

Research Article

Evaluation of Anxiety to Dental Treatment in Students: Cross-Section Study

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Submitted: 26 November 2019

Accepted: 10 December 2019

Published: 12 December 2019

ISSN: 2373-9312

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Abstract

The anxiety presented by the patients may be related to numerous factors. The study aims to evaluate the anxiety level and influence of factors of regarding dental treatment in high school students between 14 and 19 years of age, based on an anxiety scale and identifying the influence of determinant factors associated with anxiety. It's a cross-sectional observational study including 153 students, of whom 47 were from the private school and 106 from the state school in a city of southern Brazil. The Corah Dental Anxiety Scale, composed of 4 questions, was used to evaluate the dental anxiety levels of all students. The data were analyzed through descriptive statistic to verify the frequency distribution of all variables. Pearson's chi-square test ($p < 0.05$) and 95% confidence interval were used to evaluate the association between the dependent variable (dental treatment anxiety) and the independents, aided by the SPSS software 20.0. The descriptive results show that most of the participants already consulted the dentist (98%) and presented satisfaction with the same (72.5%). School children reported that the greatest cause of dental fear is pain (33.3%), but they attend the dentist at least once every three months (43.8%). Regarding inferential analysis, the majority of the participants presented mild anxiety (48.3%), of which anxiety was higher in females (71.4%) and in those who were dissatisfied with their dentist (81%). This survey revealed that the level of dental anxiety found in students was mostly low, with influence of the individuals' gender and their satisfaction with the dentist.

Keywords

- Dental anxiety
- Dental fear
- Manifest anxiety scale
- Fear of dentist
- Adolescents

INTRODUCTION

Despite the significant technological advance in dentistry, people still present high levels of anxiety because of the perception of pain associated with dental treatments [1].

The anxiety presented by the patients may be related to numerous factors and should be investigated before the beginning of the dental treatment. Some of them may be related to low frequency of dental appointments, to negative perception of the treatment, to past painful experiences, to lack of knowledge of the procedures, to the environment and the unpleasant noises of the surgery such as high instrumental rotation, to unexpected and abrupt movements of the dentist, among other reasons [2].

Fear is a feeling that is part of children development, however, many usual childhood fears can persist for long periods and produce many problems for the child and his family [3]. Likewise, it may occur in relation to the fear of dental treatment, which can originate from bad experiences of the child in some dental treatment or can even be transmitted negatively to the children by relatives or more indirectly by the media. Some evidences

indicate that fear of dental treatment may begin in childhood, but little is known about how it develops [3,4].

The fear of dental appointments is one of the reasons that distract the patients from the necessary treatments, causing them to postpone the appointment, and only addressing to the professionals when they have painful symptoms, which can aggravate the state of oral health, leading to a more invasive treatment [5,6].

Some studies have reported that anxiety and fear of dentistry may vary according to age, gender, educational level and socioeconomic factors, and also report that fear of dental treatment is more common among women than men, it is higher among younger adults, and it is more common in individuals with lower educational levels [7-9].

Dentist's awareness of patients' dental anxiety level and the use of anxiety reduction measures during treatment may encourage routine care of patients [10]. Hence, anxiety control is essential for good dental care and for the patient's confidence and safety [2].

A good conduct is verbal and behavioral management with the patient. However, it is known that there are other methods such as sedation with benzodiazepine drugs, which in addition to decreasing anxiety, decrease salivation, reflex of vomiting and are muscle relaxants. It can also be used nitrous oxide, an inhaled gas that has a calming effect and changes perceptions of pain and anxiety, in addition the body easily eliminates it [1,2].

Fear, anxiety and stress are part of the pre and trans-operative moments, and invasive procedures, such as anesthesia and the high-rotation apparatus, generate greater anxiety. Understanding and seeking the source of fear is extremely important so that the dental surgeon can interact with his patient as a whole, not only thinking about oral problems, but also with his human and emotional side [13,14]. Identifying these conditions is more of a challenge for dentists, who must discover in their care ways to improve dental treatment and make it less tense, by modifying patients' pessimistic views and focusing on oral health [14].

Thus, the objective of the present study was to evaluate the level of anxiety about dental treatment in high school students of ages 14 to 19 in State and Private schools in a city in the southern of Brazil, based on a dental anxiety scale and identifying the influence of determinant factors associated with anxiety.

MATERIALS AND METHODS

The present work was written according to the Strengthening the reporting of guide to Strengthening the Reporting of Observational Studies in Epidemiology (STROBE).

Ethical research criteria

The study observed the guidelines of Resolution No. 466/12 of the Health Council and approval of the Research Ethics Committee of the IMED Faculty (CEP/IMED), with report under report #2.014.444 (CAAE 65086116.8.0000.5319).

Study design and participants

The present research of epidemiological survey has a quantitative approach, with cross-sectional design.

The research was carried out in two schools (state and private) in the municipality of Nova Araçá, located in the Northeast region of Rio Grande do Sul, Brazil. The municipality ranked 6th in the general ranking of the most developed municipalities in Rio Grande do Sul according to the Socioeconomic Development Index (IDESE) of the municipalities of Rio Grande do Sul state for the year 2014.

IDESE evaluates the socioeconomic situation of the municipalities of Rio Grande do Sul in terms of education, income and health, considering quantitative and qualitative aspects of the development process, that is, more developed. Moreover, Nova Araçá stands out as 3rd place in the state related to the Health block [15]. According to IBGE [16], the municipality has 4,429 inhabitants and a territorial unit area of 74,704 km².

The sample was made by convenience characterized as a census, where all students, aged 14 to 19, enrolled in schools were included in the study during the months of November and December 2017, totalizing a final sample of 153 students, of which 106 students from State School and 47 from Private. There were no exclusion criteria.

The total number of students enrolled in schools in this age group was 170, but at the date of data collection some students were not present, so there was a small loss of 10% (n = 17).

Data collection

Permission was requested from the school principals prior to the collection of the research data and to those responsible for the students, authorization was requested through a Free and Informed Consent Term. Two data collection instruments were used to collect data.

The first instrument was a questionnaire to collect the following variables: sex (male/female), age (14 to 19 years old), whether had already consulted the dentist (yes/no), whether or not likes to go to the dentist), frequency of appointments (1x month/every 3 months, 1x every 6 months, 1x year, only when you feel pain, does not consider necessary) and what causes more fear (needle/anesthesia, motor noise, pain, scissors/pilers, environment). The second instrument evaluated the anxiety level and the Dental Anxiety Scale (DAS) of Corah was used [17], which is a widely used and validated instrument to evaluate the manifestations of dental anxiety since the 1970s and which allows to recognize the level of anxiety thru the sum of the answers provided by their multi-item questions: 1) How did you feel the day before the procedure?, having five possible alternatives (All right, I did not care, I was slightly worried, I felt a greater discomfort, I was afraid of what could happen, I was very apprehensive, I did not sleep right), 2) In the waiting room, waiting to be called, how did you feel?, 3) In the chair waiting for the anesthesia procedure, how did you feel?, 4) Already anesthetized, waiting to start the procedure, how did you feel?, questions 2, 3 and 4 have as options for answers (calm/relaxed, a little uncomfortable, tense, anxious/afraid, so anxious or afraid that I start to sweat and feel bad).

The instrument consists of a four-item scale, each containing five alternatives, and was developed specifically to measure dental anxiety, with scores ranging from 4 to 20. The total score is calculated by summing the scores of all items, scoring between 1 and 5. The final scale is scored where points of up to 5, indicate very little anxiety; 6 to 10, slightly anxious; from 11 to 15, moderately anxious and from 16 to 20, extremely anxious.

Data were analyzed by descriptive and inferential statistics. All questionnaire response data were entered into a specific database for statistical analysis. Descriptive statistics were used in order to verify the frequency distribution of all variables. Subsequently, the Pearson's chi-square test was used to assess the association between the dependent variable (dental treatment anxiety) and the exposure variables (associated factors) at a significance level of 5% and a confidence interval of 95 %. The data were analyzed using the IBM SPSS® statistical software (Statistical Package for the Social Sciences), version 20.0, Armonk, New York.

The demographic variables of exposure were: gender, age, school, perception with the dentist (whether likes or not to go to the dentist), frequency of appointments, and what causes most fear. The dependent variable anxiety to dental treatment was obtained by categorizing anxiety levels of the Corah Scale in only two categories, the first was obtained at the "not very anxious"

level and the second was obtained by associating the levels of anxiety "slightly, moderately and extremely anxious".

RESULTS AND DISCUSSION

Table 1 shows the data referring to the frequency of all variables. It was observed that of the 153 participants in the research, 69 were male (45.1%), and 84 were female (54.9%). The predominant age group found in the students was 16 years (39.2%).

The attendance of private school participants was 30.7% and 69.3% was from the State School. It was observed that 150 (98.0%) of the participants already visited the dentist and 111 (72.5%) reported liking going to the dentist.

It was observed that 67 (43.8%) participants attend the dentist once a month or once every three months and what is most frightening for the participants is pain (33.3%).

Table 2 analyzed the questions that are part of the Corah questionnaire. It was found that the vast majority of participants (78.4%) reported that they were well the day before the procedure. After the anesthesia procedure, most participants report that they feel more relaxed (44.4%).

Table 1: Distribution of demographic variables, frequency of dental appointments, perception with the dentist, and major causes of fear in dental appointments by the students of Nova Araçá, RS, 2017.

Variables	N (153)	-100%
Gender		
Male	69	45,1
Female	84	54,9
Age		
14 y/o	7	4,6
15 y/o	35	22,9
16 y/o	60	39,2
17 y/o	31	20,3
18 y/o	16	10,5
19 y/o	4	2,6
School		
Private	47	30,7
State	106	69,3
Ever consulted a dentist		
Yes	150	98,0
No	3	2,0
Likes going to the dentist		
Yes	111	72,5
No	42	27,5
Frequency of dental appointments		
At least once every 3 months	67	43,8
Once every 6 months	44	28,8
Once a year	17	11,1
Only in case of pain	21	13,7
Doesn't think it's necessary	4	2,6
Causes of fear		
Needle/anesthesia	49	32,0
Motor noise	33	21,6
Pain	51	33,3
Scissors/pilers	18	11,8
Environment	2	1,3

Table 2: Distributions of the frequencies of answers to the anxiety scale variables, Corah, by the students of Nova Araçá, RS, 2017.

Corah's Anxiety Scale Variables	N (153)	-100%
How did you feel on the day before the procedure?		
Well, didn't care.	120	78,4
Was slightly worried	11	7,2
Felt a greater discomfort	11	7,2
Was afraid for what could happen	9	5,9
Was very apprehensive, couldn't sleep well	2	1,3
In the waiting room, waiting for your appointment, how did you feel?		
Calm, relaxed	92	60,1
A little uncomfortable	32	20,9
Tense	15	9,8
Anxious of afraid	12	7,8
So anxious or so afraid that started sweating and feeling bad	2	1,3
In the chair waiting the anesthesia procedure, how did you feel?		
Calm, relaxed	51	33,3
A little uncomfortable	50	32,7
Tense	23	15,0
Anxious of afraid	25	16,3
So anxious or so afraid that started sweating and feeling bad	4	2,6
Already anesthetized, waiting the beginning of the procedure, how did you feel?		
Calm, relaxed	68	44,4
A little uncomfortable	38	24,8
Tense	24	15,7
Anxious of afraid	20	13,1
So anxious or so afraid that started sweating and feeling bad	3	2,0

Figure 1 shows the patients' anxiety according to the Corah Scale levels / grades. The majority of participants had a slightly anxious degree (43.8%), followed by a very low anxiety level (38,6%).

Table 3 shows the bivariate relationships between the dependent variable and the independent variables (gender, age group, school, visit to the dentist, perception with the dentist (enjoying), frequency of appointments with the dentist, and causes of fear), statistically significant among some of the analyzed variables ($p < 0.05$). The women were more anxious than the men ($p < 0.03$), with a prevalence of 71.4%. Participants who had less satisfaction with the dentist (who did not like going to the dentist) were the ones with the highest level of anxiety ($p < 0.01$), with a prevalence of 81%.

DISCUSSION

Fear and anxiety are troubling emotions in the dental office because they trigger different types of behavior and may cause undesirable repercussions in the visits [18]. Dental anxiety represents a state of apprehension for the patient and that something bad will happen in relation to dental treatment. High levels of anxiety prevent the patient from fully cooperating with the dentist and this can limit the effectiveness of dental treatment

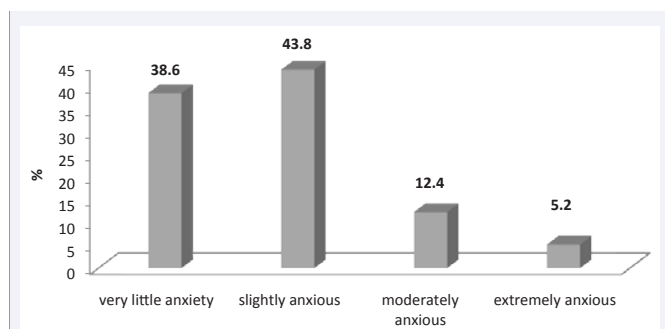


Figure 1 Electrospun nanofibers membrane of poly- ϵ -caprolactone visualization after 21 days of human Osteoblasts culture (Cells visualization in blue (nucleus /DAPI) and PLL^{FTIC} labelled nanofibers in green): colonization and proliferation of osteoblasts into the nanofibers membrane.

[19]. For the behavior management strategy, it is very important to know the reason for dental fear, which has become a difficulty in the administration of the patient, which can also reduce dental prevention, especially in children and young people [20].

The present research consists of a cross-sectional and prevalence study widely used in public health to evaluate and plan disease control programs. This type of study measures the prevalence of the disease; widespread in epidemiology; obtains data collected at a particular, relatively short, point in time, specifically to obtain desired information from large populations, as well as being easy and economical [21]. Other authors such as Singh et al. [3], and Costa et al. [22], also conducted studies with the same design for evaluation of dental anxiety, making it easier to control the sample. However, a randomized clinical trial could provide us with more accurate and more relevant information and results, thus suggesting a longitudinal study with two or more study groups testing the efficacy of different methods of anxiety control, as well as in the study by Chaturvedi [19], which carried out a survey using visual audio distraction through a pair of glasses, a good allied method for dental appointments in anxious patients.

The instrument chosen to carry out the present study in the evaluation of anxiety levels was the Corah Scale, because it is a specific and validated instrument, used worldwide and translated into the Portuguese language, and which provides reliable results, becoming easy to understand [17]. This is also confirmed by Carvalho et al. [1], who affirm that the scale is known as an instrument to evaluate dental anxiety since 1970, by recognizing anxiety through the sum of multi-item questions. There are other instruments also validated, as mentioned in the study by Merdad and El-Housseiny [9], with the Oral health-related quality of life (OHRQoL) scale, which has been used to describe the consequences of oral health conditions and treatments in children. Also in the study by Siveiro et al. [23], where they used the Dental Anxiety Scale (DAS), in which the patient is submitted to questions related to the stress suffered by dental treatment; the Visual Analogue Scale (EVA), to which the patient assigned a score of 0 (absence of pain) to 10 (maximum felt pain) for subjective evaluation of the pain expected before the surgical procedure; the IDATE-S anxiety inventory, which

is an instrument of self-evaluation and presents as a main characteristic the measurement of non-specific aspects such as tension, nervousness, worry, apprehension and others; and the Brazilian version of the Self Reporting Questionnaire (SRQ-20), which aims to evaluate possible minor psychiatric disorders (PMS), such as depression and pathological anxiety. However, the scale used in this study was easy to understand and use, besides being available in the Portuguese language.

Regarding the size of the study sample, it was considered to evaluate all the students, because the research was carried out in a small municipality, with a population of few inhabitants that only has two schools that offer education for the age group surveyed. Thus, one can observe the relevance of the study that presented statistically significant results. As well as those presented in the study by Silva et al. [14], with 150 patients and Singh et al. [20], with 200 patients who also obtained similar samples, but significant and relevant results. However, the suggestion is that the study be performed by obtaining a larger sample in a city with a larger population, in addition to relating other variables such as the presence of dental caries or oral problems, the quality of life of individuals, family socioeconomic level, the oral hygiene habits, the reasons for seeking dental care, and the type of health service (public or private) that they use, as such, presented in studies by Carvalho et al. [1], with 3,000 patients and Botton et al. [18], with 1,219 patients, among other exposure variables.

From the analysis of the results of the present study, regarding the degree of anxiety, 43.8% of the participants presented a slightly anxious level, thus demonstrating that the high school students in the municipality of Nova Araçá have low anxiety. Similar result was also seen in the study by Costa et al. [22], whose results obtained by the Corah Scale showed a predominance of the slightly anxious level. Still in the studies of Botton et al. [2], an investigation was carried out with children and adolescents, using the DAS evaluation scale demonstrating that 84% of the evaluated students showed some signs of anxiety. Among the anxious individuals, the highest frequency was the low anxiety level (70%). In the study by Carvalho et al. [1], the majority of participants showed little or slight anxiety related to dental care (very little anxious 40.59% and slightly anxious 40.17%). This was also observed in a study that verified anxiety in patients attending the Faculty of Dentistry of the Universidade Federal de Minas Gerais, whose result was a higher occurrence of the slight anxiety level [8]. In the study by Yildirim [7], who evaluated the anxiety level of patients at a Dental Health Center in Turkey, the patients presented predominantly the moderately anxious level. As in the study by White et al. [10], in which moderate and high levels of anxiety were found in the individuals. The results presented in the aforementioned studies that corroborate with the results presented in the present study identified that the anxiety index in adolescents in general appears to be low [1,2,8,22], but individuals with moderate and high anxiety are observed in some studies [7,10].

The results obtained from the association between the variables showed that there was a female influence (71.4%) with a higher level of dental anxiety. Similar results are also seen in the studies by Singh et al. [20], that evaluated 200 children between 12 and 15 years old, whose results showed that the

Table 3: Inferential analysis between the anxiety variable and exposure variables of schoolchildren from Nova Araçá, RS, Brazil, 2017.

Variables	Very little anxiety (n %)		Slightly/ moderately/ extremely anxious (n %)		p
School					0,143
Private	18	38,3	29	61,7	
State	41	38,7	65	61,3	
TOTAL	59	38,6	94	61,4	
Age					0,452
14 -16 y/o	42	37,8	69	62,2	
17-19 y/o	17	40,5	25	59,5	
TOTAL	59	38,6	94	61,4	
Gender					*0,003
Male	35	50,7	34	49,3	
Female	24	28,6	60	71,4	
TOTAL	59	38,6	94	61,4	
Likes going to the dentist					*0,001
Yes	51	45,9	60	54,1	
No	8	19,0	34	81,0	
TOTAL	59	38,6	94	61,4	
Frequency of dentist appointments					0,075
At least once every 6 months	46	41,4	65	58,6	
Once a year or more	13	31,0	29	69,0	
TOTAL	59	38,6	94	61,4	
Causes of fear					0,130
Needle/ Anesthesia/ Scissors/ Pilers/ Pain	44	37,3	74	62,7	
Motor noise/ Environment	15	42,9	20	57,1	
TOTAL	59	38,6	94	61,4	

* $P < 0,05$ - Statistically significant difference.

female had higher anxiety scores than the male sex. It is also seen in the studies of Singh et al. [3], Macedo et al. [8], Yildirim [7] and White et al [10], According to Carvalho et al. [1], that women seek dental care more frequently, being significantly more likely to report a high level of anxiety compared to men, corroborating studies conducted in developed countries, where women show higher levels of anxiety to dental factors. However, in a study by Medeiros et al. [24], there is no more anxious gender, disagreeing with several studies that affirm that the female sex presents greater level of anxiety than the male gender facing dental treatments. Presoto et al. [25], report that women tend to recall the pain vividness after the appointment is over, which may help explain the increase in anxiety during treatment. In addition, women are more effective at dental care because they care about their oral health, making them more susceptible to higher rates of anxiety [26]. This can also be observed in the present study, since there was a statistically significant relationship between sex and anxiety ($p < 0.003$).

Another statistically significant associated variable presented in the study was the perception with the dentist, where disliking to go to the dentist was observed in adolescents with a higher anxiety level ($p < 0.001$). In this way, we can observe that lack of dental appointments or not seeking them, may be related to the

higher anxiety level, together with the dissatisfaction of going to the dentist, as in studies carried out by Botton et al. [26], Macedo et al. [8], and Souza et al. [6], where they reported that individuals who lack appointments or who avoid them more frequently are those with the highest level of anxiety.

Dental fear and anxiety may be associated with traumatic experiences in a dental environment during childhood. Toothache besides being an oral health problem can also affect the well-being of individuals interfering in quality of life [9]. The study by Souza et al. [6], show that adolescents with restorative treatment needs have higher levels of anxiety. Often associated with patients who require dental treatment associated with surgical procedures, anxiety can become an even more complicating factor [24]. Despite the advances in dental equipment and pain management associated with dental procedures and a greater awareness of the importance of building relationships of trust by dentists, dental fear still remains a serious problem for dentists and their patients.

However, in the present study we can observe that, despite having some level of anxiety, patients frequently seek dental service, being more frequent at least once every three months, similar to the study by Botton et al. [26], where they reported that

the frequency of subjects who performed dental appointments was high (76.7%), even though they had some anxiety.

Regarding age, in this study there was a higher frequency of 16-year-olds, although with no association with anxiety. According to Medeiros et al. [24], in the associations of age and anxiety, the results are diverse, relating higher anxiety in young/adult patients, in relation to the elderly, contradicting authors who say that anxiety decreases over the years. In other situations, they show that there is greater anxiety in the elderly compared to the younger ones because of traumatic experiences during the time they were young. Carvalho et al. [1], verified that the age group of patients with anxiety showed to be widely varied, with cases ranging from young to old, approximately twice as frequent in the older age groups. This profile can be justified because we currently deal with adults who, in childhood, attended clinics where there was no technology that would provide a stress-free care. These factors make current reality reflect phobic behaviors. In the present study there was no statistical association between age and anxiety, which can be explained by the fact that adolescents are in the same age group, with no great differences between ages.

Studies related to anxiety and dental fear are of extreme importance, especially nowadays, where anxiety and stress levels are still high in dental offices, despite all the evolution and technology acquired today. These feelings end up having a reflex in dental appointments, where patients end up avoiding routine visits to the dentist [5], where they report that the fear of dental appointments is one of the reasons that distract patients from the necessary treatments, causing them to postpone the appointment, and only seeking the professionals when they have painful symptomatology, worsening the state of oral health, which makes the late treatment more invasive. Fearful individuals have worse oral health than those who are not fearful [26]. Quality of life is also affected in these patients, as shown in the study by Merdad et al. [9], in which a poor quality of life indicates greater dental fear/anxiety. The association of pain thoughts related to dental appointments refers to feelings of fear, helping to justify high levels of anxiety in patients who lack or dislike dental appointments [8,26].

Studies and reflections on fear and anxiety can contribute to a significant improvement in dental appointments, using measures to increase patient's confidence in treatment and in the dentist, as presented in a study by Ulhoa et al. [13], which aimed to minimize dental anxiety, identifying the origins, characteristics and stimuli that generate anxiety, presenting a program of desensitization of fear. Understanding and seeking the source of fear is extremely important so that the dental surgeon can interact with his patient as a whole, worrying not only with oral problems but also with his human and emotional side. Silva et al. [14], also state that identifying these conditions is a challenge for dentists, who should seek improvements in care by leaving the patient less tense, modifying the pessimistic view so that the focus on oral health can be achieved. It is also important a good dialogue between the professional and the patient, in order to reduce the stress that the care may cause and thus reducing possible emergency complications, which high anxiety can cause, as observed in the study by Macedo et al. [8]

In children and adolescents there is an additional challenge in the perception of fear, since these need to be conditioned in the best possible way, so that they do not have negative experiences that in the future may develop a trauma to the dental treatments, as reported in a study of Merdad et al. [9], who affirm that the receipt of a "treat" during dental visits are significantly associated with a better cooperation of the child, thus obtaining an improvement in the quality of life. Another method that can be used is distraction, as a relatively easy, economical and simple approach to reduce anxiety and improve children's behavior. Chaturvedi et al. [19], conducted a research in the dental environment reporting the positive value of psychological techniques in the preparation of children during dental treatment.

CONCLUSIONS

- Based on the research conducted it was possible to conclude that: The anxiety level of most schoolchildren regarding dental treatment was slightly anxious.
- Most schoolchildren report that the cause of most fear is pain.
- It was noted that most participants attend the dentist at least once every three months.
- The vast majority of respondents reported feeling well the day before the procedure, and felt relaxed after anesthesia.
- Women were more anxious about dental treatment.
- Dissatisfaction with the dentist is related to the feeling of great anxiety.

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Cite this article

Zanetti P, Flores MR, Rigo L (2019) Evaluation of Anxiety to Dental Treatment in Students: Cross-Section Study. *Ann Pediatr Child Health* 7(1): 1164.