



The Effectiveness of Using Apples and Papayas in Reducing the Debris Index Score in Children with Mild Mental Retardation

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Abstract

One of the supporting factors causing dental caries is debris or leftover food around the teeth. The fiber and water content of apples can stimulate the speed of salivary secretion and neutralize acidic substances in the mouth and also have an effect on reducing the debris index. Consumption of fresh fruit rich in vitamins and minerals and water can encourage self-cleaning of the teeth, papaya is a plant source of vitamins, minerals and water. The aim of the study was to determine the effectiveness of using apples and papayas in reducing the debris index score in mildly mentally retarded children at SLBN 2 Jambi City. The type of research used in this study was quasi-experimental while the research design used was two group pre-test and post-test debris index observed twice, namely before treatment and after treatment with a total sample of 32 people with a total sampling technique. Based on the results of the study there was a significant difference in the average debris index between before and after chewing apples p value 0.000 and papayas p value 0.000. There is a significant difference in the average difference in debris index reduction between the use of apples compared to papayas with a p value of 0.000.

Keywords: Apple, papayas, debris indeks, mildly mentally retarded

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INTRODUCTION

Health is one of the elements of a prosperous society, namely achieving the right to a healthy life for all levels of society through a health system that can guarantee community protection from various risks that can affect health as well as the availability of quality, affordable health services and equitable distribution of health services. Health as an investment to produce a healthy and productive population as human resources for sustainable development and global competitiveness.¹⁻³

Dental and oral health are parts of body health that cannot be separated from each other. A healthy mouth allows individuals to talk, eat, and socialize without pain, discomfort, or embarrassment. Teeth are a part of the body that functions for chewing, speaking and maintaining the shape of the face.^{4,5}

One of the contributing factors that causes dental caries is debris or leftover food around the teeth. Debris is a soft material found on the surface of teeth consisting of a layer of biofilm, white material and food debris. Debris has quite a big influence on the caries process. Debris index is a score of debris attached to the surface of the determining tooth. This debris index measurement is carried out to measure the tooth surface that is covered with debris.⁶⁻⁸

According to the World Health Organization (WHO), dental and oral health problems are increasing every year, as evidenced by the results of the 2018 Basic Health Research, dental and oral health problems have doubled compared to 2013, namely 25.9% to 57.6 %. As many as 20 provinces have a prevalence of dental and oral problems above the national problem.^{9,10}

Clinically, the level of oral hygiene is assessed using the Oral Hygiene Index Simplified criteria. This criterion is assessed based on the condition of soft deposits or debris and tartar or calculus. Most food residues are liquefied by bacterial enzymes and disappear 5-30 minutes after eating, but it is possible that some may still remain on the surface of the teeth and mucous membranes. Chewing fibrous fruit such as apples, watermelon, guava and papaya can help clean teeth. Apart from that, fruit also has the ability to self-clean the oral cavity. Physiologically, fibrous foods will encourage saliva secretion, thereby helping to clean food residue stuck to the surface of the teeth.¹¹⁻¹³

The fiber and water content of apples can stimulate the speed of saliva secretion and neutralize acidic substances in the mouth and also have an effect on reducing the debris index. Apart from containing lots of fiber and water, apples also contain flavonoids which function as anti-bacterials in the mouth.⁸

Consuming fresh fruit rich in vitamins, minerals, fiber and water can encourage self-cleaning of teeth, thereby reducing the surface area of dirt and ultimately preventing dental caries. Papaya is a plant source of vitamins, minerals, fiber and contains enzymes that are useful for digestion.¹⁴

Mentally retarded children are children whose intelligence is below average and are classified as children who can be trained. The existing limitations and abilities possessed by mentally retarded children give rise to various problems, one of which is difficulty in caring for their dental health.¹⁵

Based on observations at SLBN 2 Jambi City, it was found that many mentally disabled children do not regularly consume

fibrous foods such as fruit and vegetables. This is one of the factors in children's limited abilities and lack of knowledge about the importance of consuming fruit and vegetables with fiber. Apples and papayas both contain fiber and water, where the fiber in apples is higher than in papayas, while the water content in papayas is higher than in apples.

METHOD AND MATERIAL

The type of research used in this research is quasi experiment. The research design used was two group pretest and posttest. The debris index was observed twice, namely before treatment and after treatment. The sampling technique used a total sampling of 32 mildly mentally disabled children in SLBN 2 Jambi City. The research was carried out in May 2023 on mentally disabled children at SLBN 2 Jambi City.

The measuring instrument used in this research is the Debris Index (DI) and the research materials are apples and papaya

which have been weighed weighing 100 grams and packaged in plastic. The stages of data collection were carried out as follows: All samples were first given biscuits with the aim of equalizing the condition of their oral cavity, then the first measurement was carried out on all samples. After the first measurement, the samples were divided into two groups, The first group consumed apples and the second group consumed fruit. papaya, both groups received fruit with the same weight, namely 100 grams and finally, after both sample groups had eaten the fruit, a second measurement would be carried out again.

Data analysis for effectiveness before and after chewing apples and chewing papaya was carried out by the Wilcoxon test. The effectiveness of chewing apples and papaya in reducing the debris index score using Mann Whitney so that later it can be seen whether there is a difference between chewing apples and chewing papaya in reducing the debris index score.

RESULT

Table 1: Debris Index score before and after chewing apples and papaya

	Group	Mean	SD	p value
Apples	Pre-test	2,113	0,3862	0,001
	Post-test	0,431	0,2056	
Papaya	Pre-test	2,088	0,3263	0,001
	Post-test	1,094	0,0929	

Based on table 1, it shows that a different average value was obtained for the apple group before 2.113 and after 0.431. In the papaya fruit group, the average value before and after was 2,088 and 1,094. This means that it indicates there is a difference in the average debris index score before and after chewing apples and papaya in children with mild mental retardation at SLBN 2 Jambi City with a p value of 0.001.

Table 2: Effectiveness of Using Apples and Papaya in Reducing Debris Index Scores

Variable	n	Mean Rank	SD	p value
Apples	16	23,53	0,4647	0,001
Papaya	16	9,47		

Based on table 2, after carrying out the Mann-Whitney statistical test, it was obtained that the Mean Rank decrease in the debris index score was higher for the use of apples than papaya, namely 23.53 compared to 9.47. Statistically there is a significant difference between the effectiveness of using apples and papaya in reducing debris index scores in children with mild mental retardation in SLBN 2 Jambi City ($p=0.001$).

DISCUSSION

Based on the research results, before chewing the apple, the average value was 2.113 in the apple group, after chewing the apple, the average value was 0.431, based on the Wilcoxon test, the significance value was $0.001 < 0.05$. This means that there is a difference between the pre-test and post-test in the apple group.

Based on the results of statistical tests, it was found that the lowest debris index value before chewing an apple was 1.5 and the highest debris index value was 2.8. Meanwhile, after chewing an apple, the debris index value was the lowest, namely 0.1 and the highest debris index value, namely 1.0. It can be seen that there is a decrease in the debris index value of the sample after chewing the apple, which also shows that the dental hygiene of the sample has increased. The factor that causes a decrease in dental hygiene after chewing apples is that the fruit consumed contains fiber which can control debris mechanically, because the chewing process directly causes a cleaning effect.^{16,17} The fiber and water content of apples can stimulate the speed of saliva secretion and neutralize acidic substances in the mouth and also have an effect on reducing the

debris index.^{8,18} Primary prevention in children who are at high risk of caries is that eating more fibrous and watery vegetables and fruit will cleanse and stimulate saliva secretion so that dental caries can be prevented.^{19,20}

Based on data analysis before chewing the papaya, the average value was 2,088, after chewing the papaya the average value was 1,094, based on the Wilcoxon test, the significance value was $0.001 < 0.05$. This means that there is a difference between the pre-test and post-test in the papaya group. It can be concluded that the papaya fruit group also experienced a decline.

Based on the results of statistical tests, it was found that the lowest debris index value before chewing papaya fruit was 1.5 and the highest debris index value was 2.6. Meanwhile, after chewing papaya, the debris index value was the lowest, namely 1.0 and the highest debris index value, namely 1.3. This also shows a decrease in the debris index of the papaya fruit group, but the decrease is quite low because the fiber content in papaya fruit is lower than in apples but the water content in papaya fruit is higher. Papaya contains quite highwater content which can help produce more saliva which can have a self-cleaning effect on the teeth (self-cleansing effect).²¹

Based on the results of the Mann-Whitney statistical test, the Mean Rank value for the apple group was 23.53 and the Mean Rank for the papaya group was 9.47, and a significance value of $0.001 < 0.05$ was obtained. This means that there is a significant difference between the initial and final debris index values in the apple group (which received treatment by chewing apples) and the papaya group (which received treatment by chewing papaya).

This shows the effectiveness of using apples and papaya in reducing the debris index score. There is an increase in dental hygiene in mildly mentally disabled children in SLBN 2 Jambi City, between apples and papaya in reducing the debris index score, apples are more effective in reducing the debris index score. The results of this research are in accordance with the statement by Penda, et al, that apples can reduce the debris index effectively. Apples contain high concentrations of tannin which can prevent tooth decay caused by plaque buildup. The fiber content in apples can help clean food debris stuck to the teeth, because apples are a fibrous fruit so chewing apples can be called a natural toothbrush. Eating or consuming apples by biting and chewing the apple can stimulate saliva in the mouth. Apples can also be used as a medium to clean and freshen the mouth. This is because apples contain tannin, a substance that functions to clean and freshen the mouth so that it can prevent tooth decay and gum disease.²²⁻²⁴

CONCLUSION

From the results of the research and discussion regarding the effectiveness of using apples and papaya in reducing debris index scores in mildly mentally disabled children in SLBN 2 Jambi City, it can be concluded that there is a significant difference in the average difference in debris index reduction between the use of apples compared to papaya.

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CONFLICT OF INTEREST

The authors declare that they have no conflict interests.

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