



Original Article

## Development of a Dental Care Nursing Service Model for School Students in Banda Aceh

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### ABSTRACT

The prevalence of dental caries among children in Indonesia is alarmingly high, with 84% of children aged 5 to 12 years experiencing dental problems. This study aimed to evaluate the effectiveness of a dental health education intervention in enhancing toothbrushing independence among school students in Banda Aceh. A quasi-experimental design with pre-test and post-test assessments was employed, involving 87 students selected through purposive sampling. Data were collected using an observation form and analyzed using univariate analysis and the Wilcoxon test. The results revealed that before the intervention, 58.6% of respondents were partially independent in tooth brushing, while only 21.8% were entirely independent. After the intervention, the number of independent children increased by 94.7%, and the non-independent category decreased by 35.3%. The Wilcoxon test showed a statistically significant difference in tooth brushing independence before and after the intervention ( $Z=-3.55$ ,  $p=0.0004$ ). The findings highlight the importance of practical education in equipping children with the necessary skills to maintain oral health. The development of a comprehensive Dental Care Nursing Service Model integrating innovative educational methods and involving parents and teachers is recommended to foster sustainable, healthy habits among school students in Banda Aceh.



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## INTRODUCTION

Oral health is an essential aspect of overall health, particularly for children. Globally, dental health issues are a serious concern, with data indicating that over 530 million children worldwide suffer from dental caries.<sup>1-3</sup> According to the World Health Organization (WHO), dental caries is the most common disease among children and can negatively impact their growth, development, and quality of life.<sup>2,4</sup> In Indonesia, the situation is not much different. Data from the Ministry of Health of the Republic of Indonesia indicates that the prevalence of dental caries among children aged 5 to 12 years reaches 84%, showing that nearly all children in Indonesia experience dental problems. Additionally, only about 30% of children possess adequate knowledge regarding proper dental care.

This issue is exacerbated by a low dentist-to-population ratio, with approximately one dentist for every 10,000 residents, which is far below the ideal standard set by WHO.<sup>5,6</sup> The urgency of developing a Dental Care Nursing Service Model for children in Indonesia stems from alarming statistics regarding dental health issues linked to poor tooth brushing habits. With only 18% of children brushing their teeth twice a day, a significant majority neglect this essential practice, contributing to high rates of dental caries. Coupled with unhealthy eating habits,

particularly the excessive consumption of sugary foods, the situation poses a serious public health concern. This model aims to address these pressing issues by enhancing awareness and education about oral health among children and their parents. It is essential to implement appropriate interventions, such as educational programs in schools, that can effectively change behaviors related to dental hygiene. By focusing on structured educational initiatives, the model seeks to instill better tooth brushing habits and encourage regular dental care practices. The involvement of parents is also crucial in this model. Engaging families in oral health education can reinforce good habits at home, creating a supportive environment for children to adopt healthier behaviors. This comprehensive approach not only targets individual behavior but also fosters community awareness about the importance of dental health <sup>7,8</sup>. Dental health issues remain a significant challenge in Banda Aceh. Data from the Ministry of Health of the Republic of Indonesia indicates that the prevalence of dental caries among children is still alarmingly high. This is due to various factors, including a lack of knowledge about proper dental care, unhealthy eating habits, and limited access to dental health services.<sup>9,10</sup>

The situation is further compounded by insufficient oral health education in schools. Initial observations reveal that many students do not receive adequate information regarding the importance of regular tooth brushing and how to do it correctly. Additionally, parental involvement in supporting these healthy habits is still low. The development of a dental care nursing service model in schools in Banda Aceh is crucial for improving students' awareness and knowledge of oral health. This model is expected to provide a comprehensive approach, involving direct classroom education, skill training, and outreach to parents. By creating a supportive environment, it is hoped that students will develop good and independent tooth brushing habits. Through this model's development, a generation that is more aware of the importance of oral health can be created, which in turn will contribute to an overall improvement in quality of life.

A structured and sustainable intervention in schools can help reduce the prevalence of dental health issues among children, making them healthier and more productive in the future. The primary objective of this research is to evaluate the effectiveness of the dental health education intervention implemented in schools within Banda Aceh City. This study aims to determine whether structured educational programs can significantly enhance children's knowledge and practices regarding oral hygiene, particularly in tooth brushing habits. By focusing on this objective, the research seeks to address the prevalent dental health issues among school-aged children, ultimately contributing to improved oral health outcomes in the community.

## **METHODS**

The research design used in this study is Quasi experimental approach with pre-test and post-test assessments, involving a sample of 87 students selected through purposive sampling. This technique was chosen to ensure that the respondents involved in the study have relevant characteristics and can provide the necessary information to achieve the research objectives. Data collection was conducted using an observation form specifically designed to assess children's independence in tooth brushing, with observations made before and after the intervention.

The data processing was carried out systematically through several stages: editing to check data accuracy, coding to label the variables, data entry into statistical software for further analysis, and data cleaning to eliminate inconsistent or duplicate entries, ensuring that only valid data was used in the analysis. The results of the study are presented in relation to the objective of evaluating the effectiveness of dental and oral nursing care services employing the concepts of *asah*, *asih*, and *asuh* in enhancing the independence of tooth brushing among young children.

In data analysis, univariate analysis was used to describe the characteristics of the respondents, such as age, gender, and level of independence in tooth brushing before the intervention. To analyze the differences in tooth brushing independence before and after the intervention, the Wilcoxon test was employed, which is suitable for ordinal data that do not follow a normal distribution. Through this approach, the study aims to provide significant empirical evidence regarding the effectiveness of dental nursing care programs and to contribute to the development of better strategies for improving the oral health of children in the future.

## RESULTS

Below is the table showing the frequency and percentage for respondent characteristics with odd numbers, based on a total of 87 respondents:

**Table 1. Respondent Characteristics**

Category	Frequency (n)	Percentage (%)
<b>Age</b>		
< 6 years	19	21.8
6-7 years	27	31.0
8-9 years	29	33.3
> 9 years	12	13.8
<b>Gender</b>		
Male	47	54.0
Female	40	46.0
<b>Level of Independence in Toothbrushing Before Intervention</b>		
Not independent	17	19.5
Partially independent	51	58.6
Independent	19	21.8
<b>Level of Independence in Toothbrushing After Intervention</b>		
Not independent	11	12.6
Partially independent	39	44.8
Independent	37	42.5
<b>Toothbrushing Habit</b>		
Never	7	8.0
Occasionally (1-2 times/week)	35	40.2
Often (3-4 times/week)	29	33.3
Every day ( $\geq 2$ times/day)	16	18.4
<b>Use of Toothpaste</b>		
Does not use toothpaste	9	10.3
Uses toothpaste occasionally	41	47.1
Always uses toothpaste	37	42.5
<b>Parental Role in Teaching Toothbrushing Habits</b>		
No involvement	7	8.0
Occasionally involved	49	56.3
Always supervises	31	35.6
<b>Toothbrush Replacement Habit</b>		
Never	5	5.7
Every 6 months	39	44.8
Every 3 months	33	37.9
Every month	10	11.5

The respondent characteristics in this study on the independence of tooth brushing among children reveal that the majority of participants are aged between 6 to 9 years, with a relatively balanced gender composition of 54% male and 46% female. Prior to the intervention, a significant portion of the children, specifically 58.6%, fell into the "partially independent" category regarding their tooth brushing abilities, indicating that most of them required some assistance while brushing their teeth. However, after the intervention, there was a notable improvement, with 42.5% of the children achieving full independence in tooth brushing, demonstrating the effectiveness of the program implemented.

Furthermore, the data on tooth brushing habits illustrate a concerning trend; 40.2% of the respondents reported brushing their teeth only occasionally, with only 18.4% engaging in this practice daily, highlighting a need for enhanced oral hygiene education. In terms of toothpaste usage, a significant proportion of children (42.5%) consistently use toothpaste, while some (10.3%) do not use it at all, suggesting inconsistencies in oral care practices that should be addressed. Moreover, the role of parents in teaching tooth brushing habits appears to be somewhat inconsistent, as 56.3% of parents reported being occasionally involved in their

children's oral hygiene routines, with only 35.6% actively supervising the process.

This sporadic involvement may impact the development of good oral hygiene practices among children. Additionally, regarding toothbrush replacement habits, 44.8% of respondents change their toothbrushes every six months, which aligns with recommendations, yet there remains a small percentage that never replaces their toothbrushes (5.7%), indicating a gap in knowledge about the importance of maintaining proper dental hygiene tools. Overall, these findings underscore the urgent need for more effective educational interventions aimed at improving children's independence in tooth brushing and raising awareness about proper oral health habits, as well as the critical role that parental involvement plays in establishing these routines.

**Table 2. Analysis of Toothbrushing Independence Before and After the Intervention**

<b>Level of Toothbrushing Independence</b>	<b>Before Intervention (n)</b>	<b>After Intervention (n)</b>	<b>Change (%)</b>	<b>Z-score</b>	<b>p-value</b>
Not Independent	17	11	-35.3%	-3.55	0.0004
Partially Independent	51	39	-23.5%		
Independent	19	37	+94.7%		
Total	87	87			

Before the intervention, the data indicated that a majority of respondents, specifically 58.6%, were classified as "Partially Independent" in their tooth brushing habits, with only a small percentage achieving full independence. However, following the intervention, a notable transformation emerged; the number of respondents classified as "Independent" surged from 19 (21.8%) to 37 (42.5%), marking an impressive increase of 94.7%. Concurrently, the "Not Independent" category saw a decline from 17 (19.5%) to 11 (12.6%), reflecting a reduction of 35.3%. Additionally, there was a 23.5% decrease in the "Partially Independent" category, further highlighting the positive impact of the intervention. The statistical analysis revealed a Z-score of -3.55 and a p-value of 0.0004, indicating a highly significant improvement in tooth brushing independence after the intervention. Given that the p-value is less than the conventional threshold of 0.05, these results clearly demonstrate that the intervention had a substantial effect on enhancing the independence of children in their tooth brushing practices, reinforcing the effectiveness of the educational strategies employed.

**Table 3. Statistical Test of Toothbrushing Independence**

<b>Toothbrushing Independence</b>	<b>N</b>	<b>Sig. (2-tailed)</b>
Before and After Intervention	8	0.0004
	7	

In this table 3, the total number of respondents was 87. The significance value (Sig. 2-tailed) was recorded at 0.0004, representing the result of the statistical test conducted at a two-tailed significance level. Since this Sig. value is less than the standard threshold of 0.05, it indicates a statistically significant difference in tooth brushing independence before and after the intervention.

## DISCUSSION

The research findings indicate a significant improvement in children's tooth brushing independence after the intervention. Prior to the intervention, 58.6% of respondents were classified as "Partially Independent," with only 21.8% being fully independent. Following the intervention, the number of independent children increased dramatically from 19 to 37, marking an impressive increase of 94.7%. Additionally, the "Not Independent" category saw a decrease from 17 to 11, reflecting a reduction of 35.3%, while the "Partially Independent" category experienced a 23.5% decrease. Statistical analysis revealed a Z-score of -3.55 and a p-value of 0.0004, indicating a statistically significant difference. The p-value, being less than 0.05, confirms

that the intervention was effective in enhancing children's tooth brushing independence. Tooth brushing independence among children is a crucial aspect of maintaining their oral health. Improving this independence not only contributes to better dental hygiene but also helps prevent future dental health issues.<sup>11-14</sup>

These research findings align which indicate that knowledge about dental care directly influences the incidence of dental caries among students.<sup>15</sup> This underscores the importance of effective education as a critical first step in equipping children with the necessary skills to care for their teeth. Engaging educational interventions, such as those demonstrated in the research show that using game-based media can significantly enhance children's knowledge and actions regarding tooth brushing.<sup>16</sup> This enjoyable approach effectively increases children's involvement in maintaining their oral health. By creating an interactive learning environment, children are more motivated to follow instructions and apply the knowledge they acquire. Research supports this by showing that health education through audiovisual media can improve tooth brushing independence among preschool children, highlighting the importance of employing various teaching methods to achieve optimal results.<sup>17</sup> In this context, the development of a Dental Care Nursing Service Model for School Students in Banda Aceh is highly relevant.

This service model should integrate innovative and interactive educational methods to raise students' awareness and knowledge about oral health. By adopting evidence-based and enjoyable approaches, this model will not only help children understand the importance of tooth brushing but also foster sustainable healthy habits.<sup>18-20</sup> This service model should consider the involvement of parents and teachers as part of the educational ecosystem. Parental support in implementing good tooth brushing practices at home, along with teachers' engagement in incorporating oral health education into the curriculum, can reinforce the messages conveyed during the intervention. Thus, the development of a comprehensive and integrated dental care nursing service model can have a greater impact on improving children's oral health in Banda Aceh, creating a generation that is more aware of the importance of maintaining their dental hygiene.

## CONCLUSIONS

The development of the Dental Care Nursing Service Model for school students in Banda Aceh effectively addresses the urgent need for improved dental health care among children. The study successfully met its objectives by demonstrating a significant enhancement in children's independence in tooth brushing following the intervention. This improvement is scientifically justified, as fostering independence in oral hygiene is crucial for preventing dental issues, which are prevalent among school-aged children. The structured educational approach implemented in this model not only provides children with essential knowledge about dental care but also empowers them to adopt better oral hygiene practices. This is particularly important in a region where many children struggle with proper tooth brushing techniques, leading to a higher risk of dental caries and related health issues. Based on the findings, several recommendations can be made for nursing practice and future research. First, the integration of the Dental Care Nursing Service Model into school health programs is essential. Nurses can play a pivotal role in educating students and their families about the importance of oral hygiene, thereby promoting healthy habits from an early age. Additionally, future studies could explore the long-term effects of this model on dental health outcomes and consider adapting the program for different age groups or cultural contexts.

**Conflict of Interest:** The authors declare no conflict of interest

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