

The Effect of Different Non-Pharmacological Methods in the Management of Pediatric Patients' Dental Anxiety and Behaviour, a Randomized Control Study

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Received: October 05, 2019; **Published:** October 23, 2019

DOI: 10.31080/ecde.2019.18.01230

Abstract

Introduction: Dental fear and anxiety expressed by children in the dental office during treatment, have been found to be one of the most real challenges for pediatric dentists and the dental practitioners. So far, behavioral management is one of the most reliable methods to deal with and reduce the effect of dental anxiety on children.

Objectives: This study aims to assess the effect of different Non-Pharmacological methods in the management of pediatric patients' anxiety and behavior during dental treatment.

Materials and Methods: This randomized controlled clinical trial was conducted on 42 children, aged between 5 to 12 years, who attended the pediatric dental clinics at College of Dentistry, Taibah University, Medina, Saudi Arabia. Following parents' consent and child assent, children were randomly divided into three groups; "A", "B" and "C", with 14 children in each group according to the behavior management technique used. A" visual distraction using audio-visual aids,"B" Parental presence in dental operatory and "C" Tell-Show-Do (Control group). All dental procedures requiring local anesthesia were included. Facial Image Scale (FIS) and pulse oximeter were used to assess the anxiety of children, in addition, children were asked for the reason of being anxious at the dental clinic.

Results: Among the total of 42 children, 27 were boys (64.3%) and 15 were girls (35.7%). No significant difference was seen in FIS between all groups (p. value = 0.663). However, the mean pulse rate varied with significant difference between all groups (p. value = 0.014). It was found that dental injection was the major reason of dental anxiety (38.1%), followed by pain (33.3%). Tell-show-do, in general, reduced anxiety in comparison to other methods.

Conclusion: Tell-Show-Do was the most accepted non-pharmacological behavior method for children according to FIS and Pulse rate results. The major reason of fear and dental anxiety was dental injection.

Keywords: Anxiety; Behavioral Management; Non-Pharmacological; Facial Image Scale; Dental Fear; Tell-Show-Do

Abbreviations

FIS: Facial Image Scale; SFP: Smiley Faces Program; ACDAS: Abeer Children Dental Anxiety Scale; TUCDREC: College of Dentistry Research Ethic Committee

Introduction

Dental fear and anxiety have been found to be one of the most challenges on the dental chair for pediatric dentists and the dental practitioners during treatment of children [1]. Many causes have been discovered and were the researchers concern to overcome the complications that may end with wrong way of managing dental anxiety [2]. Some researchers found that anxiety could be linked to the degree of pediatric patient maturation and tolerating the dental procedure, which can be an important factor during dental assessment at

the first child visit [3,4]. Prevalence of dental fear and anxiety have been reported for more than 50% of the children, which means that it really can affect the quality of dental treatment [1].

Behavioural management is one of the most reliable methods to deal with and reduce the effect of the dental anxiety for the pediatric dentists [3]. Various techniques have been used to manage the child behaviour at the dental chair [4]. Pharmacological and Non-Pharmacological methods were used for dealing with and overcome the children's dental phobia and fear [4,5]. Pharmacological methods include drugs, sedation or general anaesthesia and all of that depend on the severity of anxiety and degree of child cooperation [6]. Several non-Pharmacological methods like distraction, voice control, modelling, positive reinforcement, Tell-Show-Do and others were used to help in building a strong relation between child and dentist during dental treatment and improve child's dental health in the future [5,7]. Tell - Show - Do is one of the most non-pharmacological approaches that can be used easily with good and effective results at the paediatric dental clinics [7,8]. Many studies considered this approach as the most reliable and effective one [7,9]. Visual distraction has been proven to be successful in managing anxiety during dental treatment [1]. It is universally accepted by children and easy to apply with visual material available for their mental age at the dental clinic [10]. Presence of the parent during child treatment was found to vary from one to another in child's response and consequently effectiveness of treatment [8,9].

Recording the child's dental anxiety level before dental treatment can help the dentist select the suitable behavioural management technique to help the child cope with dental treatment. Strategies to manage patients with dental anxiety have been linked with many scales that can measure the level of dental anxiety [11]. For example: Facial image scale (FIS), Smiley Faces Program (SFP), Modified Child Dental Anxiety Scale and Aberer Children Dental Anxiety Scale (ACDAS) [11,13].

The facial image scale is widely used to assess the level of child's anxiety. It consists of five faces ranging from 'very unhappy' to 'very happy' and numbered from 5 to 1. Children point to the face that they feel reflects their feelings at the moment [14]. Also, some physiological changes as increase in pulse rate can be used to assess dental anxiety. The finger pulse oximeter is an easy and reliable method for measuring pulse rate in children [1,15].

The field of the pediatric dentistry still need to conduct many clinical researches to practice these techniques and to discover much more about dental anxiety to provide the best quality of dental treatment for the paediatric patients with less anxiety and dental fear [5,6].

Aim of the Study

This Study aims to assess the Effect of different Non-Pharmacological methods in the management of paediatric patients' anxiety and behaviour during dental treatment.

Materials and Methods

This randomized controlled clinical trial was carried out in the Dental Clinics at Taibah University, Dental College and Hospital in Al-Madina Al-Munawrah, KSA over a period of 6 months. All patients attending the pediatric dental clinics for treatment between 20 September 2018 to 20 April 2019 who fulfilled the inclusion criteria were included in the study.

The Ethical approval was obtained from the College of Dentistry, Research Ethics Committee, Taibah University.

The sample size was 42 participants, According to OpenEpi, Version 3, open source calculator--SS Cohort, the sample size is 14 participants in each group Percent of Unexposed with Outcome: 5% and Percent of Exposed with Outcome 90%. Only who accept and fulfill the inclusion criteria were enrolled.

Inclusion criteria:

- Arabic or English speakers.
- Absence of mental, cognitive and physical disabilities.
- Children ages between 5 - 12 years old without any systemic disease.
- First dental visit.

- All procedures requiring local anaesthesia (class I, II, III, IV, V cavity preparations-Pulpotomy-Extraction).

Exclusion criteria:

- Children with any systemic disease.
- Audible or Visual impairment.
- sensitivity to local anaesthesia.

A data collection sheet (Figure 1) was completed in an interview type format with the principal investigator which included: Demographic data, type of procedure, Facial Image Scale to measure anxiety level, where the child was asked to point the face which he or she felt most closely depicted their feelings, Child Finger pulse oximeter - for pulse rate measurement before and after the treatment and the cause of dental anxiety.

Figure 1: Data collection sheet.

The aim of the study was explained to the parents and they signed an informed consent and enrolled children gave their assent.

Children were divided into three different groups labelled "A", "B" and "C" randomly. Each group comprised of 14 children to receive "A" visual distraction using audio-visual aids,"B" Parental presence in dental operator and "C" Tell-Show-Do (Control group).

After seating the child on the dental chair, the data collection sheet was filled before giving the local anesthesia.

The FIS comprises a row of five faces ranging from 'very unhappy' to 'very happy' and numbered from 5 to 1 and aims to assess state anxiety (Figure 2) [14]. The children were asked to point to the face which they felt most closely depicted their feelings at that moment. Child Finger pulse oximeter was used before and after injection of local anesthesia to record the pulse rate (Figure 3) [15].

Local anaesthesia (1.8 ml scandicaine 2% with epinephrine 1:100,000) was administered to the patient.

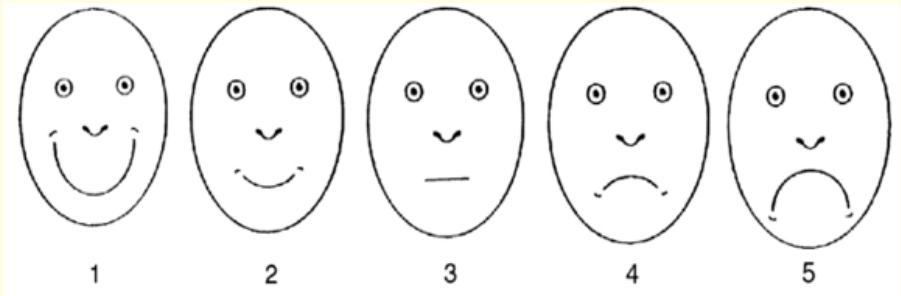


Figure 2: FIS.



Figure 3: Pulse oximeter.

Statistical analysis

Data entry and analyses of results were done using the Statistical Package for Social Sciences (SPSS) ver. 22 for Windows software. The level of significance was set at $p < 0.05$, and it measured by Chi Square, Paired T-test and ANOVA test.

Results

A total of 42 children, 27 boys (64.3%) and 15 girls (35.7%) met the study criteria and were randomly and equally distributed into three groups according to the non-pharmacological method used (Table 1). Most of the children (40.5%) ranged in age between 7 - 9 years old followed by (33.3%) 5 - 6 years old and (26.2%) 10-11 years old (Table 2).

Method	Male N (%)	Female N (%)
Group A	8 (29.6)	6 (40)
B Group	9 (33.3)	5 (33.3)
C Group	10 (37.0)	4 (26.7)
Total	27 (100) (64.3)	15 (100) (35.7)

Table 1: Characteristics of the study sample based on gender.

Method	5-6 years N (%)	7-9 years N (%)	10-11 years N (%)
A Group	5 (35.7)	4 (28.6)	5 (35.7)
B Group	5 (35.7)	6 (42.9)	3 (21.4)
C Group	4 (28.6)	7 (50)	3 (21.4)
Total	14 (100) (33.3)	17 (100) (40.5)	11 (100) (26.2)

Table 2: Characteristics of the study sample based on age.

All examiners were the same and treatment was completed by two practitioners. Self-reported anxiety level based on facial image scale according to non-pharmacological method used is illustrated in table 3. Non-significant difference was seen in FIS between all groups (p. value = 0.663). Average pulse rate was lower after the treatment with group C (Tell-Show-Do) than those in group A (visual distraction method; p = 0.290) and group B (Parent presence method; p = 0.492) (Table 4).

Method	Facial Image Scale (FIS)					Total	P. value
	1 N (%)	2 N (%)	3 N (%)	4 N (%)	5 N (%)		
Group A	8 (57)	2 (14)	4 (29)	0 (0)	0 (0)	14 (100)	0.663
Group B	5 (36)	2 (14)	6 (43)	0 (0)	1 (7)	14 (100)	
Group C	8 (57.1)	2 (14.3)	2 (14.3)	1 (7.1)	1 (7.1)	14 (100)	

Table 3: Self-reported anxiety level based on facial image scale according to non-pharmacological method used.

Method	Before	After	P. value
Group A	93.97 (±19.8)	88.07 (±18.0)	.290
Group B	93.00 (±14.2)	90.36 (±16.0)	.492
Group C	98.14 (±16.4)	87.50 (±13.4)	.014

Table 4: Mean Values of pulse rate before and after treatment for all groups.

Self-reported anxiety level based on facial image scale according to method and gender showed a non-statistically significant difference with p-value = 0.896, 0.397 and 0.669 in groups A, B and C respectively.

Regarding participants' age, almost half of children showed the least stressful treatment according to self-reported anxiety level based on facial image scale. Seven to nine years old children (69.9%) reported the best score in anxiety level with significant difference between all age groups (p-value = 0.02) (Table 5).

Age	FIS					P. value
	1 N (%)	2 N (%)	3 N (%)	4 N (%)	5 N (%)	
5 - 6 years	6 (28.6)	2 (33.3)	4 (33.3)	0 (0)	2 (100)	.020
7 - 9 years	13 (61.9)	0 (0)	3 (25)	1 (100)	0 (0)	
10 - 11 years	2 (9.5)	4 (66.7)	5 (41.7)	0 (0)	0 (0)	
Total	21(100) (50%)	6 (100) (14.3%)	12 (100) (28.6%)	1 (100) (2.4%)	2 (100) (4.8%)	

Table 5: Self-reported anxiety level based on facial image scale according to the age.

Concerning the reasons of fear from dentists, the current results showed that dental injection was the major reason of fearing from dentist (38.1%), followed by fear from pain (33%) (Figure 4).

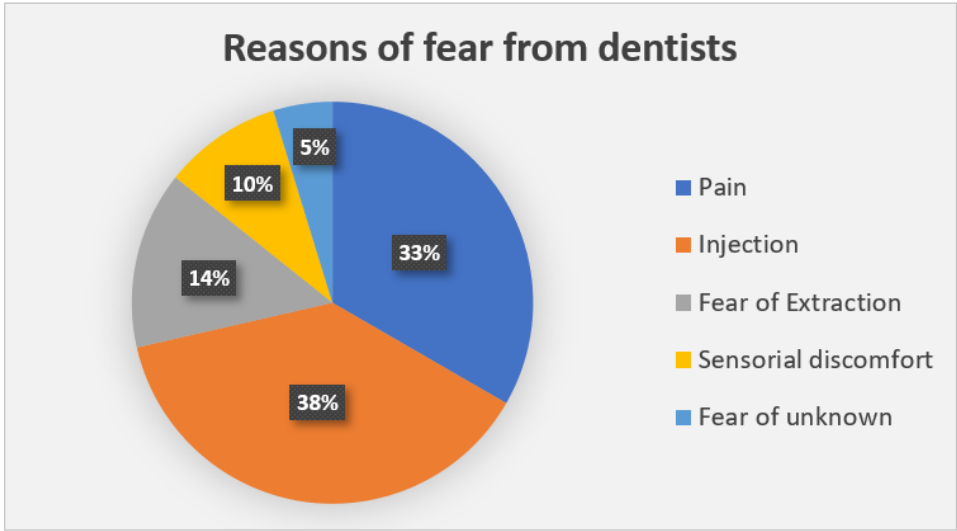


Figure 4: Reasons of fear from dentists.

Discussion

This study was conducted to compare the effect of different Non-Pharmacological methods in the management of paediatric patients' anxiety and behaviour in the region of Madinah, Saudi Arabia.

Three non-Pharmacological methods were used including: Tell-Show-Do, visual distraction using audio-visual aids and Parental presence in dental operatory. In our study, facial image scale (FIS) was used to measure children's anxiety as it is considered one of the most valid scales that is popularly used in research studies [16-18]. Also, the ease of expression and choice of the child through faces, makes it convenient and faster to use effectively. In this study there was no statistical difference in the self-reported anxiety level based on FIS scores between all groups (p. value = 0.663), however it was non-significantly lower in the Tell - show - do group compared to the other two groups. This confirms that the result of the current study is consistent with many studies on this effective way to reduce stress and fear in children in facing the type of treatment and dentist [7,8].

The pulse rate was used as a true indicator of the child's stress and fear in the dental clinics; studies have shown that it increases in the clinical settings. This indicator has been used previously in many studies [1,5,19]. The present study showed that the mean pulse rate varied with significant difference between all groups (p. value = 0.014) (Table 4). Average pulse rate was lower after application of the non-pharmacological techniques in all groups but decreased significantly with group C (Tell-Show-Do) than those in group A (visual distraction method; p = 0.290) and group B (Parent presence method; p = 0.492) (Table 3). This result may be attributed to that verbal and non-verbal communication with the child and trying to convey a sense of interest in the dental procedures, contribute significantly to reduce stress and high heartbeat and fear. Additionally, trying to involve the child in all steps of treatment as much as possible according to his mental abilities and level of perception and understanding results in lower anxiety levels.

Regarding the result of group, A, the use of the audiovisual approach to reduce fear during dental clinic visit in this study is also consistent with other studies conducted in the control of the child during treatment and achieve better results [1,10]. This could be to the ease of applying this method and the tools for it become globally available today and related to the child mind.

The presence of parents or not during treatment was not the superior method of reducing fear and dealing with the child in this study, and this is consistent with a previous study [8]. In addition, it was found that the absence of parents may cause misconduct in the child behavior during dental clinic visit [8].

This study showed that gender differences is statistically insignificant in the extent of fear and anxiety from the dentist and dental treatment. This is consistent with previous studies [8,21].

As regards the self-reported anxiety level based on facial image scale according to the age it was noted that the degree of fear decreases as age increases especially at the age of 7 - 9 years old. We believe that this is an important finding as visiting the dentist at an early age can reduce fear and results in better understanding of his/her physiological problems to avoid oral problems in the future. This result has been observed in other studies as well where the relationship between age and dental anxiety level is inversely proportional [22,23-29].

Dental injection was the highest reason of fear from the dental visit followed by fear of pain from dental treatment and dental extraction. Despite dramatic advances in dentistry and rapid developments, the fear of localized needle injections is still worthwhile further research into how to overcome it. This finding is consistent with several studies conducted on the cause of fear from visiting the dentist in young patients [12,14].

The present study aimed to assess the effect of different Non-Pharmacological methods in the management of pediatric patients' anxiety and behavior during dental treatment, which would upgrade the knowledge of how to provide better treatment results and understanding the cause of fear related to pediatric patients.

Conclusion

Non-significant difference was observed between the three Non-Pharmacological techniques. However, Tell-Show-Do was the most accepted method for children according to FIS scores and Pulse rate results. The major reason of fear and dental anxiety was dental injection.

Recommendation

further research on various non-pharmacological methods and how to overcome children's anxiety and dental fear are needed for improving dental treatment and to achieve advanced results in maintaining oral health.

Conflict of Interest

The author has no conflict of interest to declare.

Bibliography

1. Ghadimi S., *et al.* "Effect of Visual Distraction on Children's Anxiety during Dental Treatment: A Crossover Randomized Clinical Trial". *European Archives of Paediatric Dentistry* 19.4 (2018): 239-244.
2. Appukuttan Deva Priya. "Strategies to Manage Patients with Dental Anxiety and Dental Phobia: Literature Review". *Clinical, Cosmetic and Investigational Dentistry* 8 (2016): 35-50.
3. Singh Harender., *et al.* "Techniques for the Behaviors Management in Pediatric Dentistry children with dental anxiety". *International Journal of Scientific Study* 2.7 (2014).
4. Ahuja Shilpa., *et al.* "Assessment of the Effect of Parental Presence in Dental Operatory on the Behavior of Children Aged 4-7 Years". *Journal of Indian Society of Pedodontics and Preventive Dentistry* 36.2 (2018): 167-172.
5. Cianetti Stefano., *et al.* "Evidence of Pharmacological and Non-Pharmacological Interventions for the Management of Dental Fear in Paediatric Dentistry: A Systematic Review Protocol". *BMJ Open* 7.8 (2017): e016043.

6. Wong Cecile., *et al.* "Pain Management in Children: Part 1 - Pain Assessment Tools and a Brief Review of Nonpharmacological and Pharmacological Treatment Options". *Canadian Pharmacists Journal* 145.5 (2012): 222-225.
7. Farhat-McHayleh Nada., *et al.* "Techniques for Managing Behaviour in Pediatric Dentistry: Comparative Study of Live Modelling and Tell-Show-Do Based on Children's Heart Rates during Treatment". *Journal of the Canadian Dental Association* 75.4 (2009): 283.
8. Boka V., *et al.* "A Study of Parental Presence/Absence Technique for Child Dental Behaviour Management". *European Archives of Paediatric Dentistry* 18.6 (2017): 405-409.
9. Gavic Lidia., *et al.* "The Role of Parental Anxiety, Depression, and Psychological Stress Level on the Development of Early-Childhood Caries in Children". *International Journal of Paediatric Dentistry* 28.6 (2018): 616-623.
10. Meshki Razieh., *et al.* "Effects of Pretreatment Exposure to Dental Practice Using a Smartphone Dental Simulation Game on Children's Pain and Anxiety: A Preliminary Double-Blind Randomized Clinical Trial". *Journal of Dentistry (Tehran, Iran)* 15.4 (2018): 250-258.
11. Buchanan H. "Development of a Computerised Dental Anxiety Scale for Children: Validation and Reliability". *British Dental Journal* 199.6 (2005): 359-362.
12. Al-namankany Abeer. "Assessing Dental Anxiety in Young Girls in KSA". *Journal of Taibah University Medical Sciences* 13.2 (2018): 123-128.
13. De Menezes Abreu Danielle Matos., *et al.* "Dental Anxiety in 6-7-Year-Old Children Treated in Accordance with Conventional Restorative Treatment, ART and Ultra-Conservative Treatment Protocols". *Acta Odontologica Scandinavica* 69.6 (2011): 410-416.
14. Navit Saumya., *et al.* "Effectiveness and Comparison of Various Audio Distraction Aids in Management of Anxious Dental Paediatric Patients". *Journal of Clinical and Diagnostic Research* 9.12 (2015): ZC05-ZC09.
15. Zone Medical. "Child Pulse Oximeter ChoiceMed C53". Zone Medical (2019).
16. Shah HA., *et al.* "Evaluation of Dental Anxiety and Hemodynamic Changes (Sympatho-Adrenal Response) during Various Dental Procedures Using Smartphone Applications v/S". *International Journal of Applied Research* 3.5 (2017): 429-433.
17. Boman Ulla Wide., *et al.* "Common Use of a Fear Survey Schedule for Assessment of Dental Fear among Children and Adults". *International Journal of Paediatric Dentistry* 18.1 (2008): 70-76.
18. Krishnappa S., *et al.* "Evaluation of Facial Image Scale and Venham Picture Test Used to Assess Dental Anxiety in Children". *Journal of Indian Association of Public Health Dentistry* 11.3 (2013): 31-35.
19. Vasiliki B., *et al.* "The Effect of Parental Presence on the Child's Perception and Co-Operation during Dental Treatment". *European Archives of Paediatric Dentistry* 17.5 (2016): 381-386.
20. Barros Luísa and Heather Buchanan. "Correspondence between Dentist and Child Ratings of Dental Anxiety in Portugal: A Preliminary Study". *Revista Portuguesa de Estomatologia, Medicina Dentaria e Cirurgia Maxilofacial* 52.1 (2011): 13-15.
21. Radhakrishna Sreeraksha., *et al.* "Comparison of Three Behavior Modification Techniques for Management of Anxious Children Aged 4-8 Years". *Journal of Dental Anesthesia and Pain Medicine* 19.1 (2019): 29-36.
22. Popescu Sanda Mihaela., *et al.* "Dental Anxiety and Its Association with Behavioral Factors in Children". *Current Health Sciences Journal* 40.4 (2014): 261-264.
23. Gaffar Balgis O., *et al.* "The Prevalence, Causes, and Relativity of Dental Anxiety in Adult Patients to Irregular Dental Visits". *Saudi Medical Journal* 35.6 (2014): 598-603.

24. Chapman HR and NC Kirby-Turner. "Dental Fear in Children - A Proposed Model". *British Dental Journal* 187.8 (1999): 408-412.
25. Council Review. "Behavior Guidance for the Pediatric Dental Patient". *Pediatric Dentistry* 40.6 (2015): 246-259.
26. Salem Katayoun., *et al.* "Dental Fear and Concomitant Factors in 3-6 Year-Old Children". *Journal of Dental Research, Dental Clinics, Dental Prospects* 6.2 (2012): 70-704.
27. Folayan MO., *et al.* "The Modulating Effect of Culture on the Expression of Dental Anxiety in Children: A Literature Review". *International Journal of Paediatric Dentistry* 14.4 (2004): 241-245.
28. Nakai Y., *et al.* "The Children's Fear Survey Schedule-Dental Subscale in Japan". *Community Dentistry and Oral Epidemiology* 33.3 (2005): 196-204.
29. Abu-Ghazaleh Suha B., *et al.* "The Arabic Version of the Modified Dental Anxiety Scale". *Saudi Medical Journal* 32.7 (2011): 725-729.

Volume 18 Issue 11 November 2019

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