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| ORIGINAL

Influence of music on the behavior of children during dental care

Influência da música no comportamento de crianças frente ao atendimento odontológico

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ABSTRACT

Objective: To evaluate the role of music as a distraction technique to minimize anxiety during dental care in children aged 7 to 9 years when submitted to local anesthetic procedure. **Methods**: This study was carried out in the Dentistry Module of the State University of Southwestern Bahia, located in the city of Jequié, Bahia, Brazil. It was performed through the application of the Facial Image Scale, measurement of heart rate and blood pressure with the aid of the digital sphygmomanometer at two different times during pediatric dentistry care with and without the influence of classical music. Data were tabulated in the Statistical Package for Social Sciences software, version 21.0, expressed as medians and interquartile range. For inferential statistics, the Shapiro-Wilk normality test was used and the analysis of the effect of music was calculated using the paired T-tests and Wilcoxon, considering a significance level of 95%. **Results**: The sample consisted of 7 children, mostly male, with a median of 8 years of age. Regarding the psychophysiological variables, no significant variations were observed compared to before and after in the groups with music and without music. **Conclusion**: In this study, no differences were found regarding the reduction of anxiety in the group in which music was used. Additional studies with a representative sample are needed.

Indexing terms: Anxiety. Music therapy. Pediatric dentistry.

RESUMO

***Objetivo**: avaliar o papel da música como técnica de distração para minimizar a ansiedade durante o atendimento odontológico em crianças de 7 a 9 anos de idade quando submetidas a procedimento anestésico local. **Métodos**: Este estudo foi realizado no Módulo de Odontologia da Universidade Estadual do Sudoeste da Bahia, situado na cidade de Jequié – BA. Foi realizado a partir da aplicação da*

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Facial Image Scale, mensuração da frequência cardíaca e pressão arterial com auxílio do esfigmomanômetro digital em dois momentos distintos ao longo do atendimento em odontopediatria com e sem a influência da música clássica. Os dados foram tabulados no software Statistical Package for Social Sciences, versão 21.0, expressos como medianas e intervalo interquartílico. Para a estatística inferencial, utilizou-se o teste de normalidade Shapiro-Wilk e a análise do efeito da música foi calculada utilizando os testes T-pareado e o Wilcoxon, considerando nível de significância de 95%. ***Resultados****: A amostra foi constituída por 7 crianças, pertencendo sua maioria ao sexo masculino, com uma mediana de 8 anos de idade. Em relação às variáveis psicofisiológicas, não foram observadas variações significativas em comparação ao antes e depois nos grupos com música e sem música.* ***Conclusão****: Neste estudo não foram encontradas diferenças no que diz respeito à redução da ansiedade no grupo em que a música foi utilizada, havendo necessidade de estudos adicionais, com amostra representativa.*

Termos de indexação: *Ansiedade. Musicoterapia. Odontopediatria.*

INTRODUCTION

Pediatric dentistry is a specialty of dentistry that requires from the professional a broad and diverse knowledge related to psychosocial aspects concerning the growth and development of children and adolescents, which are not restricted to the application of mere techniques, but above all know how to deal with emotions, leading the child/adolescent to a positive attitude, accepting and understanding their role, as a fundamental part for the success of dental treatment [1].

Among the emotions and feelings experienced by children and adolescents, especially when faced with the dental situation, fear and anxiety occupy a prominent place [2,3]. Anxiety is defined as a response to some future situation that presents itself as a threat to the individual, and may be related to the age of the children, their socio-cultural background and/or dental experiences of them and/or their parents, which interferes with the management and care of patients [2,4-6].

On the other hand, fear is a biological function that responds to certain objects and situations, being part of the children's development. This fear can come from experiences lived in the past and can be transmitted to children by people close to them or by the media. It is usually transient and does not produce major disturbances in the children's life, however many fears present at this stage of life can persist for long periods and cause various problems for the children and their families [3,6,7].

In moments of anxiety, the individual presents psychophysiological changes, which occur at the level of the autonomic nervous system (tachycardia, increased blood pressure, sweating, and xerostomia, among others) [8]. Thus, it is important that the professional has sensitivity and technical capacity to identify these changes and their relationship with the behavior of the child/adolescent, with a view to a better clinical management in pediatric dental care [9-11].

For the assessment of anxiety in children and adolescents, instruments are available, used in national and international studies. The Facial Image Scale (FIS), which consists of an image containing 5 distinct faces, which refer to feelings from happiness to sadness, presents easy execution and has been recommended for children and adolescents from 3 to 18 years of age [12]. There is also the Dental Anxiety Scale (DAS) which consists OF 4 questions that can add up to 4 to 20 points, where 12 represents low level of anxiety, 12-14 moderate and above or at 15 high level of anxiety [13]. Another option is the Venham Picture Test (VPT) which is indicated for children/adolescents from 3 to 18 years old, consisting of 8 figures, each with 2 children, who present expression ranging from anxiety to happiness, according to what is shown in the illustrations. Each selected anxious image is worth one point, and the higher the score, the higher the level of anxiety [14].

In addition to these instruments, the distraction technique has been pointed out in the literature as an alternative to prevent, reduce and even eliminate the effects of anxiety during dental visits. This method aims to divert the patient's attention from more invasive procedures, and can be performed with the help of music or videos during clinical care [15-18].

It is important to consider that music has the ability to mask dental noises, such as those of high rotation, which frighten many patients [19]. In addition, according to the studies researched, music can influence the cardiovascular and

respiratory system, promote changes in blood pressure, temperature and, depending on the musical style, contribute to the reduction of anxiety, fear and other tensions [20].

For this reason, conducting studies that address the effects of alternative therapies in reducing negative feelings during dental care is of great relevance [9,11]. It is also extremely necessary to know the symptoms and techniques that can circumvent and/or reduce anxiety, to promote a better quality of clinical care [17,18]. Given the above, the present study aimed to evaluate the role of music as a distraction technique to mitigate anxiety during pediatric dental care.

METHODS

This is a pilot, quantitative, cross-sectional study. It was carried out in the Dentistry Module of the State University of southwestern Bahia, located in the city of Jequié, Bahia, Brazil, which is 365 km from the capital Salvador. Jequié has a population of 151,895 people, a population density of 47.07 inhab/km² and a Municipal Human Development Index of 0.665, according to the IBGE website (2010). The Dentistry module was founded in 2003 with the objective of being a field for supervised practical performance of UESB undergraduate professors. This served an average of 3,000 people throughout 2017, covering specialties such as: pediatric dentistry, endodontics, periodontics, dentistry and dental prosthesis.

The study population consisted of children aged between 7 and 9 years old who, for some reason, sought dental care at the school clinic of UESB. Children with limiting cognitive and/or mental and visual alterations, confirmed by medical and/or psychological evaluation, were excluded from the study in order to avoid possible biases in the result. As an inclusion criterion, infant patients who required invasive dental care (requiring the use of local anesthesia) were included.

It was performed using the software G Power version 3.1.9.2 in which assuming an error of 5%, power of 80% and adding 20% for probable losses, it reached a minimum of 63 participants.

The instrument used was the Facial Image Scale (FIS), created in the last decade, being formed by an image containing 5 distinct faces, which refer to feelings from happiness to sadness, presents easy execution and has been recommended for children and adolescents from 3 to 18 years of age [12]. The evaluation is performed by scoring with 1 the face selected as most positive and 5 for the face chosen as most negative. Thus, the higher the score, the higher the child's anxiety level.

Physiological changes such as blood pressure and heart rate were also evaluated. To measure these, the Premium® LP200 digital sphygmomanometer was used, which is able to measure BP and heart rate simultaneously. Increasingly, the use of this instrument has been recommended by health associations [21]. According to research studies, these devices have specificity close to 90% and sensitivity close to 80%. These values are acceptable for research purposes [22].

After undergoing a clinical evaluation, children were selected in which there was need for intervention with anesthesia in more than one session of care, with authorization granted by the guardians to participate in the study, by signing the informed consent form and the consent form by the child/adolescent. These children were attended by dental students, supervised by a faculty advisor, and were instructed to point out the corresponding face of the Facial Image Scale (FIS) anxiety scale that reproduced their emotional state, in two moments: when sitting in the clinical chair, before performing any procedure and after anesthesia. At these times, physiological data such as blood pressure and heart rate were also measured.

The appointments were divided into two groups: group A and B, one with the presence of music (Symphony 40 in G minor K550 by Wolfgang Amadeus Mozart) and another without musical stimulation. The same child participated in both groups. Sound distraction was applied with the aid of an mp3 player and headset in volume 10 of the device 70 decibels allowing the child to listen to the Dental Surgeon and the music simultaneously.

Descriptive statistics were used to express the results as medians and interquartile range. For inferential statistics, the Shapiro-Wilk normality test was performed. The analysis of the effect of music was calculated using the paired T test,

when the variables presented normal distribution and the Wilcoxon test, when manifested non-normal. The significance level established was α=0.05. Data were tabulated and analyzed in the Software: SPSS version 21.0 (Statistical Package for Social Sciences, IBM Corp. Chicago, IL, USA).

The study protocol was approved by the ethics committee of the State University of Southwest Bahia, receiving approval under protocol number 2,783,574 (CAAE 90810218.0.0000.0055).

RESULTS

The sample consisted of 7 children, mostly male, with a median of 8 years of age. As shown in table 1.

Table 1. Data of those surveyed according to sex and age in the city of Jequié. Bahia, 2018.

Variable	n	%
Sex		
Male	4	57.1%
Female	3	42.9%
Total	7	100%
Age (median/ Q25-Q75)	8 (7-9)	

Table 2. Distribution of children surveyed according to the visit to the dentist and receipt of local anesthesia, Jequié, Bahia, 2018.

Variable	n	%
Have you been to the dentist?		
Yes	3	42.9%
No	4	57.1%
Have you undergone local anesthesia before?		
Yes	2	28.6%
No	5	71.4%

Regarding the first contact with the Dental Surgeon, 42.9% stated that they had never had a consultation, and only 29.6% (n = 2) of the total children had already undergone the anesthetic procedure.

Regarding the psychophysiological variables (Tables 3 and 4), no significant variations were observed compared to before and after in the groups with music and without music.

Table 3. Distribution of children surveyed according to psychophysiological variables, FIS scale in the absence of music in the city of Jequié, Bahia, 2018.

Variables	"Without music"				p value
	Baseline		Post-treatment		
	Median	Q25-Q75	Median	Q25-Q75	
FIS Score	2	1-3	1	1-3	0.577*
Systolic BP (mm/Hg)	98	89-110	98	86-98	0.400†
Diastolic BP (mm/Hg)	67	65-67	65	61-74	0.670†
HR (bpm)	85	70-89	93	66-94	0.350†
	Frequencies				
Collaborative (Y/N)	(7/0)				
The child cried (Y/N)	(0/7)				

Table 4. Distribution of children surveyed according to psychophysiological variables, FIS scale and presence of music in the city of Jequié, Bahia, 2018.

Variables	(With Music				
	Baseline		Post-treatment		p value
	Median	Q25-Q75	Median	Q25-Q75	
FIS Score	2	2-2	2	2-5	0.141*
Systolic BP (mm/Hg)	86	80-98	93	90-98	0.080*
Diastolic BP (mm/Hg)	62	54-66	60	58-65	0.866†
HR (bpm)	84	78-88	85	79-93	0.176†
	Frequencies				
Collaborative (Y/N)	(5/2)				
The child cried (Y/N)	2/5)				

In table 3 and 4, in which physiological data on blood pressure and heart rate were compared according to the FIS scale, no significant differences were observed, regardless of the presence of music.

DISCUSSION

We sought to evaluate the children's response to local dental procedure anxiety under the influence of music. In the dental field, which generates stress and fear, anxiety can provoke different responses to the autonomic nervous system, being able to lead to changes in blood pressure, heart rate and emotional [8], which can hinder and/or prevent the work of the Dental Surgeon [23]. In this sense, the professional can use devices that can reduce or eliminate these changes, such as music, which was the option chosen in the present study.

To measure anxiety, we chose to use the Facial Anxiety Scale (FIS), similarly to the study conducted by Ferreira and Oliveira [24], because it presents itself efficiently in the measurement of anxiety with image [25] in children when clinical evaluation is desired and mainly because it is simple to perform.

The instruments used in the measurement of physiological data consisted of: digital sphygmomanometer, which was used to measure systolic and diastolic BP, according to the study by González and Otazú [26]; the music of choice was the classical one, specifically, the Symphony 40 in G minor by Wolfgang Amadeus Mozart [21] because it brings greater health benefits and consequently prolongs the life of the individual according to the study by Trappe [27], while contributing to the reduction of anxiety, as observed in the study by Bernardi et al. [20].

The results evaluated in this study, despite the sample size, showed no significant difference between the before and after anesthesia in the care of children submitted to contact with music. That is, there was no statistical difference between the groups regarding the change in blood pressure and heart rate in relation to the degree of anxiety measured by the FIS scale. These data corroborate those found in the research carried out by Aitken et al. [28] when evaluating the effects of agitated and relaxing music during the restorative procedure with local anesthesia in 45 children, aged 4 to 6 years, using heart rate as a parameter.

It is necessary to consider whether classical music would be the most indicated as a prevention strategy or even anxiety control, since a certain musical style may not be part of the daily lives of children or even suffer criticism or rejection by the family itself. Still, with regard to the maintenance of the anxiety condition, it can be explained by the fact that local anesthesia is a procedure associated with pain and generates anxiety [29], which may be exerting a greater influence on the child's body than music or even occur independently of it.

It was also noted that during the anesthetic procedure, when they were not submitted to musical appreciation, all children were collaborative and did not cry. However, in the service in which classical music was used, two children resisted and cried during the service. It is prudent to consider that, faced with the reality of the Brazilian child, who

often does not have access to cultural activities, including classical music, not familiarizing with this type of listening can neutralize any effect that music can offer. It is noteworthy that the diversification of the musical style as well as allowing the choice of music by the children can be a positive factor for collaborative behavior and object of future investigations and a diversification in the musical style or even some music chosen by the children should be considered.

Unlike our results, Brant [30] in their research when evaluating 34 children who underwent a procedure with modified atraumatic restorative treatment (mART), with the parameters: blood oxygenation, arterial BP and HR, with and without the influence of classical music, observed a significant reduction (p=0.045) in blood oxygenation indexes in care with musical effects compared to without the effects. Similarly, Marwah et al. [15] carried out research with the objective of verifying whether the use of music was effective in controlling anxiety; to this end, they counted on the participation of 40 children aged between 4 and 8 years and verified that there was a reduction in the pulse rate of the musical group when compared with the control group, that is, music acted as an anxiety attenuating factor.

It is important to consider some limitations of the present study, such as the inequality in the resourcefulness and conduct of care by undergraduate students during pediatric dentistry clinics, the influence of neighboring care due to the proximity between the care boxes, which are performed concomitantly, in addition to family and social history, factors that greatly contribute to high levels of fear and anxiety.

Because this is a pilot study, in this investigation, about 10% of the total sample was evaluated, a factor that contributed to a low power of the study, which could not reveal the difference between the groups under the degree of statistical significance considered. Still, it is important to emphasize that other comparisons were also not possible, such as the search for differences with sex and age. In view of the above, it is necessary to carry out additional studies, with a representative sample and in a controlled dental environment, with bond formation.

CONCLUSION

It is possible to conclude that, under the conditions in which this study was carried out, classical music did not interfere in the reduction of children's anxiety when they underwent pediatric dental care.

Collaborators

RS Silveira, conceptualization, methodology, writing. MS Camizão, conceptualization, methodology. YSS Rocha, writing (review and editing), approved the final version of the article. LAN Barros, data analysis, writing (review and editing). ACDSA Maia, writing (review and editing), approved the final version of the article. NCN Santos, project administration, conceptualization, methodology, writing (review and editing).

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