Original Article

The Efficacy of Little Lovely Dentist and Tell Show Do in Alleviating Dental Anxiety in Iraqi Children: A Randomized Clinical Trial

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ABSTRACT

Aim: Behavior management approaches in treating children are generally viewed as techniques to enhance communication with patients to promote positive attitudes. Patients, particularly children, consider visiting a dental clinic to be a difficult and painful experience, so a dentist who treats children should have a variety of behavior management techniques. This study aimed to evaluate and compare the efficacy of Tell Show Do (TSD) and a mobile app in reducing dental anxiety among children patients. **Materials and Methods:** A clinical trial study with 66 children aged 6–8 years was divided into three groups by the randomization method, which was performed in two steps: the first step used a random group generator template for excel to distribute the 66 children into three groups (each group 22), and the second step by excel function (RAND) to make the sequence for children. The sample was divided into three groups; each group has 22 children: Group I (TSD), Group II mobile app (Little Lovely Dentist), and Group III control. ClI fillings of the primary molars were provided to all participants. Anxiety levels were measured using physiological methods (heart rate and oxygen saturation by pulse oximeter) and psychological methods (Venham picture test) before treatment, during the education stage, and after treatment. The statistical tests were the paired *t* test for intragroup comparison and one-way analysis of variance (ANOVA) for intercomparison. **Results:** One-way ANOVA showed a significantly lower pulse rate in the mobile app group after treatment, significantly higher SPO_2 saturation in the mobile app group than in the TSD and control groups, and significantly lower Venham scores in the mobile app group than in the control group. **Conclusion:** The use of the Little Lovely Dentist mobile app decreased dental anxiety levels in children's first dental visit more than both the TSD technique and control groups when compared.

Keywords: *Anxiety, behavior management, little lovely dentist, mobile, public health, tell show do*

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Introduction

Fear from the dentist is the most common cause of avoiding dental visits in children, and dental anxiety management is one of the most important determinants of desired results following dental treatment in pediatric patients.[1] Pediatric dentistry patients frequently experience significant levels of anxiety, which in turn prevents them from receiving the best care possible.[2] In general, anxiety is defined as a scared response to different stimuli, such as dental treatment, and it is frequently classified as feeling sick, vomiting, having a rapid heart rate, having high blood

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pressure, and experiencing palpitations.[3] Sometimes, dental anxiety may originate without any previous dental visits or even simple intervention; instead, it can be caused by collective attitudes and thoughts.[4]

Pain and the usage of local anesthetic agents are still real problems in pediatric dentistry. [5] Also, there was a strong relationship between pain and anxiety; by decreasing the anxiety of the child, the amount of perceived pain decreased.[6] So, to handle worried children during dental treatment, behavior management strategies must be used; thus, it's crucial to briefly speak with the kid patient before the dental visit in order to build rapport and trust.[7] One of the most popular behavior management strategies that are based on the idea of learning is the "Tell Show Do" strategy. According to it, the kid must be fully told about any procedure before it is carried out, and the process must be demonstrated using a simulator before it begins.[8] Dental mobile applications allow kids to play entertaining games in which they may perform a range of dental treatments on cartoon characters. A dental app that offers more thorough explanations can demonstrate the entire dental procedure to the young patient.[9] Furthermore, these applications offer a range of dental services, including dental hygiene, pulp therapy, tooth extraction, teeth restoration, and more.[10] A study examining the efficacy of the Tell Show Do (TSD) and Little Lovely Dentist methods in minimizing dental anxiety in pediatric patients was carried out, and they found that the Little Lovely Dentist method was more effective at reducing anxiety levels than the TSD technique and in the same research, TSD did not prove to be beneficial in reducing anxiety levels.[11] Another study compared TSD with audio-visual distraction (AVD) and found that AVD was more effective in reducing dental anxiety than TSD. ADditionally, the study found that a combination of TSD and AVD had an additive effect in reducing anxiety levels, and it proved to be more effective than just using TSD or AVD alone.[12]

Rationale

Dental anxiety is a common problem faced by many patients worldwide and remains a significant challenge in providing dental care, especially for pediatric patients; however, there have been many studies on the effects of TSD on dental anxiety, but few studies have compared TSD and mobile apps (Little Lovely Dentist). Therefore, this study compared and evaluated the TSD technique in reducing dental anxiety in Iraqi children undergoing restorative dental treatments with that of a smartphone app called Little Lovely Dentist.

Hypothesis

Null

There is no difference between the effects of the TSD and mobile apps on dental anxiety.

Alternative

There is a difference between the effects of the TSD and mobile apps on dental anxiety.

Materials and Methods

Study design

The current study began after receiving permission from the Ethical and Scientific Committees at the College of Dentistry, University of Baghdad from February 6, 2022, Project No. 475322.

Eligibility criteria

Sixty-six healthful children aged 6–8 years old who had never had any dental experience were included in the study. Dental treatment was necessary for all participants carious primary first molars without pain or pulpal involvement. Children with physical illnesses or special health care needs were excluded. After explaining the research's procedure to the participants' parents and getting their informed permission before starting therapy, the participants were enrolled in the trial.

Sample size estimation

Using G power 3.1.9.7 (developed by Franz-Faul, University of Kiel, Germany) with 80% research power, 0.05 two-sided alpha error of probability, and an effect size of F of 0.40 (big effect size), with three groups, with all these conditions the sample size is 58 subjects, adding 10% as an error rate so the sample size is 66 subjects (22 subjects for each group). Effect size F is: small = 0.1, medium = 0.25, large = 0.4.

Randomization

Randomization of this study was made in two steps: The first step was by using a Random Group Generator template for Excel to distribute the 66 children into three groups (each group 22), then the second step was by using the Excel function (RAND) to make the sequence for children.

Blinding

Only the statistician was involved in the blinding process during the statistical analysis, but the operator was not blind regarding the type of intervention.

Procedure

The same clinical procedures were carried out for the three groups; all participants received preoperative instructions before receiving dental care, after which the parent was told of the study's objectives, drawbacks, and benefits and given a written consent form. At least one parent of the kids passively watched the session. After that, during the education stage before starting the treatment (the first group was managed by the TSD technique, the second group was managed by the mobile

app Little Lovely Dentist, and the third group was the control group). Heart rate, O_2 saturation, and Venham picture test (VPT) were monitored in each group before and after recording to assess the efficacy of the management strategy. Infiltration local anesthesia administration was done after applying topical anesthetic gel for 1 min.[13] For all children, one visit was sufficient to complete the entire dental procedure, which lasted approximately 20–30 min to be completed.

Group I

The TSD approach was applied to this group; during the "Tell" phase, a verbal explanation of the type of treatment most suited to the child's developmental stage was given. They learned about the procedure toolkit during the "Show" phase, and after that, they saw a correctly explained, nonaggressive demonstration of the approach. After administering the local anesthesia, the dentist began the remainder of the procedure without deviating from the instruction and demonstration. This was the "Do" phase.

Group II

For this group, a mobile app called "Little Lovely Dentist" was employed [Figure 1]. The dentist participated in the activity by teaching the kids about the restorations that would be done for them by playing the game with them for 5–10 min.

Group III

No behavior management strategy was applied to the control group.

Figure 1: Mobile application (Little Lovely Dentist)

Statistical analysis

SPSS version 25 which produced by SPSS Inc. in Chicago and it was acquired by IBM in 2009, was employed for data analysis, with the parameters classified into two categories: physiological parameters, including heart rate and oxygen saturation, and the psychological parameter being the VPT. Since the sample size was greater than 30, the Shapiro–Wilk test was used to determine whether the data were normally distributed.[14] The statistician was involved in the blinding process during the statistical analysis to ensure no bias possibility and no observer's recruitment. To ascertain the efficacy of the three behavior management techniques in this study, paired *t*-test (intragroup comparison) on groups' mean values and one-way analysis of variance (ANOVA) for intergroup comparison. A *P*-value of ≤0.05 was considered statistically significant, and the ICC value was between 0 and 1.

Results

The gender distribution in the three groups was 12 boys and 10 girls. Also, the normality of the sample was tested by the Shapiro–Wilks test, and it revealed that they were normally distributed ($P > 0.05$).

Heart rate

In the mobile app group, there was a significant decrease in heart rate before and after treatment, while TSD and control group showed a significant increase in heart rate [Table 1].

Furthermore, when comparing the posttreatment heart rate among the three groups, there was a significant difference among the groups.

When pairwise multiple comparisons were used, the heart rate was significantly higher in the control group than in both other groups, while when comparing the TSD technique with the mobile app technique, the heart rate was significantly higher in the first than the second [Table 2].

Oxygen saturation

In the mobile app, there is a significant increase in O_2 saturation before and after treatment, while in the TSD and control group, there is a significant decrease in O_2 saturation [Table 3].

Table 1: Descriptive and statistical test of heart rate among group before and after

	Tell Show Do		Mobile		Control		ANOVA		
	Mean	SD±	Mean	SD±	Mean	SD±	df	*F*	*P* value
Before	97.04	1.46	96.81	4.41	98.54	2.93	2	2.029	0.140
After	99.40	3.38	92.95	3.65	102.68	2.59	2	48.279	0.001
Paired *T*-test	4.247		5.446		7.902				
P value	0.001≥		0.001≥		0.002				

Additionally, when comparing the pre and posttreatment of O_2 saturation among the three groups, there was a significant difference among groups.

Intergroup multiple comparisons revealed that the oxygen saturation before treatment was significantly higher in TSD and the control groups than in the mobile app group, while after treatment, O_2 was significantly higher in the mobile app than TSD and the control group [Table 4].

Venham picture scale

In Table 5, intracomparison of the VPT showed that the mean of the VPT after treatment of the mobile app group showed a significant decrease, followed by the TSD group and then the control group.

Furthermore, when comparing the posttreatment of the VPT among the three groups, there was a significant difference.

Post-hoc multiple comparisons revealed that the mean differences of Venham test values after treatment in the mobile app were significantly lower than the control group, as shown in Table 6.

Discussion

Dental anxiety has long been known as a significant cause of difficulty in controlling kids during dental treatment.[15] Anxiety during dental treatment may interfere with the proper delivery of oral care because it can appear in a variety of ways, commonly as disruptive or interruptive behaviors.[16] Most homes in the modern world have many electronic devices like televisions, tablets, and smartphones, through which children are introduced to various facets of life, including cartoons about medical procedures, more especially dental procedures.[17] The mobile application "Little Lovely Dentist" has been developed by Leaf Cottage software and Shanghai Edaysoft Co., Ltd., which is available on the App Store and Google Play software; the application

Table 2: Intergroup pairwise comparison of the heart rate after treatment

(Intercomparison) pairwise comparisons			
Measure: heart rate after treatment			
Group (*I*)	Group (*J*)	Mean difference (*I* - *J*)	Sig.
TSD	Mobile	6.45455*	0.001
Control	TSD	3.27273*	0.005
	Mobile	9.72727*	0.001

*TSD: Tell Show Do

Table 6: Intergroup multiple comparisons of Venham picture test after treatment between groups

Multiple comparisons				
Measure: Venham picture test after treatment				
Groups (*I*)	Groups (*J*)	Mean difference (*I* - *J*)	Std. error	Sig.
TSD	Mobile app	0.72727	0.39135	0.159
Control	TSD	0.81818	0.39135	0.1
	Mobile App	1.54545*	0.39135	0.001

*TSD: Tell Show Do

Table 3: Descriptive and statistical test of oxygen saturation among groups before and after treatment

	Tell Show Do		Mobile		Control		ANOVA		
	Mean	SD±	Mean	SD±	Mean	SD±	df	*F*	*P* value
Before	97.63	1.39	94.54	2.60	97.90	1.44	2	20.295	0.001
After	93.77	5.08	97.77	1.80	93.22	2.19	2	11.420	0.001
Paired *T*-test	3.585		6.087		5.853				
P value	0.002		≤0.001		0.001≥				

Table 4: Intergroup multiple comparisons of O_2 saturation before and after treatment

Multiple comparisons							
Measure: O_2 before treatment				O_2 after treatment			
Groups (*I*)	Groups (*J*)	Mean difference (*I* - *J*)	Sig.	Groups (*I*)	Groups (*J*)	Mean difference (*I* - *J*)	Sig.
TSD	Mobile app	3.09091*	0.001.	TSD	Control	0.54545	0.859
Control	TSD	0.27273	0.888	Mobile app	TSD	4.00000*	0.001
	Mobile app	3.36364*	0.001		Control	4.54545*	0.001

*TSD: Tell Show Do

Table 5: Descriptive and statistical test of Venham picture test among groups before and after treatment

	Tell Show Do		Mobile		Control		Anova		
	Mean	SD±	Mean	SD±	Mean	SD±	df	*F*	*P* value
After	1.77	1.37	1.07	1.17	2.59	1.33	2	7.806	0.001
Paired *T*-test	4.29		4.70		2.69				
P value	0.002		0.001≥		0.014				

consists of various activities, which include restorations, fissure sealants, extractions, brushing, and playfully explaining oral hygiene methods to the child.[11]

The TSD technique was selected as the comparator in the present study as it is one of the children's most commonly used methods for behavior control. Since then, it has been the technique that is most frequently used and compared to other behavior control strategies globally.[12,18]

Concerning the change in the heart rate, after treatment, the TSD group and the control group had significantly higher heart rates after treatment, possibly due to dental procedures (anesthesia and cavity preparation) induce sympathetic stimulation and release of catecholamine, which results in increasing heart rate.[19] Additionally, the pulse rate is a physiological indicator of anxiety; the rise in pulse rate may also be attributed to the effect of vasoconstrictor in local anesthesia.[20,21] While the significantly lower pulse rate in the mobile app group after treatment was explained the lower anxiety level in this group's children. This finding agreed with Radhakrishna study, which found that after treatment, there was a significant reduction in mean pulse rate for the smartphone dentist game group, indicating lower anxiety levels in the group when compared to the TSD group and control group.[22]

SPO_2 saturation was significantly higher in mobile app and video groups than in TSD and control groups; this means that the anxiety level of children in TSD and control groups was high because the anxiety leads to hypoxia and consequent decrease in SPO_2 level.[23] Clinical symptoms of anxiety include heart rate increase and hyperventilation.[24]

Anxiety in children may be manifested in many ways. Some children respond in a disruptive or an interruptive behavior and others may respond by sweating and an increase in heart beat rate while Some children don't show any external sign of anxiety.[25] The amount of dental anxiety was assessed subjectively using the VPT. It is fast, reliable, precise, and easy to use. When children were given the option of any self-reported anxiety measure, VPT was the scale they chose.[26] The VPT scores showed a decline in the three groups, but the greatest decline was found in the mobile app group when compared to baseline scores. Also, when comparing the three groups, among them, the mobile app was better (low VPT scores) than the control. The lack of playfulness and interaction in the TSD group's instruction, despite the fact that it was delivered in a non-threatening manner and suitable language, may have contributed to the group's higher heart rate, VPT scores, and lower oxygen saturation. While the decrease in anticipatory anxiety in the mobile app group because the sounds and animation in the mobile game masked the external environment, which consisted of potential anxiety-provoking stimuli, such as metallic sounds of instruments and drills, sharp tools, and staff conversations. These stimuli could elicit exaggerated responses and anxiety in the absence of distraction. Furthermore, it might be related to the exposure to the treatment in a fun, interactive way using the dental app "Little Lovely Dentist." Exposure to the process and its noises during the virtual procedure simulation may have been another crucial element that helped to lessen anxiety. This helped the patients become accustomed to the dentist's environment, lessen their nervousness, create a bridge for future communication, and prepare for treatment sessions.[8,9]

The findings of this study were consistent with those of Elicherla, who discovered that TSD is less effective than behavior guidance using a dental app for alleviating anxiety in kids who have never had dental work done.[9] This is so that the youngster may become more familiar with the process and participate in a virtual interactive simulation of the treatments prior to the procedure. To help youngsters behave appropriately during their first dental appointment by lowering their fear of the procedure, pediatric dentists can consider using a dental app as a behavior management technique. There was a difference between the mobile app group and the TSD group, so we accepted the alternative hypothesis and refused the null hypothesis. The study's limitations were due to the lack of children in this age range who had not previously visited a dentist; hence, the average age needs to be reduced.

Conclusion

Based on the procedures used and the results of this investigation, it is feasible to make the following conclusions:

- Children aged 6–8 years who used TSD and mobile app strategies had lower dental anxiety levels than those who never employed any behavior management methods.
- Comparing the "mobile application" to the TSD approach, a greater reduction in anxiety was achieved.
- Pediatric dentists recommended to use of dental game applications since they encourage cooperative conduct during the kid's first appointment.

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Conflict of interest

There is no conflict of interest to declare.

Author contributions

S.Z.: Data curation, writing—original draft preparation, formal analysis, resources. Z.J.: Conceptualization, methodology, supervision, writing—reviewing and editing, project administration.

Ethical Policy and Institutional Review board statement

The Research Ethics Committee of the College of Dentistry, University of Baghdad, has reviewed the submitted research project outlined below for ethical approval on February 6, 2022, Project No. 475322.

Patient declaration of consent

I confirm that I have read and understood the above research information and have had sufficient time to ask questions. On the topic and all my questions have been answered. I understand that my participation in the research is voluntary and that I am free to withdraw from participation at any time without that is on the medical care provided to me. I understand that my research-related information will be viewed by the persons responsible for the research at the College of Dentistry, University of Baghdad, and I give my approval. I agree to participate in the above research.

Data availability statement

Data associated with the paper is available.

References

1. Zighair RK, Jafar ZJ. Evaluation of children's dental anxiety in colorful versus conventional dental clinic. Int Med J 2021;28:58-60.
2. Bandelow B, Michaelis S, Wedekind D. Treatment of anxiety disorders. Dialogues Clin Neurosci 2022;19:93-107.
3. Chhabra N, Chhabra A, Walia G. Prevalence of dental anxiety and fear among five to ten-year-old children: A behaviour based cross sectional study. Minerva Stomatol 2012;61:83-9.
4. Jafar Z. Interaction of dental anxiety and ABO secretor status of blood group on dental caries in a group of children. Braz Dent Sci 2022;25:e2928.
5. Ismail MM, Haidar AH. Impact of Brix 3000 and conventional restorative treatment on pain reaction during caries removal among a group of children in Baghdad city. J Bagh Coll Dentistry 2019;31:7-13.
6. Khalaf MS. Children's preference of dental injectors and its influence on child cooperation. J Bagh Coll Dentistry 2011;23:10.
7. Ram D, Shapira J, Holan G, Magora F, Cohen S, Davidovich E. Audiovisual video eyeglass distraction during dental treatment in children. Quintessence Int 2010;41:673-9.
8. Vishwakarma AP, Bondarde PA, Patil SB, Dodamani AS, Vishwakarma PY, Mujawar SA. Effectiveness of two different behavioral modification techniques among 5–7-year-old children: A randomized controlled trial. J Indian Soc Pedod Prev Dent 2017;35:143-9.
9. Elicherla SR, Bandi S, Nuvvula S, Challa R, Saikiran KV, Priyanka VJ. Comparative evaluation of the effectiveness of a mobile app (Little Lovely Dentist) and the tell-show-do technique in the management of dental anxiety and fear: A randomized controlled trial. J Dent Anesth Pain Med 2019;19:369-78.
10. AlKlayb SA, Assery MK, AlQahtani A, AlAnazi M, Pani SC. Comparison of the effectiveness of a mobile phone-based education program in educating mothers as oral health providers in two regions of Saudi Arabia. J Int Soc Prev Community Dent 2017;7:110.
11. Abbasi H, Saqib M, Jouhar R, Lal A, Ahmed N, Ahmed MA, *et al*. The efficacy of little lovely dentist, dental song, and tell-show-do techniques in alleviating dental anxiety in paediatric patients: a clinical trial. Biomed Res Int 2021;2021:1-7.
12. Khandelwal D, Kalra N, Tyagi R, Khatri A, Gupta K. Control of anxiety in pediatric patients using "Tell Show Do" method and audiovisual distraction. J Contemp Dent Pract 2018;19:1058-64.
13. Elicherla SR, Sahithi V, Saikiran KV, Nunna M, Challa RR, Nuvvula S. Local anesthesia in pediatric dentistry: A literature review on current alternative techniques and approaches. J South Asian Assoc Pediatr Dent 2021;4:148-54.
14. Shapiro SS, Wilk MB. An analysis of variance test for the exponential distribution (complete samples). Technometrics 1965;14:355-70.
15. Milgrom P, Weinstein P, Kleinknecht R, Getz T. Treating Fearful Dental Patients: A Clinical Handbook. New York: Appleton; 1985.
16. Ayer Jr WA, Domoto PK, Gale EN, Joy Jr ED, Melamed BG. Overcoming dental fear: Strategies for its prevention and management. J Am Dent Assoc 1983;107:18-27.
17. Radesky JS, Weeks HM, Ball R, Schaller A, Yeo S, Durnez J, *et al*. Young children's use of smartphones and tablets. Pediatrics 2020;146:1.
18. Al-Khotani A, Bello LA, Christidis N. Effects of audiovisual distraction on children's behaviour during dental treatment: A randomized controlled clinical trial. Odontol Scand 2016;74:494-501.
19. Prabhakar AR, Marwah N, Raju OS. A comparison between audio and audiovisual distraction techniques in managing anxious pediatric dental patients. J Indian Soc Pedod Prev Dent 2007;25:177-82.
20. Singh D, Samadi F, Jaiswal JN, Tripathi AM. Stress reduction through audio distraction in anxious pediatric dental patients: An adjunctive clinical study. Int J Clin Pediatr Dent 2014;7:149.
21. Navit S, Johri N, Khan SA, Singh RK, Chadha D, Navit P, *et al*. Effectiveness and comparison of various audio distraction aids in the management of anxious dental pediatric patients. J Clin Diagn Res 2015;9:ZC05-9.
22. Radhakrishna S, Srinivasan I, Setty JV, Krishna M, Melwani A, Hegde K. Comparison of three behavior modification techniques for the management of anxious children aged 4–8 years. J Dent Anesth Pain Med 2019;19:29-36.
23. Fukayama H, Yagiela JA. Monitoring of vital signs during dental care. Int Dent J 2006;56:102-8.
24. Goodday RH, Crocker DA. The effect of rubber dam placement on the arterial oxygen saturation in dental patients. Oper Dent 2006;31:176-9.
25. Khalaf MS. Evaluating the Effect of Showing the Dental Injector to Children on Their Dental Behavior in Relation to the Vital Signs and Maternal Anxiety. J Med Dent 2016;61-5.
26. Ghadimi S, Estaki Z, Rahbar P, Shamshiri AR. Effect of visual distraction on children's anxiety during dental treatment: A crossover randomized clinical trial. Eur Arch Paediatr Dent 2018;19:239-44.