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Evaluation of the correlation between the pre-operational stage of Piaget's theory and the Tell-Show-Do Technique.

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Abstract

Background: One of the most significant problems in pediatric dentistry is behavioral resistance from children during their first dental visit. Most children show variation in the rate of cognitive development when compared with their chronological age. This study utilizes Piaget's theory to identify the cognitive development of children and their segregation into logical thinkers and less logical thinkers following which the tell-show-do technique, was utilized to perform a restorative procedure on these groups.

Aim: Evaluate the correlation of the pre-operational stage of Piaget's theory with the Tell Show-Do technique: An Observational study

Materials and Methods: This comparative study was conducted among 46 children ages 4-7 years. Various characteristics specific to this age group, such as egocentrism, the concept of cardinal numbers, lack of conservation, and reversibility were assessed, using interview questions. A comparison of the tell-show-do technique during a restorative procedure was carried out among the two groups i.e., Performers and Non-performers, and behavior was observed at the first visit, during treatment, and after the treatment using the Frankl Behavior Rating Scale.

Results: There was a statistically significant difference between the two groups i.e., Performers and Non-performers groups. The performers could comprehend instructions to undergo the procedure whilst the non-performers were anxious even after explaining the procedure using the tell-show-do technique.

Conclusion: This study shows the effectiveness of the use of the tell-show-do technique in performers during dental treatment.

Keywords: Behaviour management, Cognitive theory, Paediatric dentistry, Restorative procedure, Tell-show-do.

1. INTRODUCTION

Pediatric dentists are expected to effectively recognize and treat children having dental diseases with their professional education and expertise. Dental diseases must be thoroughly comprehended with children's behavior

at all ages, to provide them with safe and efficient therapy. Behavior guidance is a method used by experts to determine whether a behavior is appropriate in a dental context and further mold it to give beneficial dental treatment. [1]

Age and cognitive development have a significant impact on a child's responses to behavior control and guidance. Various strategies like knowledge sharing, tell-show-do, tell-play-do, rewards, relaxation, and parental participation are used for better communication. Therefore, to effectively use behavior management techniques, a guided understanding of a child's behavior is necessary because it directly relates to their cognitive development. From childhood through adolescence into adulthood, cognitive development is the formation of intellectual processes, which include remembering, solving problems, and making decisions. [2]

Famous Swiss genetic epistemologist Jean Piaget was a pioneer in this area and proposed four stages for children's cognitive development: sensorimotor stage (beginning at birth until two years), preoperational stage (two to seven years), concrete operational stage (seven to twelve years) and formal operational stage (twelve years and above). He assessed how children perceive everything around them and how they develop knowledge systems such as logic, measurement, concept development, morality, language development, and the theory of physical reality. Based on his theory, interacting in cognitive and intellectual activities can help children manage, organize, and reorganize their thoughts and behavior. [3]

He believes that an individual's intellectual growth develops through a series of maturational changes and that intelligence is being able to adapt to one's environment through a balance of assimilation and accommodation. The cognitive development theory is described as having a constructivist view, i.e. people construct knowledge, skills, and understanding of the world through utilizing existing information to interpret new experiences. [3,4,5] Likewise, in the dental environment, actively engaging the child will aid in their cognitive development, and pediatric dentists can play a key role in shaping positive dental behavior. Thus, this study aims to evaluate the co-relation of the pre-operational stage of Piaget's theory with the Tell-show-do technique.

2. MATERIALS AND METHODS

This study was conducted on the children during their first dental visit to the Department of Paediatric and Preventive Dentistry, Bharati Vidyapeeth Dental College, and Hospital, Sangli. After receiving approval from the Institutional Review Board and Ethical Committee, this study was carried out.

Inclusion Criteria

- Children aged 4-7 years.
- Child's first dental visit.
- Children who require restorations.

Exclusion Criteria

- History of systemic disease.
- Children with special healthcare needs

The sample size was estimated using t-tests - Means: Difference between two independent means (two groups) Analysis: A priori: Compute required sample size Input: Tail(s) = Two Effect size d = 1.11 α err prob = 0.05 Power (1-β err prob) = 0.95 Allocation ratio N2/N1 = 1 Output: Noncentrality parameter δ = 3.7641931 Critical t = 2.0153676 Df = 44 Sample size group 1 = 23 Sample size group 2 = 23 Total sample size = 46 Actual power = 0.9573626

During the first visit, the behavior was checked using the Frankl behavior rating scale and physiological parameters such as pulse rate were assessed using a pulse oximeter. The following features were evaluated in children, based on the theory of cognitive development:

2.1 Concept of cardinal numbers (centration)

The ability to focus on only one aspect of the situation and other aspects of the situation are ignored. This was assessed by arranging two equal rows of coins, where the coins are kept far apart in the second row. If the child is unable to comprehend that the two rows are the same, then they lack the understanding of centration. (Figure 2.1)

Figure 2.1 - Concept of cardinal numbers (centration)

2.2 Lack of conservation and reversibility (conservative)

This was assessed to evaluate whether the child could comprehend that if the appearance of 2 similar objects is changed, but nothing is added or subtracted the quantity remains the same. Two similar linear worms (equal amount of clay, and same length), one worm was changed to a wiggly worm (without the addition or removal of clay), and the child was asked if an equal amount of clay was present. If the child is unable to answer, then the child is unable to understand the concept of conservation and reversibility. (Figure 2.2)

Figure 2.2 - Lack of conservation and reversibility (conservative)

2.3 Egocentrism -

The inability to perceive another individual's perspective. The traditional three-mountain experiment was used for its evaluation. The child was made to sit at one end of the table while a doll and three mountains of varying heights were placed at the other end. The child was required to choose one image from a collection that captured

the viewpoint of the doll. The child was egocentric and unable to comprehend another person's point of view if they chose an image that reflected their viewpoint rather than the viewpoint of the doll. (Figure 2.3)

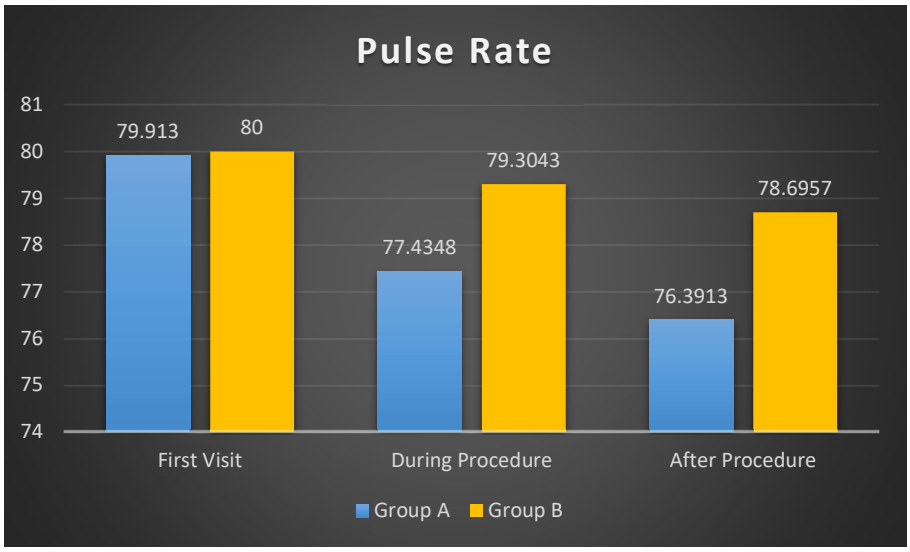
Figure 2.3 – Egocentrism

The children were divided into performers and non-performers based on how they performed the above activity. If they answered more than 2 questions correctly, then they were segregated into the group of performers. Tell-show-do technique and euphemisms were used. Instructions that were to be followed were given to the children before the restorative procedure. The behavior and pulse rate were checked during and after the procedure using the Frankl behavior rating scale and pulse oximeter respectively.

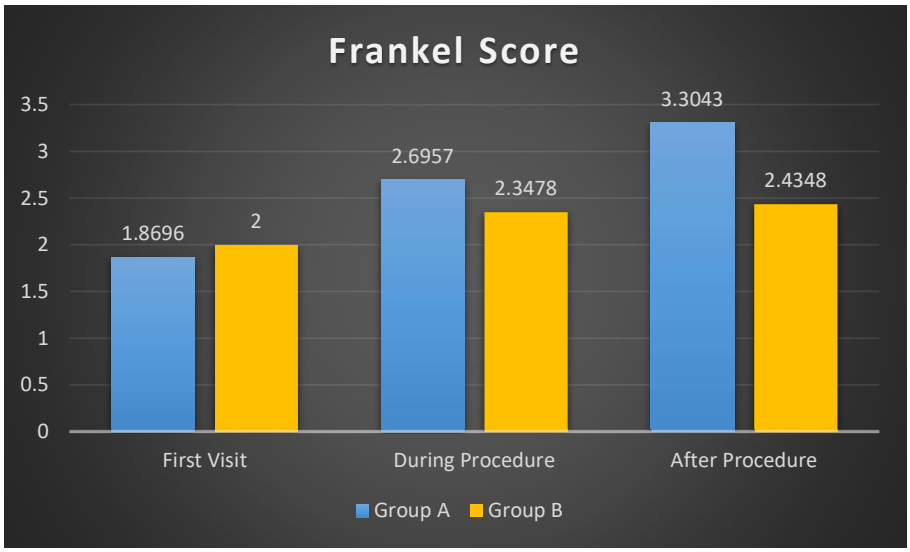
The data were obtained and analyzed using the statistical package for social sciences (SPSS) 26 using the Shapiro-Wilk test and Mann-Whitney U test.

3. RESULTS:

There was a statistically significant difference between the two groups i.e., performers, and non-performers groups. The performers could comprehend instructions to undergo the procedure whilst the non-performers were anxious even after explaining the procedure using the tell-show-do technique. Here, graphs 3.1 and 3.2 depict the behavior and pulse rate of performer children from the first visit until after the procedure has reduced the anxiety of the child which leads to a better understanding and acceptance of the dental treatment than the non-performers. Hence, the Tell-show-do technique can be used in performers as a behavior management technique in a dental setup.



Graph 3.1: Mean Pulse rate at different time intervals in Group A and Group B



Graph 3.2: Child Behaviour at different time intervals in Group A and Group B

DISCUSSION

A dentist who comprehends the cognitive processes of children can effectively engage in communication with the child, resulting in the development of favorable dental behavior. This study was designed such that the assessments that were done before the treatment reduced anxiety, thus improving the rapport with children.

The cognitive development of children is a complex and ever-changing process that differs between individuals. This study employs the tell-show-do strategy for behavior management. It is worth noting that different techniques for managing behavior can be used with children in this age range.

The stage of preoperational cognition spans from two to seven years. It is commonly known as the preconceptual or intuitive thought phase, during which the infant can only develop a single concept of an item. The usage of symbols is prominent in language, art, and other forms of play such as symbolic play, fantasy play, and make-believe play as well as mental representations. [6] Nevertheless, intuitive cognition relies on the child's personal experiences rather than any structured system or regulations, resulting in the development of egocentrism, animism, and artificialism. At this stage, children's schemes are fixed and cannot be changed. This causes them to focus on specific outcomes exclusively and makes it difficult for them to complete activities that require considering multiple factors or preserving quantities. [3,5]

These limitations and achievements have been utilized in dentistry through the implementation of different behavior management approaches, such as distraction, tell-show-do, tell-play-do, and mobile dental apps.

Sharath Asokan et al. conducted a cross-sectional study in 2014 to examine the applicability of Piaget's cognitive principles in 200 children during the preoperational thought stage. The study found that the principles of egocentrism, lack of conservation, and reversibility were indeed relevant. Children typically engage in symbolic thinking when it comes to items and rely on their visual perception rather than logical reasoning. [5]. Therefore, the utilization of the tell-show-do technique, which engages a child's visual, aural, and tactile senses, stimulates their symbolic thinking, as demonstrated in a retrospective study conducted by Sharma et al. [7]

Prashanth et al. (2017), Radhakrishna et al. (2019), and MV Kevadia et al. (2020) have conducted studies on the use of tell-play-do and smartphone dental apps to harness symbolic play. These interventions effectively decrease anxiety and fear and enhance chair-side behavior in future dental appointments. [8,9,10]

Piaget demonstrated egocentrism throughout the preoperational period using the traditional three-mountain experiment. To leverage a child's egocentrism in the dental clinic, it is helpful to communicate with them using euphemisms and to reward them by complimenting their behavior in front of their parents or friends. This approach helps foster a positive mindset. Engaging patients in the treatment process by assigning them tasks such as holding the suction tip or pausing the therapy when they raise their hand enhances their sense of involvement and positively impacts their behavior during the procedure. [11,12,13]

During the conceptual and intuitive stages of development, children exhibit animism by attributing life to inanimate objects. Additionally, they have beliefs in magic or artificialism. [3] Therefore, by assigning names, emotions, and physical characteristics similar to those of humans to dental inanimate objects such as suction tips, airotors, and micromotors, we can make their introduction to children and their use in the oral cavity a straightforward process. (11) Piaget studied the lack of conservation and reversibility using the famous beaker experiment. Audio-visual aids like video games, virtual reality headsets, and 3D glasses use these features to cause distraction. [12,14,15] The notion of centration is applied in creating a soothing environment in the clinic that helps a kid concentrate on specific items' features, such as peaceful sounds, aroma, or a fish aquarium. This can divert attention and regulate their behavior while seated in a chair. [12,16] The preoperational stage is characterized by the development of social behavior. Using reinforcements and managing parental presence or absence in the operatory are excellent methods for controlling the behavior of resistant children, obtaining their cooperation, and improving the quality of dental procedures. [17,18]

CONCLUSION

Implementing behavior management approaches that are suitable for a child's age and intellectual development can result in successful treatment and a happy dental experience. The study findings indicate that performers have demonstrated a greater capacity to understand and adhere to the directions given by the operator in comparison to non-performers. This study demonstrates the effective utilization of the Tell-show-do strategy for performers undergoing dental treatment. There is additional potential in this field to use various behavior management strategies for children who are not performing well. Nevertheless, further investigation is necessary to examine the impact of other variables on cognitive development through the use of behavior control approaches. This study focuses on implementing adjustments, such as the Tell-play-do approach, in age groups below 4 years old. Further research can be conducted to establish a correlation between different behavior control approaches and cognitive development.

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