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COMBINATION OF DIRECT INSTRUCTION AND TOOTH BRUSHING DEMONSTRATION METHODS ON TOOTH BRUSHING SKILLS IN PRESCHOOL CHILDREN

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Abstract

Background: Tooth decay in early childhood remains very high, with an average national def-t index of 8.43 and a caries prevalence of 92.6%. This figure indicates that preschool children have a history of cavities in 8-9 primary teeth, still far from the WHO target of 2030 for preschool children to have caries of only 50%. Appropriate promotional efforts are needed, aligned with the development of preschoolers, one of which is a combination of direct instruction and tooth-brushing demonstrations to improve preschoolers' tooth-brushing skills. Objective: This study aims to analyze the effectiveness of tooth-brushing skills before and after education with a combination of direct instruction and tooth-brushing demonstration methods. Method: This research used a pre-experimental design with a pretest and posttest with control group design. This research was carried out on pre-school children at Pertiwi VI Kindergarten, Pondok Labu Village, South Jakarta. The sampling technique was purposive sampling of 34 respondents. The instruments used to measure teeth brushing skills were observation sheets. The data was tested using wilcoxon t-test analysis, namely a pre-post design. Results: The mean tooth-brushing skill before education was 42.35 and after education was 92.06. The results of the data effectiveness test before and after being given education with a combination of direct instruction and tooth-brushing demonstration methods show that the p-value 0.001 ($p < 0.05$). Conclusion: the combination of direct instruction and tooth brushing demonstration methods is effective in improving teeth brushing skills in preschool children.

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Introduction

Oral and dental health is crucial to everyone's life, including children (Octavianita et al., 2024). Poorly maintained teeth and gums can cause discomfort, difficulty chewing, and potentially negatively impact overall health (Kasihani et al., 2022). Dental and oral health problems in children can also impact their growth and development (Papilaya & Zuliari, 2016).

Practicing consistent good oral hygiene is a key preventative measure against various dental health problems, particularly tooth decay and periodontal disease (Purnama et al., 2024). Regular brushing is essential for maintaining healthy teeth and mouth. Consistent and accurate daily brushing is essential for removing plaque and addressing potential problems that may arise from plaque buildup, such as tooth decay and periodontitis (Wijayanti & Rahayu, 2019).

Several studies have proven that, among other things, (Karamoy et al., 2017) revealed a significant link between dental caries and a poor quality of life. A similar finding was also found in (Wong et al., 2011) study, which revealed that a history of caries is also associated with a decreased quality of life in children, as children with caries experience difficulty speaking and eating various foods, which can affect their growth and development. Dental caries in school-age children can cause impaired quality of life and hinder daily activities due to difficulty chewing (Alsumait et al., 2015).

The 2018 Basic Health Research shows that nearly all Indonesians suffer from dental and oral health problems. In West Java, approximately 58.0% of the population has dental and oral health problems. The data presented comes from the 2018 Basic Health Research conducted by the Ministry of Health. According to the study, the 5-9 age group has the highest prevalence of cavities, accounting for 54% of cases (Kementerian Kesehatan RI, 2018).

The increasing prevalence of tooth decay in preschool-aged children may be due to their tendency to consume foods high in sugar, especially those with

a dense and sticky consistency (Nurilawaty et al., 2021). A lack of parental guidance in educating children about the importance of brushing their teeth is said to be a major contributing factor to cavities, especially when combined with a tendency for children to consume sweet foods (Anggina et al., 2020).

Another cause is that children are not independent in brushing their teeth, as proven by research (Putra & Kasiyati, 2019) It can be observed that the child is physically in good condition, but he lacks the ability to brush his teeth properly. He performs the tooth-brushing process based on his own knowledge without understanding the proper procedures. Therefore, to address this problem, the child needs to be given guidance so that he can practice brushing his teeth correctly (Purnama et al., 2020).

One way to improve tooth-brushing skills is through dental health education. This is supported by research by (Harisnal, 2018), which found that providing health information has a positive impact on increasing understanding of dental health. The effectiveness of behavior change through dental health education is influenced by the teaching method used (Tandilangi et al., 2016).

According to a study conducted by (Wijayanti & Rahayu, 2019), as many as 55% of preschool and school-aged children are not accustomed to brushing their teeth after meals. Most preschool and school-aged children lack proper tooth-brushing practices (Fadjeri et al., 2022). To reduce dental and oral health problems in preschool children, it is crucial to provide information and knowledge about effective tooth-brushing techniques (Puteri & Emini, 2023). This aims to enable children to be independent in performing self-care and adopting clean and healthy lifestyle behaviors, thereby preventing dental disease and oral problems (Kasihani et al., 2021).

Disseminating information or knowledge about effective tooth-brushing techniques can be done through oral health promotion efforts (Syaputri et al., 2023). This is highly relevant because dental health workers have the competence to educate the public on improving oral health. Oral health is a vital component of general health and requires adequate care to prevent damage that can negatively impact overall well-being. An individual's oral health significantly impacts educational well-being, child development, and the overall health of families and communities (Selvyanita et al., 2021).

The Direct Instruction Model is a learning method or process that involves direct instruction with a more centralized teacher role and clear boundaries. This model plays a crucial role in more comprehensive research programs. This approach places the focus on the teacher, who plays a key role in conveying the subject matter through various learning activities (Putra & Kasiyati, 2019). First, the mentoring session began with the researcher demonstrating effective tooth-brushing steps, directly involving the child in the process. Afterward, the child was encouraged to practice repeatedly and continue with guidance from the teacher.

The demonstration method in oral health education supports increased understanding in children by directly practicing the correct way to brush their teeth (Ngatemi, 2021). The demonstration method is a challenging method for children because it can satisfy their strong curiosity about what they are learning and wanting to know. This demonstration method is also appropriate for children because it suits their concrete thinking style and way of thinking and promotes more critical thinking (Agustin, 2014). Another study by showed that there was an effect of oral health education using the demonstration method on reducing plaque scores in children (Purnama & Sofian, 2023).

Method

This research is a pre-experimental research with pretest and posttest with one group design. The study was conducted in August 2025. The research sample was preschool aged 5-6 years in Pertiwi VI Kindergarten, Pondok Labu Village, Cilandak District, South Jakarta City. The research sample was taken using a total purposive sampling technique, as many as 34 respondents. The research instrument used an observation sheet brushing teeth which was tested for validity and reliability by the same previous researcher who examined teeth brushing skills.

Data analysis was carried out using the SPSS statistical program. The data normality test used the Shapiro-Wilk test, the paired sample test. The study was conducted after obtaining approval from the Ethics Committee of the Health Polytechnic of Yogyakarta No.DP.04.03/e-KEPK.1/1031/2025.

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Result

Table 1. Frequency Distribution of Respondent Characteristics

Characteristics	Frequency	Percent (%)
Age		
5 Years	17	50,0
6 Years	17	50,0
Gender		
Male	19	55,9
Female	15	44,1

Table 1 shows that there were equal numbers of respondents aged 5 and 6 years and the majority were male, 19 respondents (55.9%).

Table 2. Tooth brushing skill scores before and after education with a combination of direct instruction and tooth brushing demonstration methods

Tooth brushing skill	$\bar{x}$	Statistics		
		SD	Min	Max
Pretest	42.35	7.410	30	60
Posttest	92.06	9.464	70	100

Table 2 shows that the mean tooth-brushing skill before education was 42.35 and after education was 92.06. This indicates that there was an increase in tooth-brushing skills before and after education with a combination of direct instruction and tooth-brushing demonstration methods.

Table 3. Data Normality Test

Tooth brushing skill	$\bar{x} \pm SD$	*p-value*
Pretest	42.35± 7.410	0.001
Posttest	92.06± 9.464	0.001

Table 3 shows that the pre- and post-test scores for tooth-brushing skills were 0.001. The data were not normally distributed because the p-value was <0.05, so non-parametric tests were used.

Table 4. Testing the effectiveness of tooth-brushing skills before and after education with a combination of direct instruction and tooth-brushing demonstration methods

Tooth brushing skill	$\bar{x} \pm SD$	*p-value*
Pretest	42.35± 7.410	0.001
Posttest	92.06± 9.464	

Table 4 shows that the results of the data effectiveness test before and after being given education with a combination of direct instruction and tooth-brushing demonstration methods show that the p-value 0.001 (p <0.05), meaning education with a combination of direct instruction and tooth-brushing demonstration methods effectively improve teeth brushing skills in preschool children.

Discussion

This study aimed to analyze the effectiveness of a combination of direct instruction and demonstration methods in improving tooth-brushing skills in preschool children. Overall, the results showed a significant increase, indicating a significant increase in the tooth-brushing skill scores of preschool children after intervention with the combination of the two methods.

This improvement is proven through a comparison of pre-test scores (before intervention) which showed a low or less skilled level of tooth brushing skills of 42.35, while the post-test score (after intervention) showed a drastic increase to skilled or very skilled tooth brushing with a score of 92.06. This significant difference, with a p value <0.05 in the Wilcoxon statistical test, is strong empirical evidence of the effectiveness of this combination of methods.

Direct Instruction focuses on delivering material in a structured, step-by-step, and clear manner (Reavey & Zahay, 2022). For preschoolers, this method provides the necessary cognitive structure. It ensures children receive information about the "what" and "why" of tooth brushing, as well as the sequence of steps to be followed verbally. This helps children organize their initial understanding (Mason & Otero, 2021).

Additionally, essential components of direct instruction are repetition and guided practice (drill). For fine motor skills like brushing teeth, consistent repetition and instant correction (immediate feedback) are crucial for establishing proper procedural memory (Reavey & Zahay, 2022). The contribution of the tooth-brushing demonstration method is that it involves visualization and hands-on practice. This is very appropriate for preschoolers' learning styles, which tend to be concrete and require stimulation when brushing their teeth (Celikel et al., 2025).

Preschool children learn most effectively through observation and imitation. When a teacher demonstrates how to hold a toothbrush, the direction of the movement, and the duration, children can directly observe the correct behavior model (Purnama

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et al., 2019). This aligns with Bandura's theory, which states that children learn through observation and imitation (Blake, 2024). When a demonstration is followed by a simulation or hands-on practice by the child (which is an integral part of the demonstration), the learning process shifts from passive to active. This practice allows the child to develop the hand-eye coordination and fine motor control necessary for proper tooth brushing technique (e.g., circular motions or from gum to tooth) (Ngatemi, 2021). The combination of these two methods creates a comprehensive and layered learning process. Direct Instruction provides cognitive understanding (steps, sequences), while demonstration provides psychomotor development (practical skills, visualization). This combination also demonstrates that children not only know how to brush their teeth (cognitive), but are also able to do so correctly (psychomotor). The power of Direct Instruction in providing scaffolding (gradual support) is complemented by the power of demonstration in making abstract concepts concrete and replicable.

The findings of this study are consistent with various previous studies, including (Mabrur et al., 2021) study, which demonstrated that the direct instruction learning model is an approach designed in a structured manner and implemented in stages, resulting in effective and efficient knowledge delivery. This is further supported by (Salim & Pamungkas, 2023) study, which found that the direct instruction learning model facilitates children's understanding of each skill step, especially considering their low initial abilities. Children's abilities then improved after four sessions of the direct instruction learning model were implemented in Cycle I. In Cycle II, the direct instruction learning model was reapplied for four sessions, with further improvements.

The use of demonstration aids in my research aligns with (Ali, 2016) study, which found that the use of high-intensity educational aids facilitates knowledge absorption, particularly in children's oral health education. This is further supported by (Ngatemi, 2021) research, which demonstrated that tooth-brushing demonstrations improve preschool children's tooth-brushing skills.

Conclusions

The conclusion of this research is that the combination of direct instruction and tooth brushing demonstration methods is effective in improving teeth brushing skills in preschool children.

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