Assessing the behavior management problems during the first dental visit of preschool children using a doll placement test

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ABSTRACT

Context: Assessing dental anxiety as a predictor of the likely behavior of the child in the dental operatory is of paramount importance for a clinician to render quality care. Aim: This study aims to correlate the dental anxiety of preschool children as shown during the doll placement test with that of their behavioral patterns during the first dental visit. Settings and Design: This cross-sectional study was conducted between the ages of 3–7 years. Materials and Methods: During their first dental visit, the background variables were elicited from parent/guardian at the reception desk. Later at the play area, the child was given a set of dolls representing dentist, child, and mother to place them in a model dental office having a dental chair. The child was then taken for the initial oral examination, during which the behavior of the child was rated using Frankl’s Behavior Rating Scale. The data collected were analyzed using Chi-square test and binary regression analysis. Results: The observed association between the doll placement pattern and the behavior of the patient during dental treatment was statistically significant ($P < 0.001$). The binary regression analysis showed that the child’s unpleasant previous medical and parent’s unpleasant dental experiences had higher odds favoring uncooperative behavior (46.63 and 41.93, respectively). Conclusions: The child’s behavior on the dental chair is associated with the doll placement pattern, which is also influenced by experiences of the child during his/her encounter with the medical doctor and previous dental experiences of their parents.

KEYWORDS: Behavior, children, dental anxiety, dental care

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Introduction

Uncooperative behavior of pediatric dental patients has received multiple conceptualizations, dental fear and anxiety (DFA) being the center of all.¹¹ The

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children having DFA and their parents find dental visits very cumbersome. If DFA is not identified and sufficiently taken care of during the initial dental visits itself, the child will poorly comply with the given instructions which will lead to avoidance of the follow-up care. The development of avoidance behaviors may result in compromised prognosis, adding negative impacts on the oral health thereby enhancing the already existing DFA. Thus, DFA may affect the psychological as well as overall well-being.

Management of a patient with DFA is very efficient, when there is an effective formation of the pedodontic treatment triangle. The in-depth analysis of the patient’s psychology will enable the pedodontist to manage the child appropriately during dental procedures. Assessing dental anxiety as a predictor of the likely behavior of the child in the dental operatory is of paramount importance for a clinician to render quality care. Psychometric assessments, questionnaires, and analysis of psychological responses have been suggested as the popular methods of analyzing DFA among children.

Ozaki et al. conducted a study wherein a miniature dental office was used to predict the anxiety in children. With that background, Shinji et al. conducted a study to evaluate how much anxious the child patient was while awaiting dental treatment using a doll placement test, thereby validating the doll placement test as a novel methodology to assess anxiety in children. This instigated us to conduct a study to correlate the dental anxiety of preschool children as shown during the doll placement test with that of the behavioral patterns during their first dental visit. The null hypothesis was set as there will not be any correlation between dental anxiety and behavioral pattern of preschool children during the first dental visit when assessed using doll placement test and Frankl’s behavior rating scale (FBRS), respectively.

**Materials and Methods**

This cross-sectional study was conducted after obtaining approval from Institutional Ethics Committee. The procedures followed were in accordance with the Helsinki Declaration of 1975, as revised in 2000.

**Sample size**

Based on the values derived from the study by Shinji et al. with the two ratios of 54% and 90% using the belowmentioned formula for calculating the sample size of two proportions, at an alpha error of 1% power of 95%, the derived sample size was 56.

$$N = \frac{2 \left( Z_{1-\alpha} + Z_{1-\beta} \right)^2 \left( \hat{p}(1-\hat{p}) \right)}{p(1-p)^2}$$

**Study setting**

The study was conducted on healthy children of 3–7 years of age visiting the Department of Pediatrics and Preventive Dentistry with their parent/guardian. Children were included only if it was their first ever dental visit, accompanying parent/guardian is one of the child’s primary caretakers, child and accompanying parent/guardian has no previous connection with the dentist, and accompanying parent/guardian is able to comprehend and reply to our questions. Children with discernable mental limitations or communicative disorders, parents or children unwilling to participate in the study, and children with dental emergencies were excluded.

**Procedure**

When the child arrived at the clinic, the study was explained to the accompanying parent/guardian in detail at the waiting area and the written consent was taken. Each child’s background variables such as age and gender of the child, number of siblings, education and income of the parent, experiences of the child during encounters with medical doctors, experiences of the parents during previous dental treatments, and experiences of the siblings during previous dental treatments were elicited from parent/guardian using a standardized questionnaire.

Later at the play area, doll placement test was done using a set of dolls (representing dentist, child and mother) and a dental office model with a dental chair in the center. The child was first explained which person each doll represented and then, he/she was shown the miniature dental office model with dental
After doll placement test, the child was taken for the initial oral examination at the dental operatory. The behavior of the child during the same was observed and directly rated using FBRS\(^\text{[17]}\) by a calibrated examiner blinded to the study. Same examiner did the behavior rating for all the children.

**Statistical analysis**

The questionnaire was analyzed using tests of proportion by calculating the frequency and percentage. Chi-square test was used to test the association between the behavior of the child and doll placement patterns as well as the background profile of the patients. Binary logistic regression analysis with variables – age, gender, placement pattern, experiences of the child during encounters with medical doctors and experiences of the parents during previous dental treatment was done to predict uncooperative patients. All data were processed using the SPSS (version 20.0) (SPSS, Chicago, IL, USA) software package. The level of significance was set at 5% (\(P < 0.05\)).

**Results**

In the present study, the child patients placed the dolls in one of the following five patterns:

- Pattern I: child on the chair, dentist in the treating zone, mother standing in the corner of the operatory [Figure 2a]
- Pattern II: child on the chair, dentist in the treating zone, mother beside the patient [Figure 2b]
- Pattern III: child on the chair, mother beside the patient and dentist standing in the corner of the operatory [Figure 2c]
- Pattern IV: child at the corner of the operatory, dentist in the treating zone and mother is along with the dentist [Figure 2d]
- Pattern V: child and the mother at the corner of the operatory, dentist in the treating zone [Figure 2e].

Table 1 describes the relationship between the doll placement pattern and the behavior of the patient on the dental chair. The Pattern I of doll placement (23.2%) and Pattern II (46.4%) constituted the majority of the children. Among these children, none showed definitely negative behavior. 90% of the children showing Pattern I showed definitely positive and 80% of the children who arranged Pattern II showed a positive behavior. All the children who arranged dolls in Pattern III showed negative behavior. Under doll placement Pattern IV and V, majority children (66.7% and 33.3%, respectively) showed definitely negative and negative behavioral patterns, respectively. The observed association between the doll placement pattern and the behavior of the patient during dental treatment was statistically significant (\(P < 0.001\)).

Evaluation of the possible associations of other tested variables with the behavior of the child during the initial dental examination was also done using Chi-square test [Table 2]. Of the 56 study participants, 26 children were below 5 years of age and 30 children were above 5 years. 23 were boys and 33 were girls. While considering the age of the child and the type of behavior, there was no statistically significant difference. However, a statistically significant difference was observed when the gender of the patient was compared with their behavior. The majority of the patients belonging to definitely negative and negative category (100% and 92.3% respectively) were girls. When evaluation of the association of behavior of the child with that of various factors like number of siblings that the patient had, experiences of the siblings during previous dental treatments, education status and income of the parent was done, no statistically significant differences were observed.
When the experiences of the child during encounters with medical doctors (e.g., vaccinations or for any other illness) were compared with their behaviors during the dental examination, all the 3 patients of definitely negative category and 9 of 13 patients of negative category reported unpleasant experiences during encounters with medical doctors. Similarly, when the effect of experiences of the parents during previous dental treatments and the behavior shown by their children during their initial examination were
evaluated, the obtained differences were statistically significant. All the patients who behaved positively during the dental examination had their parents with either no or pleasant dental experiences. Only one patient’s parents reported previous unpleasant dental experiences of 10 definitely positive patients.

Binary logistic regression analysis was performed to predict uncooperative behavior (i.e., negative and definitely negative categories together) adjusted for the variables age (<5 years and >5 years coded as 0 and 1), gender (male and female coded as 0 and 1), child’s previous medical experience (pleasant, unpleasant coded as 0 and 1), parents’ previous dental experience (no previous experience/pleasant, unpleasant coded as 0 and 1), and doll placement pattern (child doll on the dental chair and child doll off the dental chair, coded as 0 and 1) [Table 3]. The child doll on the dental chair category included placement Patterns I, II, and III, whereas the child doll off the dental chair category included placement Patterns IV and V. The analysis showed that child’s unpleasant previous medical experiences and parent’s unpleasant previous dental experiences had higher odds favoring uncooperative behavior. In addition to these findings, the uncooperative behavior was associated with the child doll off the dental chair pattern of doll placement pattern, which had a role in predicting the child’s uncooperative behavior when used in logit in equation, although it was not statistically significant.

Discussion

The prospect of dental treatment is likely to cause fear and anxiety in most young children.[15] The doll placement test is a suggested method to evaluate the anxiety levels of young children, while they are waiting in the waiting area for dental treatment. It is an objective method of understanding the child and his/her thoughts of dental treatments and the dental surgeon, as it is conducted under simulated natural condition.[14] The method used in the present study to anticipate child’s behavior during dental examination is comparable in its kind to the studies done by Sonnenberg and Venham,[18] Sheskin et al.,[19] and Mathur et al.,[20] who used the pictures drawn by children to identify their anxiety levels.

Dental anxiety is the predictor of the child’s behavior at the dental operatory. A strong inverse association exists between both. A child with lower levels of anxiety is likely to behave better during dental treatment.[21,22] Results of our study also showed that the doll placement patterns had an association with the type of behavior they exhibited on the dental chair during their initial examination. Children who had placed the child doll at the corner of the operatory (Patterns IV and V), mostly showed definitely negative or negative behavior, while children who had placed the child doll on the dental chair and the dentist doll at the treatment zone (Patterns I and II) showed mainly positive and definitely positive behavior. This can be correlated with the findings of the study conducted by Shinji et al.[14] who concluded the doll placement test as a valuable anxiety predictor in children who are waiting in the reception area of the dental clinic. The ability of the child to respond to the requirements of dental treatment is complex and multifactorial. Various determinants include age, cognitive level, temperament, socioeconomic status, anxiety, fear, previous medical/dental experience and parental anxiety related to dentistry.[23] Shoben and Borland,[24] in their study investigated the role of different possible factors in causing dental anxiety and had concluded that unpleasant past dental history and/or negative attitude of the family towards dental treatment played a significant role. Our study showed significant associations between previous medical experience of the child and his/her dental behavior in addition to the association of negative dental experience of the family with the dental behavior. While the conclusions of the former study are appropriate, it might have overlooked the influence of other factors on dental anxiety such as bad medical/dental experiences, because of the small sample size. The results of the present study are supported by the study conducted by Facco et al.[25] on 230 patients, where those who reported previous unpleasant dental/medical experiences had significantly greater Modified dental anxiety scores than the ones without any negative histories. The study by Locker et al.[26] also concluded

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**Table 3: Binary regression model analysis of dental behavior* as a function of age, gender, doll placement pattern, experiences of the child during encounters with medical doctors and experiences of the parents during previous dental treatments**

| Variables                                      | Wald | df | Significant | OR  | 95% CI for Exp(B) |
|------------------------------------------------|------|----|-------------|-----|------------------|
| Uncooperative behavior                         |      |    |             |     |                  |
| Age (1)                                        | 0.11 | 1  | 0.73        | 0.65| 0.05 8.05        |
| Gender (1)                                     | 3.68 | 1  | 0.06        | 15.81| 0.94 265.00     |
| Doll placement pattern (1)                     | 2.58 | 1  | 0.11        | 12.96| 0.57 296.17     |
| Experiences of the child during encounters with medical doctors (1) | 8.58 | 1  | 0.003       | 46.63| 3.57 609.83     |
| Experiences of the parents during previous dental treatments (1) | 4.73 | 1  | 0.03        | 41.93| 1.45 1214.9     |
| Constant                                       | 11.8 | 1  | 0.001       | 0.001|                  |

*Behavior reference category: Cooperative behaviour. CI=Confidence interval; OR=Odds ratio
that patients with DFA belong to the families which have had unpleasant dental experiences in the past.

In the present study, there was no significant association of the dental behavior with the age of the patient. However, this could be due to only a small difference between the age group included in the study (3–7 years). Another finding of our study was significant difference in the type of behavior observed based on the gender of the patient. Boys behaved well during the dental examination when compared to that of girls within the study group. Many studies have reported the presence of gender difference, with higher prevalence of dental anxiety among girls than boys.[27‑29] Liddell[30] attributed this difference to the tendency of the girls to get influenced by internal factors to a greater extent, while the boys are likely to react more to external stresses.

We took into consideration the other influential factors on the dental anxiety and the dental behavior of the patient like number of siblings the patient had along with their previous dental experiences if any, education of the parent, and the socioeconomic status. However, the findings of our study showed no significant association of these factors with the type of behavior shown by the child.

About 46.4% of the children in the present study placed the mother doll beside the child doll and the majority of them showed positive behavior, in the presence of the mother while undergoing dental examination. The nature of the bonding that exists between a child and his or her mother/parent has a remarkable capacity to influence a child’s dental behavior.[14]

Existing literature suggests that the dentist’s attire and appearance of the dental clinic may have an impact in making children accept the dental treatment.[31,32] In the present study, the dentist doll used had a smiling feminine face and casual attire with no white coat. Furthermore, the dental clinic model was not constructed keeping in mind the child friendly environment. It was mere symbolic representation of a clinic. Other factors that influence child’s behavior in the dental operatory include child’s cognitive development and temperament.[33,34] These factors were not considered in the present study which is one of the limitations. Another limitation of the present study includes lack of heterogeneity in sample and sample size was small. Thus, in future, randomized control studies are recommended taking into consideration the abovementioned factors to further validate doll placement test as a tool to predict a child’s dental behavior.

Conclusions

Within the limitations, the present study shows a positive association of a child’s behavior on the dental chair with the dental anxiety evaluated through doll placement pattern. The behavior of the child on the dental chair is also strongly influenced by experiences of the child during encounters with the medical doctor and previous dental experiences of their parents.

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Conflicts of interest

There are no conflicts of interest.

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