

## Effectiveness of tooth brushing training for parents with special needs children

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### ABSTRACT

**Background:** Special needs children (SNC) have poor oral hygiene status than normal children. Tooth brushing is the most efficient mechanical method to improve dental hygiene in SNC. SNC has difficulties in performing tooth brushing due to their limitation, family support is needed to empower SNC to perform oral hygiene activities. The aim of this study is to assess the effectiveness of toothbrushing training in parents with SNC to decrease plaque index compare to parents who were not trained

**Methods:** This study used quasi experimental with non-equivalent control group design. The subjects of this study were 28 students with special needs at SLB Negeri Purwosari Kudus. Data analysis using paired samples t test.

**Results:** The result showed that average plaque index of SNC before tooth brushing training in their parents was 3.57 and after the intervention the average plaque index decrease to 2.52. SNS plaque index decreased by 27.37% and statistically proven with  $p < 0.0001$  ( $p < 0.05$ ).

**Conclusion:** there is a significant influence of tooth brushing training in parents with SNC on the decreasing of SNC plaque index.

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## INTRODUCTION

Caries and periodontal disease are the most common mouth disease that affect both children and adults.<sup>1</sup> According to World Health Organization (WHO), tooth decay has affected 60%-90% of school children in the worldwide.<sup>2</sup> The prevalence of caries in children with the age group 5-9 years in Indonesia according to Riset Kesehatan Dasar (Riskesdas) 2018 reached 92.6%.<sup>3</sup> Prevalence of tooth decay that occurred in the age group 5-9 years in Central Java was 53.51%.<sup>4</sup> In Kudus the incidence of tooth decay in elementary school students was 42.6%.<sup>5</sup>

Special needs children (SNC) have been reported have poor oral hygiene status with higher plaque index, more severe cases of periodontitis and gingivitis, more untreated dental disease and more tooth extraction than normal children.<sup>6-8</sup> Research by Nurizza (2020) found that 90% of special needs students in elementary school in Surabaya had poor debris index.<sup>9</sup> The caries prevalence of 96 children with mental retardation, visually impaired, hearing impaired, autistic and down syndrome in Medan reached 92.71%.<sup>10</sup> The same result also found in SNC grade 1-4 elementary school in Bantul, the caries index was in the medium criteria (def-t 3.8 and DMF-T 3).<sup>11</sup>

Plaque control is the most effective way to prevent tooth decay and periodontal disease. Mechanical cleaning of teeth by tooth brushing is the most effective and easy to do to prevent plaque accumulation.<sup>12,13</sup> The limitation of SNC prevents them from performing tooth brushing activities effectively. The difficulties they encountered include simple thinking, weak working memory skill, as well as difficulty controlling hand movements due to limited motor skills.<sup>14-16</sup>

Plaque control in children can be done by providing tooth brushing training. However, to be successful in SNC, they need their parents to

accompany and guide them in tooth brushing activities.<sup>17-19</sup> The advantages of tooth brushing training are that it will be easier for children to imitate what they see and then imitate it.<sup>20</sup> Research by Sujarwati (2019) found that tooth brushing skills in mental retardation children before their parents trained was at a minimum score 16 and a maximum 24. After training, tooth brushing skills of children increased to a minimum score 27 and maximum score 32.<sup>21</sup> Research by Purnomo and Kusumaningrum (2022) found an increasing in tooth brushing skills of mentally retarded children after 2 cycles of tooth brushing training using drill method.<sup>22</sup> Other research has also found that training in mental retardation children using direct instruction method by their parents can improve their brushing skills by 30%-40%.<sup>23</sup>

Caries prevalence for children in Kudus quite high and research conducted previously at SLB Negeri Purwosari Kudus found that out of 24 respondents, 19 children had poor plaque index and 5 children were in the moderate category. The aim of this study is to assess the effectiveness of toothbrushing training in parents with SNC to decrease plaque index compare to parents who were not trained.

## METHODS

This study used quasy experiment with non-equivalent control group design to test the effect of tooth brushing training for parent on reducing SNC plaque index. This research was carried out in January-March 2023 after obtaining a certificate of ethical suitability from the Health Research Ethics Commission, Faculty of Sports Sciences, Semarang State University No.027/KEPK/EC/2023. There were 2 group in this research, group 1 was given tooth brushing training and group 2 without intervention as a control group. This research was conducted by measuring plaque index in SNC using

PHP index (Personal Hygiene Performance) before and after their parents being trained. Tooth brushing training for parents was carried out 3 times in 21 days taking into previous research.<sup>24,25</sup> Training is carried out by providing education using leaflets and models (tooth models and toothbrush) regarding oral health, time to brush teeth, how to brush teeth, foods that are good and bad for oral health. Training on how to brush teeth was taught one by one to parents by researchers.

The population of this study were 224 students of SLB Negeri Purwosari Kudus. This study used purposive sampling technique in accordance with the inclusion and exclusion criteria determined by the researchers. There were 28 SNC students as the sample for this study.

The normality test was carried out to find out whether the data were distributed normally or abnormally. Shapiro Wilk was used in this study as the normality test because the number of samples less than 50. The data obtained was analyzed statistically using the paired t-test analysis, with a significance level of 0.05.

## RESULTS

The size of the sample that was suitable for inclusion criteria was 28. The distribution of sample characteristics is shown in Table 1. that in the intervention group, the majority of respondents were female, with 9 children (64.3%). In the control group, the majority of respondents were male, with 8 children (57.1%). The most common type of disability suffered by respondents was mental retardation where there were 6 children (42.9%) in intervention group and 7 children (50%) in control group.

**Table 1.** Frequency Distribution of Sample

Variable	Group	
	Intervention (n=14)	Control (n=14)
<b>Age</b>		
<b>11-12</b>	8 (57.1%)	7 (50%)
<b>13-14</b>	6 (42.9%)	7 (50%)
<b>Sex</b>		
<b>Female</b>	9 (64.3%)	6 (42.9%)
<b>Male</b>	5 (35.7%)	8 (57.1%)
<b>Disability</b>		
<b>Deaf</b>	4 (28.6%)	5 (35.7%)
<b>Blind</b>	4 (28.6%)	2 (14.3%)
<b>Mental retardation</b>	6 (42.9%)	7 (50%)

The results of plaque index studies showed that there was a different score between before and after intervention. Before the intervention, the plaque index in the intervention group had an average score of 3.57 and the average plaque index score of the control group was 3.19 (Table 2). Then SNC's parents in the intervention group were given tooth brushing training in 3 times for 21 days.

**Table 2.** Mean of Plaque Index

Plaque Index	Group			
	Intervention		Control	
	Mean±SD (Min-Max)	Δ (%)	Mean±SD (Min-Max)	Δ (%)
<b>Pretest</b>	3.57±0.72 (2.30-4.60)		3.19±0.97 (1.83-4.70)	
<b>Posttest</b>	2.52±0.71 (1.00-3.67)	27.37	3.09±0.55 (2.17-3.90)	3.34

After 21 days, the measurements of SNC's plaque index were taken again. The results found a decrease in the average plaque index in the intervention group to 2.52 where the percentage decreased by 27.37%. Whereas in the control group the average post-test plaque index score were 3.09 respectively with a decrease in the plaque index of 3.34%.

**Table 3.** Paired T Test Result of Plaque Index in Both Group

Group	Mean±SD	95% CI	P
<b>Intervention</b>	0.98±0.49	0.69-1.27	0.000
<b>Control</b>	0.11±0.64	(-0.27)-0.47	0.548

The result from paired t test (Table 3) of the intervention group showed  $p < 0.0001$  ( $p < 0.05$ ), it was concluded that in the intervention group there was a decrease in SNC plaque index before and after their parents were trained by 27.37% and proved statistically significant. Whereas in the control group showed  $p = 0.548$  ( $p > 0.05$ ), it was concluded that in the control group there was a decrease in the ABK plaque index score of 3.34% but was not statistically significant.

## DISCUSSION

The decrease in plaque index score of the intervention group is statistically proven ( $p < 0.05$ ). This results are in line with research by Shah et. al., (2020), tooth brushing training were given to parents with SNC then plaque index SNC were measured before, 3 months and 6 months after training. The result found that there was decreasing in plaque index score with mean 1.55 before training to 1.35 after 3 months and 1.1 after 6 months of training ( $p < 0.05$ ).<sup>26</sup>

A decrease in the plaque index was also found in another study, where the average plaque index score of deaf children decreased from 2.03 to 1.23 after 3 weeks of tooth brushing training for their parents and was proven statistically ( $p < 0.001$ ).<sup>[24]</sup> Research by Istadi (2020) on blind children who were given tooth brushing training with braille book, after 21 days of training, he found that there was a decrease in OHI-S index which was statistically proven ( $p < 0.05$ ).<sup>27</sup> Another study conducted on children with intellectual disabilities also found that tooth brushing training significantly reduce the plaque index score ( $p < 0.05$ ).<sup>20</sup>

Tooth brushing training is a good way to empower children in oral hygiene activities independently, especially for SNC.<sup>28,29</sup> The method of tooth brushing training with supervised from parents or caregivers have had good result for

visual impairments children where the percentage of poor oral hygiene status decrease from 16.67% to 0% and increase good oral hygiene status from 16.67% to 58.33%.<sup>18</sup>

In this study, a significant decrease in the plaque index in the intervention group occurred because the respondents had been trained and used to brush their teeth properly according to the technique that has been taught. In the control group there was a decrease average in plaque index score from 3.19 to 3.09 with percentage of decrease at 3.34%. However, this decreasing was not statistically significant ( $p > 0.05$ ). This happened because their parents did not receive tooth brushing training. The tooth brushing training directly performed by parents as a model has better results in improving the child's tooth brushing skills compared to training with the puppet model.<sup>30</sup> Parents who have been given training are role models for SNC, parents will become models in establishment children's behavior, especially in tooth brushing behavior.<sup>31</sup> The more children recognize themselves in the model and identify the model as themselves, the more likely they will successfully imitate the movements being taught.<sup>30</sup>

## CONCLUSION

Special needs children need support and assistance especially from their parents in order to carry out activities related to oral health. The results in this study proved that tooth brushing training in parents significantly reduce the plaque index score in SNC.

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