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An assessment on the relevance of Jean Piaget's cognitive principles among 4-7 year old children - A cross sectional study

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Abstract

Swiss psychologist Jean Piaget in 1952 put forward the most influential theory of cognitive development. Piaget believed that in every child, the same sequence of development occurs and divided them into different stages. This study aims to assess the relevance of Piagetian principles among 4–7year old children. Three classical experiments were conducted to assess the characteristics of children belonging to preoperational period (4-7year old) that is, to assess egocentrism, concept of cardinal numbers based on centration and lack of conservation and reversibility.

Results show that the prevalence of egocentrism was 50%, centration was 48.75 %, lack of conservation was 78.75%. There was a sharp decline in egocentrism to 35% when the child reaches the age group of 6-7 years. Similarly, there was an abrupt reduction in centration to 35% when the child reaches 6-7 years. But it was found

that 85% of 6-7 years and 60% of 7-8 years still exhibited lack of conservation. The study concludes that children in the age group 4-7 years exhibited egocentrism, centration and lack of conservation showing the validity of Jean Piaget's principles. Understanding, the key features of child's behaviour in preoperational period helps to do better behaviour management and thus deliver better quality dental health care for children.

Keywords: Preoperational period, Jean Piaget, Egocentrism, Centration, Lack of conservation

Introduction

Cognition is the mental action or process of acquiring knowledge and understanding through thought, experience, and the senses. Cognitive development refers to mental development, which not only includes intelligence but also perception, recognition, recalls and interpretation of information along with all forms of reasoning. [1]

Swiss psychologist Jean Piaget in 1952 put forward the most influential theory of cognitive development. It is a comprehensive developmental stage theory which deals with the nature of knowledge itself and how humans come gradually to acquire it, construct it and use it. His study was based on detailed observational studies on his three children and a nephew, also a series of simple but ingenious tests to identify different cognitive inabilities. It was the child's production of incorrect answers that intrigued Piaget, and in attempting to discover how the children arrived at their answers, he did a lifelong journey of studying the stages and growth of cognition in children. He was interested in how children think, and how their thinking about solving problems changes qualitatively at different stages of development.[2] Piaget believed that in every child, the same sequence of development occurs and divided them into different stages.

1. Sensorimotor period (18 months to 2 years)
2. Preoperational period (2-7 years)
   - Preconceptual stage (2-4 years)
   - Intuitive stage (4-7 years)
3. Period of concrete operational stage (7-11 years)
4. Period of formal operational stage (11 years and beyond)

Piaget observed that the development of intellectual abilities occurs in a series of distinct stages and child's way of thinking is different at different stages. Since the thinking of a child is different from that of adult, we cannot expect a child to process and utilize information in the same way as an adult would. Hence for efficient communication with a child, it is essential to understand the intellectual level of that child and the ways in which thought process would work for him/her at various stages[3]. This study was undertaken to assess the relevance of Jean Piaget's cognitive principles of preoperational period among 4- 7year old children.

Materials and Methods

This cross-sectional study was conducted in the Department of Pediatric and Preventive Dentistry after obtaining prior approval from the Institutional Review Board and Ethical Committee. It was conducted among 80 children in the age group of 4-7 years. All the participants were divided into four groups based on their age.

Inclusion criteria

- 4 to 7year old physically and mentally healthy children

Exclusion criteria

- Specially abled children.
- Children whose parents refused to give consent for participation in the study.

The 80 children were divided into four groups of 20 each based on their age.

1. 4years: 20 children
2. 5years: 20 children
3. 6years: 20 children
4. 7years: 20 children

Three experiments were conducted to assess the classical characteristics of children belonging to this age group:

1. Egocentrism
2. Concept of cardinal numbers based on centration
3. Lack of conservation and reversibility

Egocentrism

It is the inability to understand another person's point of view. In this experiment, two toys were kept in front of child and was asked if he/she could see them. After the child's reply, an obstruction was placed between the toys in such a way that he/she could still see both the toys. Then again it was asked whether he/she can see both the toys. After the reply, the child was asked if the two toys could see each other. A positive reply indicated the presence of egocentrism in the child.(Figure 1)

Figure 1: Test to assess egocentrism

Concept of Centration

Centration is the tendency to focus on only one aspect of a situation and ignore other aspects of the situation. To assess the concept of centration, the child was shown two rows of same number of coins and was asked whether both has same number of coins. Then second row was spread out a little and the question was repeated. If the child possesses the concept of centration, he/she would point out that the spread-out row had a greater number of coins.(Figure 2)

Figure 2: Test to assess centration

Lack of Conservation / reversibility

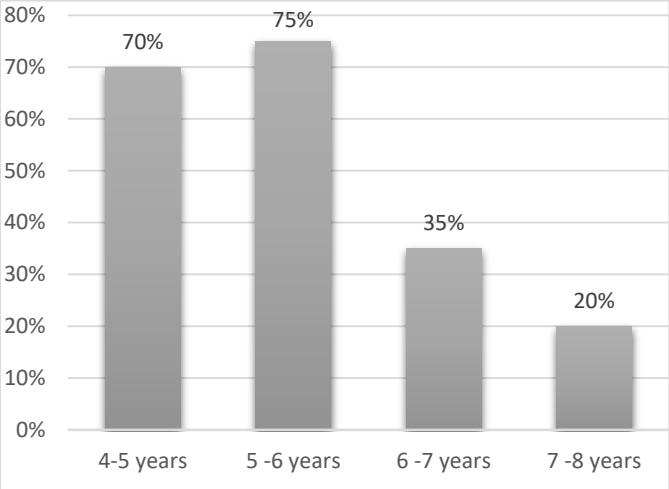
To assess the concept of conservation and reversibility, the classical beaker experiment was performed. The child was presented with two identical beakers with same amount of liquid. Then the liquid from one of the beakers was poured into a third taller and thinner beaker placed in front of the child. The child was asked to identify the beaker that contained more liquid. If the child pointed out that the taller beaker contained more liquid, then he/she lack the concept of conservation.(Figure 3)

Figure 3: Test to assess of lack of conservation

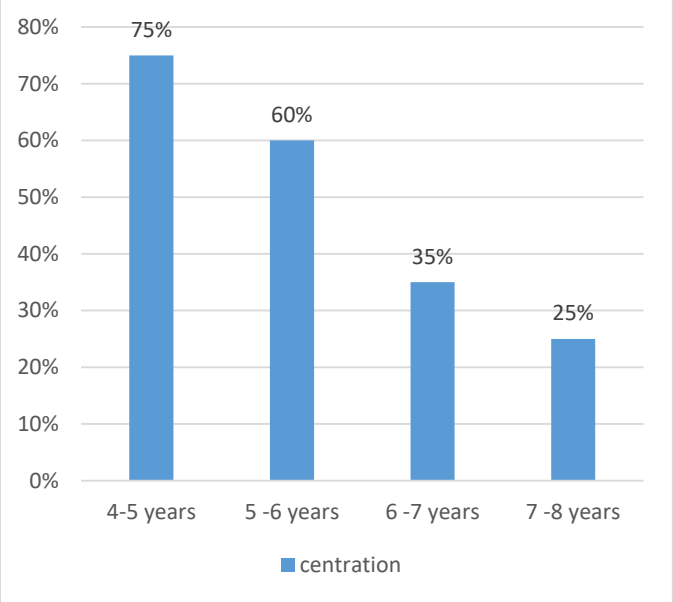
The presence or absence of the three characteristics among these 4-7 years old children was assessed in percentage values.

Results

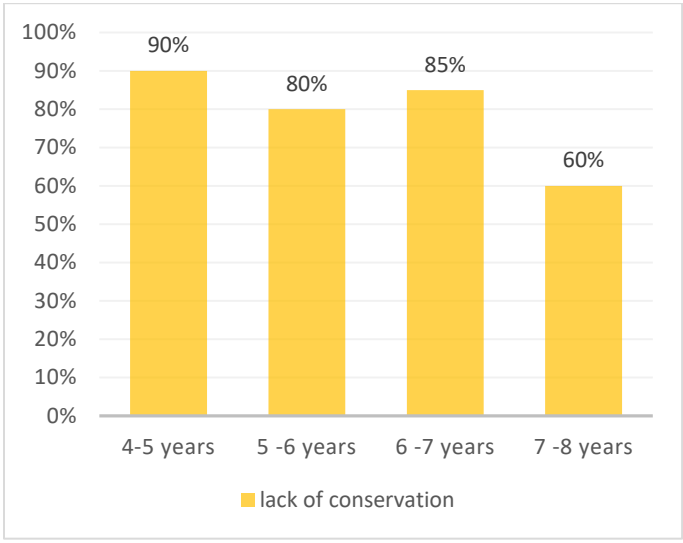
The prevalence of egocentrism was 50%, centration was 48.75 %, lack of conservation was 78.75%. There was a sharp decline in egocentrism to 35% when the child reaches the age group of 6-7 years. (Graph 1). Similarly, there was an abrupt reduction in centration to 35% when the child reaches 6-7 years. (Graph 2) But it was found that 85% of 6-7 years and 60% of 7-8 years still exhibited lack of conservation. (Graph 3)



Graph 1: Prevalence percentage of egocentrism among different age groups.



Graph 2: Prevalence percentage of centration among different age groups.



Graph 3: Prevalence percentage of lack of conservation among different age groups.

Discussion

The preoperational stage is the second stage of cognitive development and it includes preconceptual stage (2-4 years) and Intuitive stage (4-7 years). Preconceptual stage denotes the start of symbolic activity. In this stage the child's reactions are based not only on the physical nature of the stimulus but also on its meaning. In the intuitive stage, pre logical reasoning appears and it is based on pre conceptual appearances. Trial and error may lead to an intuitive discovery of correct relationships but in this stage the child is unable to take more than one attribute into account at one time.[4] The key features common in this age group, include egocentrism, centration and lack of conservation. In the present study, there was a reduction in these characteristics as the age progresses. In a study conducted by Asokan S *etal* it is found that the characteristic features explained by Piaget were present in most of the children between ages of 4-7 years. [5]

Egocentrism refers to the child's inability to see a situation from another person's point of view.[6]According to Piaget, the egocentric child assumes that other people see, hear, and feel exactly the same as the child does. There are two types of egocentrism which include,

perceptual egocentrism and cognitive egocentrism. Characteristic of perceptual egocentrism is that preschoolers do not realize that other people see things from a view point different from theirs. In cognitive egocentrism, children find it difficult that other people do not know their thoughts. Piaget conducted classical three mountain experiment to assess egocentrism; a modification of which was conducted in the present study. According to him, at age 7, thinking is no longer egocentric as the child can see more than their own point of view.[7] In the present study only 20% of 7year old possess egocentrism.

In a dental setting, it would not be of use to try convincing to a child that, his parents would be proud of him, if he stopped the digit sucking habit because the child thinks that his parent's attitude about digit sucking would be same as his own.[3]

Utilizing egocentrism in a child, they can be treated as heroes in clinic, can be allowed to make believe she/he is in-charge and could be permitted to take some decision about the treatment ie, to use hand signals to temporarily stop the procedure or allow them to be in-charge of the saliva ejector. The child constructs knowledge about dentistry by observing, touching, handling and working with dental instruments and equipments.[8]

Centration is the tendency to focus on only one aspect of a situation at one time. Hence whenever a child can focus on more than one aspect of a situation at the same time, it shows that they have the ability to decenter. The child at this age group is impressed with how things appear, rather than how they were made. In the present study, the concept of centration dropped from 75% to 25% from 4 to 7 years. The principle of conservation explains two equal physical quantities remain equal even if the appearance of one is changed, as long as nothing is added or subtracted. According to Piaget, the child masters the conservation of discontinuous quantity at about age of 6 or 7 .[9] But in the present study, 85% of 6 years and 60% of 7 years found to possess lack of conservation.

In a study conducted by Saha *etal* to know the influence of cognitive development on children's preference of isolation procedures, it was found that 2-7year old children preferred rubber dam than saliva ejector, due to centration on the color of the dam.[10]

During treatment, the child will be terrified while seeing multiple instruments. Child can be directed to focus on the hand mirror given to him and concentrate in watching the procedure. Audio and visual distractions work on the principle of centration.[11]Head phones with pleasant music could reduce dental anxiety and will help to distract the child from the noise of the drill. Providing children, a strikingly colorful, friendly, attractive environment to focus can distract them from the terrifying instruments present in the dental setting. When various distraction techniques are used in the dental operatory, the child learns to focus on the interesting aspects and forget about the dental treatment and the anxiety caused because of it.[5]

Conclusion

Children in the age group 4-7 years exhibited egocentrism, centration and lack of conservation showing the validity of Jean Piaget,s principles. Lack of conservation still persist in 6 and 7year old children. Assessing the cognitive development of a child at a particular stage of development helps to modify his/her behaviour. Understanding, monitoring and modifying the key features of child's behaviour in preoperational period helps to gain trust, do better behaviour management and thus deliver better quality dental health care for children.

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