


DENTAL'S AREA LEARNING MODEL AS AN EFFORT TO IMPROVE KNOWLEDGE AND TEETH BRUSHING SKILLS PRESCHOOL CHILDREN

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Info Article	Abstract
<p>Article History:</p> <p>Received: 4 September 2024 Revised: 25 September 2024 Accepted: 10 October 2024 Available Online: 16 October 2024</p> <p>Keywords: Dental's Area Learning Model, Plaque Control Record, Preschool children, Brushing teeth</p>  <p>This is an open access article under the CC-BY-SA license. Copyright © 2024 by Author. Published by Politeknik Kesehatan Kemenkes Jakarta I</p>	<p>Background: Preschool children have different characteristics from children of other ages, so that maximizing their cognitive, affective and psychomotor potential requires appropriate learning methods. Dental's Learning Area Model is a dental health education model that gives preschool children, especially the 3-4 year age group, the choice to choose the areas they want to learn about dental and oral health so that with this choice children are able to optimize learning according to their criteria and abilities. Objective: Develop a Dental's Area Learning Model as an effort to increase knowledge and skills in brushing teeth and reduce the Plaque Control Record (PCR) of preschool children. Method: Quasy Experiment Pretest And Posttest With Control Group Design, Research subjects were preschool children aged 3-4 years who were divided into 2 groups: 1. Dental's Area Learning Model intervention for 14 days through 4 stages of activities, namely training, simulation, brushing practice teeth and evaluation in children and group 2. 14 day tooth brushing model as control. Dependent variable: knowledge and teeth brushing skills. Data were tested using Wilcoxon and Independent t-test. Results: Dental's Area Learning Model is effective in increasing students' knowledge of brushing teeth with a p-value of =0.000 and brushing skills with a p-value of 0.000 (<0.05). Conclusion: Dental's Area Learning Model is effective in increasing knowledge and teeth brushing skills in preschool children</p>
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Introduction

Preschool-aged children are a vulnerable group for developing dental caries (Mintjelaskan, 2014; Balitbangkes, 2018). Caries in primary teeth can cause pain, infection, difficulty eating, speaking, learning disturbances, and play disruptions. This can impact the child's overall quality of life and general health, cognitive development, school readiness, self-esteem, and, in severe cases, can be life-threatening.

Dental caries in primary teeth is a major dental health issue in both developed and developing countries. In developed countries, the prevalence of early childhood caries is reported to be between 1–12% (C. Acuna et al., 2019; Nobile et al., 2014). In contrast, in developing countries, especially in Southeast Asia, the prevalence is more than 85% (Duangthip et al., 2017). In Indonesia, data shows that 81.5% of preschool-aged children, particularly those aged 3-4 years, experience caries. The high

prevalence of dental health issues among children is due to low levels of oral health maintenance behavior. Nationally, only 1.1% of children aged 3-4 years brush their teeth correctly (Balitbangkes, 2018).

Various countries have implemented different strategies to prevent dental caries in children. The World Health Organization has launched the “Global School Health Initiative” aimed at improving child health through school health programs, including disease and oral health prevention efforts (World Health Organization, 2015). In Hongkong, silver diamine fluoride (SDF) therapy is used to promote the remineralization of hydroxyapatite (Greenwall-Cohen, Greenwall, and Barry, 2020). In Indonesia, efforts to prevent oral health problems are made through the School Dental Health Program (UKGS) (Zheng et al., 2021). However, this program has not been fully optimized; according to the 2021 Health Profile of Central Java Province, the average

achievement of the collective tooth brushing program is only 36.1%, and dental care actions achieve 65%. These figures are relatively low compared to the national targets of 100% for promotive services and 80% for preventive services (Nurchafifah, 2021; Dinas Kesehatan Jawa Tengah, 2021).

To improve knowledge and skills in maintaining oral health in preschool children, implementing dental health education programs is essential (Herijulyanti, 2002). Dental health education is a structured and targeted program designed to create an environment where individuals or communities are motivated to change poor behaviors into good ones for their dental health, with the aim of addressing oral health issues (Fione, 2018; Budiharto, 2008).

Instilling and shaping behaviors to maintain oral health should start early (Herijulyanti, 2002). Early childhood is a critical period in human development. At this age, the brain can quickly absorb and process various types of information, so the stimuli provided to children are optimally absorbed and applied in their lives (Direktorat Pembinaan PAUD, 2018; Purnama et al., 2019). This golden period occurs only once in a lifetime. Therefore, fundamental educational stimuli are needed to establish a foundation of knowledge, attitudes, and skills in children. Efforts to increase knowledge and form behaviors related to oral health should be made as early as possible, as behaviors are easier to establish when started in early childhood (Yuniatari, 2020; Kementerian Kesehatan RI, 2018; Kemenkes, 2015; Ansori, 2015).

Behavior is a response or reaction to external stimuli and is categorized into three domains: knowledge, attitude, and practice (Notoatmodjo, 2012; Mahendra, Jaya, and Lumban, 2019). Behavior cannot be learned and changed quickly but rather gradually (Purnama et al., 2019). This aligns with research by Phillipa Lally in 2010, which found that it takes an average of 66 days to change a behavior into a habit, with the range varying from 18 to 254 days (Lally, 2010).

To improve oral health status through health education efforts, various methods and learning models such as lectures, discussions, and demonstrations have been used. However, these methods have limitations because they are often one-way, leading to passive learning and neglect of what is taught. Thus, an innovative dental health education

model is needed. The "Dental's Area Learning Model" is a behavioral change model developed over 14 days, combining early childhood education with dental health education to establish tooth brushing behavior in preschool children, particularly those aged 3-4 years (playgroup).

The Dental's Area Learning Model facilitates individual and group activities to develop knowledge and skills in tooth brushing through five developed areas based on Roger's behavior change theory: a) Awareness, b) Interest, c) Evaluation, d) Trial, and e) Adoption. Each area incorporates innovative teaching media such as a dental abacus. This model includes four stages: training, simulation, tooth brushing practice, and evaluation. It involves parents and teachers in transferring knowledge, attitudes, and skills related to tooth brushing. Parents can assist and serve as role models for tooth brushing at home, while teachers act as facilitators in providing dental health education and promoting good habits at school, thereby improving children's oral health maintenance behaviors.

Method

The method used in this study is a Quasi-Experimental Pretest and Posttest with Control Group Design. The research was conducted at KB Aisyiyah Bustanul Athfal 01 Semarang and KB Aisyiyah Bustanul Athfal 39 Semarang. The subjects of this study were preschool children aged 3-4 years, totaling 44 children, divided into two groups: the Dental's Area Learning Model intervention for 14 days and a 14-day tooth brushing model as the control. The dependent variables are knowledge and skills in tooth brushing. Data analysis was performed using univariate and bivariate tests, with the Wilcoxon test used to assess the impact of the Dental's Area Learning Model on the knowledge and skills of preschool children in tooth brushing.

Result

The data obtained were subjected to univariate analysis on the variables of age and gender. The results of the analysis are presented in Table 1.

Table 1. Frequency Distribution of Age and Gender Data of Research Respondents

Variable	Intervention		Control	
	N	(%)	N	(%)
Age				
≤ 4 years	17	85	16	80
> 5 years	3	15	4	20
Sex				
Male	10	50	8	40
Female	10	50	12	60

Table 1 shows that the study respondents consisted of 20 children in the intervention group and 20 children in the control group. In the intervention group, 17 children (85%) were aged ≤ 4 years and 3 children

(15%) were >5 years, with 10 children (50%) being male and 10 children (50%) being female. In the control group, 16 children (80%) were aged ≤ 4 years and 4 children (20%) were >5 years, with 8 children (40%) being male and 12 children (60%) being female.

Table 2. Data Normality Test

Variable	Intervention		Control	
	Pre-test	Post-test	Pre-test	Post-test
Knowledge	0,036	0,027	0,000	0,005
Tooth brushing skills	0,000	0,001	0,018	0,001

Table 2 shows the results of the normality test for knowledge and tooth brushing skills, with a p-value < 0.05 indicating that the data are not normally distributed, thus requiring non-parametric testing.

Table 3. Presents The Average Scores For Knowledge And Tooth Brushing Skills.

Variable	Intervention		Control	
	Pre-test	Post-test	Pre-test	Post-test
Knowledge				
Mean	42,60	84,55	48,65	54,50
SD	7,35	8,93	6,76	7,49
Min-Max	17-64	63-100	45-63	36-64
Tooth Brushing Skills				
Mean	52,50	80,75	51,50	53,75
SD	3,03	3,35	5,64	3,93
Min-Max	75-85	75-85	45-65	50-60

Table 3 Shows that in the intervention group there was an increase in the average children's knowledge score from 42.60 to 84.55, and the average increase in toothbrushing skills from 52.50 to 80.75, while in the

control group the average children's knowledge score was 48.65 to 54.50 and the average increase in tooth brushing skills from 51.50 to 53.75.

Table 4. Effectiveness Of The Model In Improving Children's Knowledge And Tooth Brushing Skills

Group		Knowledge		Tooth brushing skills	
		($\bar{x} \pm SD$)	p-value	($\bar{x} \pm SD$)	p-value
Intervention	Pre-test	42,60 ± 7,35	0,000	52,50 ± 3,03	0,000
	Post-test	84,55 ± 8,93		80,75 ± 3,35	
Control	Pre-test	48,65 ± 6,76	0,022	51,50 ± 5,64	0,060
	Post-test	54,50 ± 7,49		53,75 ± 3,93	

*Wilcoxon

Table 4 shows that the results of the statistical test for the effectiveness of the Dental's Area Learning Model on children's dental health knowledge yielded a p-value of 0.000 (<0.05), and a p-value of 0.000 (<0.05)

for tooth brushing skills. This indicates that the Dental's Area Learning Model is effective in improving both knowledge and tooth brushing skills in preschool children.

Table 5. Different Test Of Knowledge And Brushing Skills In The Intervention And Control Grup

Group		Knowledge		Tooth Brushing Skills	
		($\bar{x} \pm SD$)	<i>p-value</i>	($\bar{x} \pm SD$)	<i>p-value</i>
Intervention	Pre-test	41,95 ± 2,64	0,000*	28,25 ± 4,06	0,000**
	Post-test				
Control	Pre-test	5,85 ± 1,49		2,25 ± 0,91	
	Post-test				

t Independent*, *Mann-Whitney*

Table 5 shows that the results of the difference test show that knowledge shows a p-value between the intervention group and the control group of 0.000 ($p < 0.05$), meaning that the dental area learning model is effective in increasing children's knowledge of brushing teeth compared to the control group. Meanwhile, children's teeth brushing skills show a p-value between the intervention and control groups of 0.000 ($p < 0.05$), meaning that the dental area learning model is effective in improving the status of teeth brushing skills compared to the control group.

Discussion

Developing dental health maintenance behaviors should start early. According to Purnama (2019), early childhood is a golden period because, at this age, the brain can quickly receive and absorb various types of information, allowing children to optimally integrate and apply what they are stimulated with in their lives (Purnama et al., 2019). Similarly, Khadijah (2016) notes that 50% of the brain's ability to absorb stimuli occurs between the ages of 0-4 years.

Early childhood learning methods differ from those used with adults. Young children have unique characteristics, requiring appropriate teaching methods to help them develop cognitive, affective, and psychomotor aspects. Methods tailored to the characteristics and needs of preschool children will be more easily accepted and understood. Previous research by Yuniati indicates that employing appropriate dental health education methods, supported by suitable stimuli and responses, can influence changes in children's dental health behaviors (Yuniati et al., 2022).

Preschool children lack independence in maintaining their dental health, so the involvement of close individuals is necessary to help them establish good dental care habits. Teachers and parents, as key figures in a child's life, play a crucial role in shaping their behavior. This is consistent with previous research suggesting that involving parents and

teachers in the learning process is one way to optimize development and shape children's behavior (Suwargiani et al., 2017; Angraini et al., 2023).

In schools, teachers are responsible for educating, guiding, teaching, and directing children, helping them understand and become motivated to follow what is taught. At home, parents can act as facilitators and role models, exemplifying good habits such as tooth brushing. According to Anggraini (2019), active parental involvement significantly impacts motivating children to maintain oral health, with the family being the most influential environment for shaping a child's personality and behavior concerning oral health improvement (Angraini et al., 2023).

The Dental's Area Learning Model was developed over a period of 14 days. The first stage aims to build children's awareness through storytelling using dental puppet teaching media. Stage 2 (day 3) fosters interest, where children receive education on tooth brushing steps using the designed media. Stage 3 (day 5) involves developing evaluation skills, where teachers educate children on positive and negative aspects of dental health using Abacus type 2 media. Stage 4 (day 7) focuses on practicing and trying, through simulations and actual tooth brushing practice using dental puppets and Abacus type 2 as references. Stage 5 (days 1 to 14) aims to establish adoption skills, with children given opportunities to practice proper tooth brushing techniques.

Analysis of changes in children's knowledge in the intervention group shows an average change of 41.95, compared to 5.84 in the control group. This indicates that both teaching models can increase knowledge about tooth brushing, but the intervention group shows a higher effectiveness level, as evidenced by a p-value of 0.000. Thus, the Dental's Area Learning Model is concluded to be more effective in improving preschool children's tooth brushing knowledge compared to conventional outreach methods. These findings align with Amperawati (2022), who stated that area-based

learning models can enhance preschool children's interest and cognitive abilities in understanding the material presented.

Analysis of changes in tooth brushing skills in the intervention group shows an average change of 28.25, compared to 2.25 in the control group. This indicates that both teaching models can improve tooth brushing attitudes in preschool children, but the intervention group demonstrates higher effectiveness, supported by a p-value of 0.000. Thus, the Dental's Area Learning Model is more effective in enhancing preschool children's tooth brushing skills compared to conventional outreach methods.

The increase in tooth brushing skills among preschool children is due to the model's provision of opportunities for direct practice over 14 days at home and school, leading to the development of proper tooth brushing habits. This aligns with Purnama (2019), who found that meaningful simulation and practice of tooth brushing can improve preschool children's skills in tooth brushing.

Conclusions

The conclusion of this study is that the Dental's Area Learning Model is effective in improving both knowledge and tooth brushing skills in preschool children.

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