THE INFLUENCE DENTAL HEALTH EDUCATION ON BEHAVIOR AND DEBRIS INDEX OF STUDENTS

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ABSTRACT

Dental caries is an infectious disease resulting from the demineralization of enamel and dentin, closely linked to the consumption of cariogenic foods. Typically, children entering school age face a heightened risk of caries due to their inclination toward snacking on sweet foods and drinks. The implementation of Dental Health Education (DHE) plays a crucial role in enhancing students' comprehension of dental and oral health. Specifically, educating children on proper teeth-brushing techniques should include practical examples and applicable methods. This study aims to assess the impact of dental health education on the behavior and fecal index of students at SDN Mesjid Lheu in Aceh Besar District. Employing a quasi-experimental design, the research follows a control group equivalent to pre-test and post-test. The total population of 60 children was divided into two groups: the intervention group and the control group. Quantitative data analysis involved the paired sample t-test and the independent t-test. Significant differences were observed in the mean values of knowledge, attitudes, and actions, as well as the OHI-S scores immediately after and one month following the intervention between the treatment group and the control group (p<0.05). To reinforce children's dental health habits at home, it is advisable to involve parents in dental health education programs, as their information and resources are integral to providing support and monitoring.

Keywords: Dental Health Education; Behavior; Debris Index

1. INTRODUCTION

Dental caries remains a significant health issue among children. According to the World Health Organization (WHO) in 2016, the prevalence of caries in children still ranged from 60% to 90%.[1] Findings from the 2018 Basic Health Research (Riskesdas) survey revealed that 55% of the population in the Aceh region experienced dental health problems in the past 12 months, and only 2.8% of individuals aged > 3 years brushed their teeth correctly.[2] Additionally, data from the Darul Imarah Health Centre in Aceh Besar Regency reported 46.33 cases of dental caries among primary school-age children. 60% of dental caries occurs because children do not brush their teeth regularly and 40% because children often

consume foods and drinks containing sugar and others.[3] The state of oral health in the Aceh Besar Regency area shows that public awareness is still lacking to maintain oral health.

One of the causes of oral and dental problems is behavioural factors or attitudes towards ignoring oral hygiene. This is based on a lack of knowledge of the importance of maintaining oral health. Entering school age, the risk of children experiencing toothache is getting higher [4]. The abundance of sugary snacks and beverages at schools poses a threat to the dental health of children. The high rate of oral diseases in children today is strongly influenced by several factors caused by frequent consumption of sweet and sticky foods such as sweets and chocolate, as well as a lack of knowledge about how to brush teeth properly. [5]

The result that occurs when not maintaining good and correct oralhygiene is the emergence of several diseases related to teeth and mouth such as caries, periodontal disease, halitosisand calculus build-up. Dental and oral diseases will greatly affect the child's growth and development process.Children are prone to malnutrition, pain in the teeth and mouth clearly reduces appetite. Learning ability decreases so that it will clearly affect learning achievement [6]. Oral and dental problems are not included in the list of deadly diseases. This condition causes people to rule out efforts to prevent and even treat oral and dental diseases. Schools and families as the closest environment for children from an early age must educate children to be disciplined in brushing their teeth at least twice a day after meals and before bed. Teeth must be seen as anasset not only achieved from the health

aspect but also as a condition for achieving a promising future.[7]

One indicator of oral health is the level of oral hygiene. This can be seen clinically from the presence or absence of organic deposits, such as pellicles, materia alba, debris, calculus, and dental plaque. Plaque is a soft deposit that forms a biofilm layer and adheres to the surface of the teeth and gums and other hard tissue surfaces in the oral cavity.Dental and oral hygiene is an action to clean teeth and gums to prevent dental and oral diseases. [7]

Oral health is closely related to behaviour. Good oral health maintenance behaviour will play a major role in determining the degree of dental health.[8] Education on tooth brushing methods for children needs to be given an example of a good model and with the simplest possible technique. The delivery of oral health education to children should be made as interesting as possible, including through attractive counselling without reducing educational content, live demonstrations, audio-visual programs, or through controlled mass toothbrushing.[8]

Dental Health Education can increase students' understanding of oral health. Counselling using dental phantom tools makes it easier for the audience / target to absorb the material presented because the tools demonstrated are real and can be seen clearly so that the target is not easily bored, considering that the target is an elementary school student so that what is conveyed and displayed can be absorbed and as a motivation for students in terms of maintaining dental and oral hygiene.[9]

Childhood is the beginning of behaviour formation. During this period, children are most vulnerable to various influences, both from within and outside

the child. It is not surprising that children are quite vulnerable to changes in health status, including caries. Children aged between 10-12 years, is the age recommended by WHO for oral health research. In this age group, children's interest in learning is high, supported by children's very strong memory and ability to capture and understand the material provided. In addition, at this level children are easy to educate and enjoy being around people who pay attention to them. In general, dental health behaviour at this age is more cooperative than the younger age groups and is also considered to be independent in tooth brushing. The age of 10-12 yearsis also a critical period in the adoption, maintenance and improvement of a child's lifestyle. At this stage there is an increase in metabolic processes resulting in increased energy requirements.Increased energy needs lead to increased snacking behaviour and irregular eating patterns compared to other age levels. Good tooth brushing behaviour and good food consumption behaviour are certainly very appropriate to be taught at this age considering the increase ineating frequency and irregular eating patterns.

Based on a study conducted by Reca and Liana in 2019, it was identified that there were notable differences in the knowledge, attitudes, and actions of both children and their parents, along with variations in OHI-S (Oral Hygiene Index-Simplified) and DMF-T (Decayed, Missing, Filled Teeth) statuses of children before and after the intervention. The research suggests that family dental nursing care, specifically through home visiting services, can foster parental participation and contribute to the enhancement of children's dental health.[10] Another study by Reca and Suryani in 2021 focused on assessing the effectiveness of positive parenting in family dental nursing care, particularly regarding changes in children's caries risk scores in the era of the new normal. The findings indicated significant differences in maternal knowledge, attitudes, actions, and children's caries risk scores before and after the intervention.[11]

An initial survey involving 10 fifth-grade students at SDN Mesjid Lheu revealed that 85% of the children exhibited poor debris index criteria, ranging from 1.9 to 3.0. Additionally, the average DMF-T (Decayed, Missing, Filled Teeth) value for grade V students at SDN Mesjid Lheu was 4.3, signifying an average of 4 cavities per child. The elevated DMF-T rate surpasses the national target, posing a significant issue. The focus of this study on grade V students is justified by the age group's general cooperativeness, facilitating easier and more accurate data collection. The study aims to evaluate the impact of dental health education (DHE) on behavior and debris index among students at SDN Mesjid Lheu in Aceh Besar Regency.

2. RESEARCH METHODS

This research is a *quasi experimental*. The research design used was an *equivalentcontrol group design with pre test and post test*.[16] This research design was to determine student behaviour using a questionnaire and debris index using a diagnostic tool set and status card in students of class VA and VB SDN Mesjid Lheu. The intervention providedin the form of counselling and training onhow to brush teeth properly. *Pre test* wasconducted before (*Dental Health Education*), then shortly after *(Dental Health Education) post test* I was conducted. After 1 month (it is expected that the sample has been able tocarry out individually trained brushing methods), the researcher returned to theresearch location for data collection on

student behaviour and examination of the debris index in both groups *(post test).* The sample in this study used the total population. all students of Class VA and VB SDN Mesjid Lheu totalled 60 children, then divided into two groups, the intervention group consisted of 30 children given the intervention and the control group consisted of 30 children not given the intervention. Analysis of data results (quantitative) in this study using; 1). *Paired Samples T-tests*, and 2). *Independent T-test.*

3. RESULTS

This research was conducted on fifth grade students of SDN Mesjid Lheu Aceh Besar from June to August 2023.

a. Difference Analysis (*Paired Sample T-test*)

1) Student Behaviour in the Treatment Group

The mean differences from pre-test to *post-test I, post-test I to post-test II,* and *pre-test to post-test II* of student behaviour in the treatment group are presented in the following table:

Table 1. Mean difference and standard deviation of student behaviour in the treatment group

Data	Average Difference ± SD	t	p
Pre-test ke Post-test I	-41 ± 22,3338	-10,053	<0,001*
Post-test I ke Post-test II	-9,33± 15,960	-3,203	0,003*
Pre-test ke Post-test II	-50,3± 19,384	-14,222	<0,00i*

Description * = significant

Table 1. Shows that there was an increase in student behaviour scores in the treatment group from *pre-test* to *post-test I* with a mean difference of -41 from *post- test I* to post-test *II* with a mean difference of -9.33 and from pre-test to *post-test II* with a mean difference of -50.3. There is a statistically significant difference in the mean value of behaviour (p<0.05)

2) Student Behaviour in the Control Group

The mean differences from *pre-test* to *post-test I*, *post-test I* to *post-test II*, and *pre-test* to *post-test II* of student behaviour in the control group are presented in the following table:

Table 2. Mean difference and deviation of student behaviour scores in the control group

Data	Average Difference ± SD	t	p
Pre-test ke Post-test I	-0,67 ± 3,65	-1,000	0,3,26
Post-test I ke Post-test II	-0,33 ± 5,56	-0,328	0,745
Pre-test ke Post-test II	-1,00 ± 3,051	-1795	0,83

Description * = significant

48

Table 2. Shows that the value of student knowledge in the control group from pre-test to post-test I with a mean difference of -0.67 from *post-test I* to *post-test II* with a mean difference of -0.33 and from *pre-test* to *post-test II* with a mean difference of -1.00 There is no statistically significant difference in the mean value of student knowledge (p>0.05)

3) Debris Index in the Treatment Group

The mean difference from *pre-test* to *post-test I*, *post-test I* to *post-test II*, and *pre-test* to *post-test II* Debris Index in the treatment group is presented in the following table:

Table 3. Mean difference and standard deviation of Debris Index in treatment groups

Data	Average Difference ± SD	t	p
Pre-test ke Post-test I	1,6 ± 0,96	9,116	<0,001*
Post-test I ke Post-test II	1,2 ± 0,44	2,112	0,043*
Pre-test ke Post-test II	1,8 ± 0,81	11,956	<0,001*

Description * = significant

Table 3. Shows that there was a decrease in OHIS status in the treatment group from *pre-test* to *post-test I* with a mean difference of 1.6, from *post-test I* to *post-test II* with a mean difference of 1.2 and from *pre-test to post-test II* with a mean difference of 1.8. There is a statistically significant difference in the mean OHIS status (p<0.05).

4) Debris Index in the Control Group

The mean difference from *pre-test* to *post-test I*, post-test I to *post-test II*, and *pre-test* to *post-test II* Debris Index in the control group is presented in the following table:

Table 4.4 Mean difference and standard deviation of Debris Index in the control group

Data	Average Difference ± SD	t	p
Pre-test ke Post-test I	0,12 ± 0,43	1,578	0,125
Post-test I ke Post-test II	0,00 ± 0,22	0,162	0,873
Pre-test ke Post-test II	0,13 ± 0,48	1,477	0,151

Description * = significant

Table 4. Shows that the Debris Index in the Control Group from *pre-test* to *post-test I* with a mean difference of 0.12 from *post-test I to post-test II* with a mean difference of 0.00 and from *pre-test* to post-test II with a mean difference of 0.13. There was no statistically significant difference in the mean Debris Index in the control group (p>0.05).

49

b. **Analysis of Differences Between Groups (*Independent t-test*)**
   1) Student Behaviour
   The results of the analysis of student behaviour between the treatment and control groups are as follows:
   Table 5. Mean and standard deviation of student behaviour between treatment and control groups

Student Behaviour	Group	Average ± SD	t	p	Description
Pre-test	Treatment	37,33 ± 15,74	0,714	0,478	Not Significant
	Control	34,7 ± 13,06			
Post-test I	Treatment	78,33 ± 13,67	12,706	<0,001*	Significant
	Control	35,33± 12,52			
Post-test II	Treatment Control	87,67 ± 11,35	15,758	<0,001*	Significant
		35,67 ± 14,07			

Table 5. Shows that there was no significant difference in students' knowledge before the intervention *(pre-test)* between the treatment group and the control group. This is statistically indicated by p>0.05. There was a significant difference in students' knowledge immediately after the treatment *(post-test I)* between the treatment group and the control group. This is shown statistically p<0.05. There is a significant difference in students' knowledge 1 (one) month after treatment *(post-test II)* between the treatment group and the control group. This is shown statistically p<0.05

5. Debris Index
   The results of the Debris Index analysis between the treatment group and the control group are as follows:
   Table 6. Mean and standard deviation of Debris Index between treatment and control groups

Debris Index	Group	Average ± SD	t	p	Description
Pre-test	Treatment	2,5± 0,7	0,387	0,700	Not Significant
	Control	2,5 ± 0,5			

Post-test I	Treatment	$0,8 \pm 0,6$	-9,545	<0,001*	Significant
	Control	$2,3 \pm 0,5$			
Post-test II	Treatment	$0,7 \pm 0,49$	-12,428	<0,001*	Significant
	Control	$2,3 \pm 0,25$			

Table 6 indicates no noteworthy distinction in the debris index status prior to the intervention (pre-test) between the treatment group and the control group, as evidenced by a p-value exceeding 0.05. However, a notable difference in debris status index emerges after treatment (post-test I) between the treatment and control groups, with a statistically significant p-value less than 0.05. Additionally, there is a significant contrast in debris index status one month after treatment (post-test II) between the treatment and control groups, supported by a statistically significant p-value less than 0.05.

4. DISCUSSION
a. Student Behaviour

Based on the results of the analysis between groups (independent t-test) on grade V students of SDN Mesjid Lheu Aceh Besar respectively, it was found that there was no significant difference in student knowledge before the intervention (pre-test) between the treatment group and the control group. This was statistically indicated by p>0.05. There was a significant difference in students' knowledge immediately after the treatment (post-test I) between the treatment group and the control group. This is shown statistically p<0.05. There is a significant difference in students' knowledge 1 (one) month after treatment (post-test II) between the treatment group and the control group. This is shown statistically p<0.05 (table.5). Based on the results of the analysis by conducting a difference analysis (paired sample t-test) on class V students of Mesjid Lheu Aceh Besar in the control group (Class VB) showed the value of student knowledge from pre-test to post-test I, from post-test I to post-test II and from pre-test to post-test II. There was no statistically significant difference in the mean value of

student behaviour (p>0.05). While the value of student knowledge in the treatment group (Class VA) from pre-test to post-test I, from post-test I to post-test II and from pre-test to post-test II. There is a statistically significant difference in the mean value of knowledge (p<0.05). This shows that dental health education (DHE) helps improve students' knowledge about the importance of maintaining dental health and the steps needed to properly care for teeth.When students have better knowledge about dental health, they are more likely to understand why dental care is important and how to do it properly. *Dental Health Education* (DHE) helps raise students' awareness of the adverse effects of not taking good care of their teeth, such as tooth decay, bleeding gums, bad breath, and other health problems.[12] This awareness can encourage them to take the

necessary steps to maintain their dental health. *Dental Health Education*(DHE) can also influence changes in students' attitudes towards dental care. They may begin to perceive dental care as important and positive, rather than a tedious obligation. This change in attitude may encourage them to be more diligent and consistent in dental care. The results of *Dental Health Education* (DHE) may not only be seen in the short term but also in the long term. The understanding and habits instilled through dental health education can have a positive impact on students' dental health for years to come.[13]

The results of this study are also supported by the results of research conducted by Ali in 2016 which showed a significant difference between dental health education without demonstration and dental health education involving tooth brushing demonstrations.[14] The results of this study prove that the more a person receives information, the more it increases behaviour towards a better direction, so it is in accordance with the results of this study that providing information (*dental health education* (DHE)) can improve student behaviour in maintaining oral health.

b. Debris Index

The analysis of grade V students from SDN Mesjid Lheu Aceh Besar, conducted through an independent t-test, revealed no significant difference in debris index status before the intervention (pre-test) between the treatment group and the control group, as indicated by a p-value greater than 0.05. However, a significant contrast in debris index status emerged after treatment (post-test I) between the treatment and control groups, supported by a statistically significant p-value less than 0.05. Moreover, there is a noteworthy difference in debris index status one month after treatment (post-test II) between the treatment group and the control group, with a statistically significant p-value less than

0.05 (see Table 6).

Further analysis, employing a paired sample t-test, was conducted on grade V students from SDN Mesjid Lheu Aceh Besar in the control group (Class VB). The assessment included debris index scores from pre-test to post-test I, post-test I to post-test II, and pre-test to post-test II. The results indicated no statistically significant difference in the mean debris index score (p>0.05) for students in the control group. Conversely, in the treatment group (Class VA), the debris index scores from pre-test to post-test I, post-test I to post-test II, and pre-test to post-test II displayed a statistically significant difference in the mean values of knowledge (p<0.05). This is because the programme has successfully influenced the community to improve their understanding and habits in caring for oral health, as well as applying proper tooth brushing techniques. Effective counselling can provide people with a better understanding of the importance of maintaining oral hygiene. The information provided can explain the adverse effects of the build-up of debris, plaque and bacteria in the mouth and ways to prevent them. Practical training in proper toothbrushing can help people develop the skills necessary to clean their teeth effectively. They may learn about proper toothbrushing techniques, recommended duration, as well as the use of dental floss or mouth rinses to clean hard-to-reach areas. Counselling and training can also motivate

individuals to make changes in their daily habits. When an individual understands the benefits of better health and the potential to reduce future oral problems, they are more likely to be motivated to implement proper dental care practices. After the training, people may be more aware and get used to checking and cleaning their teeth more regularly.[15] Increased self- monitoring and feedback from counselling can also encourage positive changes in dental care habits. Counselling and training can change social norms around proper dental care. If more people around them start adopting these habits, individuals are likely to feel encouraged to partake in the same practices. Extension programmes can raise overall awareness about the importance of oral health. People may be more aware of the adverse effects of foods and beverages that can leave residue on the teeth, as well as how to prevent them. Overall, the decrease in debris index scores towards a better direction after the counselling and training shows that the programme has successfully achieved its goal of increasing awareness, knowledge, and behaviour in caring for oral health.[16]

These results show that *dental health education* (DHE) can reduce the debris index so that students have started to know new information and learn to understand the new object, namely how to maintain dental and oral hygiene.[15]

These results are in line with research conducted by Wang et al (2023) which shows that dental students have better knowledge, attitudes and oral health behavior compared to non-dental students. This research also found that oral health education can increase the frequency of brushing teeth and the use of dental floss in both groups of students .[17] This shows that the learning process

they get through the extension and training programmes provided every year can be understood and practised by these students. Based on the results of this study, it can be concluded that the hypothesis that there is an effect of *dental health education* on the oral hygiene status of students can be accepted.

5. CONCLUSION

Based on the results of the research and discussion, it can be concluded:

a. There was no statistically significant difference in the mean behavioural scores and debris index scores between the treatment and control groups before the intervention (pre-test) ($p > 0.05$).

b. There was no statistically significant ($p > 0.05$) change in the mean after the implementation of dental health education for students of SDN Mesjid Lheu Aceh Besar in the control group.

c. There was a statistically significant difference in the mean behavioural scores and debris index scores of students immediately after the intervention and 1 month after the intervention between the treatment group and the control group ($p < 0.05$).

d. There was a statistically significant

(p<0.05) change in the mean behavioural scores and debris index scores of students after the application of dental health education to students of SDN Mesjid Lheu Aceh Besar in the treatment group. It is recommended to involve parents in dental health education programmes as parental information and resources are needed to support and monitor children's dental healthhabits at home.

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