting lesser values in the scales of fear and anxiety were: How would you feel with instruments in your mouth and when conducting prophylaxis? This would suggest that high levels are present during painful and highly invasive procedures; several authors concur with this fact.^{11,26,43,45,46} Likewise, in a study conducted in Spain, it was observed that main causes for children's anxiety were «injections, burrs and turbines», whereas the fact of opening the mouth and seeing people dressed in white uniforms barely caused anxiety.³⁰ This could be explained when bearing in mind the complexity of some dental procedures which require longer time to be completed, and therefore, greater cooperation from the children, who feeling fatigued after long and complicated procedures, might express greater levels of fear and anxiety.

Based on results obtained in the present research project, it can be concluded that there are high levels of fear and anxiety to dental treatment in children treated at the University of Cartagena; it is suggested that these levels differ according to age, gender and dental procedure. This knowledge is useful for the dentist, providing him an enhanced perspective on which measures to take when treating a pediatric patient and thus find himself able to implement pre-consultation modeling strategies, thus eliciting no increase of anxiety and fear in these children.

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