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COMPARISON OF PLAQUE SCORE BETWEEN TRADITIONAL BRUSHING TEETH (MISWAK) AND BASS METHOD

(Overview of Students of the Pondok Pesantren Darul Hijrah Putera Banjarbaru)

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ABSTRACT

Background: *Siwak or miswak is obtained from the branches and stems of the Salvadora persica plant that grows in the Middle Eastern plains and commonly used as a toothbrush to clean teeth and gingival structures. Miswak contains natural antibacterial acids (astringents, abrasives and detergents) which function to kill bacteria, prevent infection and stop bleeding in the gum. Chemical substances such as Chloride, Pottasium, Sodium Bicarbonate, Fluoride, Silica, Sulfur, Vitamin C, Trimethylamine, Salvadorine, and Tannins which function to clean teeth, whiten and nourish teeth and gingiva. How to brush your teeth has an effect on reducing or removing plaque. Efforts to clean plaque can be done by brushing your teeth. Brushing your teeth using a toothbrush is a form of mechanical removal of plaque. It can be done through several methods, including the method of Bass, Stillman, Fones, and adapted to the movements named Vertical and Horizontal. The bass method is a tooth brushing technique that is done by placing a 45-degree toothbrush on the root of the tooth and then gently pressing it while doing a small rotating motion. The tip of the toothbrush is directed to the gingival neck. The bass method is more effective for removing plaque around and below the edge of the gingiva. Controlled movements are used to get rid of plaque and avoid trauma to the gingiva.* ***Objective:*** *The purpose of this study was to analyze the comparison of plaque scores between brushing tooth with traditional (Miswak) and bass methods on students of the Pondok Pesantren Darul Hijrah Putera Banjarbaru.* ***Method:*** *This study used the Quasi experimental research method with Pre and Post-test.* ***Results:*** *The results of statistical tests using the non-parametric test of the Man Whitney test showed a value of p = 0,000 (p ≤ 0,05), the results showed that there were significant differences between the plaque scores before and after the tooth brushing treatment with the miswak and bass method.* ***Conclusion:*** *The bass method group has a lower plaque score than the miswak group.*

Keywords: *Bass method, miswak, plaque score*

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INTRODUCTION

Oral hygiene is one of the important problems that need attention in the oral cavity. Good oral hygiene describes a good state of general health, whereas poor oral hygiene describes a poor health condition. In Indonesia, the high number of dental and oral diseases reaches 90% with the highest prevalence being dental support and dental caries. [1,2]

Based on data from RISKESDAS (Basic Health Research) in 2013, around 25.9% of Indonesia's population had dental and oral problems *(potential demand)* and 24.3% of the age group 15-24 years. Indonesia's DMF-T index is 4.6 with their respective values: D-T = 1.6; M-T = 2.9; F-T = 0.08; which means tooth decay of the Indonesian population is 460 teeth per 100 people. The Province of South Kalimantan has dental and oral hygiene problems which numbered to 36.1%. In South Kalimantan, the DMF-T number is 7.2. The caries experience is 86.9% and active caries is 66.0%, correct brushing is only 5% and caries free reaches 13.1% .[3]

One of the programs to improve dental and oral health is by regularly brushing teeth. Brushing teeth regularly can prevent the accumulation of plaque. Since ancient times, human have been known several variations of techniques in cleaning teeth. Starting from using chicken feathers, porcupine spines, bones to wood and twigs are used as dental cleaning tools. One alternative in brushing

teeth is to use the traditional method, named miswak. The use of miswak is an Islamic tradition carried out by ancient Arabs, Babylonians, Greeks and Romans. Miswak is believed to also be used as a cleansing and religious activity carried out by Prophet Muhammad S.A.W around the year 600 BC. Miswak is a *Salvadoraceae* plant, which is usually used to clean teeth. Some researchers report the antibacterial effects of miswak on cariogenic bacteria and periodontal pathogens, especially *Bacterioides* species and inhibit plaque formation. [2,4,5,6,7]

Brushing teeth can be done through several methods, including the *bass* method. The *bass* technique is a tooth brushing technique that is done by placing a 45-degree toothbrush on the root of the tooth and then gently pressing it while doing a small rotating motion. The tip of the toothbrush is directed to the *gingival* neck. [8]

According to observation, it shows that students of the Pondok Pesantren Darul Hijrah Putera Banjarbaru use Miswak regularly. Therefore, the authors are interested in conducting research at the Pondok Pesantren Darul Hijrah Putera Banjarbaru. This study aimed to compare between brushing teeth using miswak and brushing teeth using the *bass* method. The aim of the study was to determine the comparison of plaque scores after brushing teeth using the miswak and *bass* method at the Pondok Pesantren Darul Hijrah Putera Banjarbaru.

MATERIALS AND METHODS

This research was begun with the making of a research license and ethical cleareance issued by the Faculty of Dentistry, Lambung Mangkurat University No. 116/KEPKG-FKGULM/EC/II/ 2019. This study used the *Quasi experimental* research method with *Pre and Post-test design*. The population in this study was the class X students of the Pondok Pesantren Darul Hijrah Putera Banjarbaru. Based on the preliminary study, the population was 149 students. The sampling technique in this study used *simple random sampling*. The results of sample calculations using the *Slovin formula* obtained a total sample of 109 respondent. [9]

The tools used in this study included stick miswak, toothbrushes, pinset, dental mirror, handscoons, masker, cotton buds and disclosing agents to assess plaque scores.

First, students who will be used as research samples were gathered. Each respondent in the group was taught and demonstrated on how to brush their teeth using miswak and *bass* technique. Respondents were then divided into two groups, 54 student brushing teeth using miswak and 55 student brushing teeth *bass* method. Each group was given knowledge about dental and oral health and brushing techniques that were correct according to the techniques used at the same time. Each child in the group was spread the *disclosing agent* evenly then instructed to rinse the mouth. After that, each group was measured for plax index, using the PHP Index. Samples were instructed to brush teeth for 2 minutes in pairs and together, one from groups 1 and one from group 2, so that the control of how to brush teeth on the samples was easier until samples from each group were completed. After doing a toothbrush, then the *disclosing agent* was re-applied to the teeth according to the PHP index. Then the plaque score was assessed on the teeth after brushing the teeth and recorded. The total plaque score on the teeth will be summed and calculated using the PHP IP formula. All examination results were recorded, calculated and processed. The data was analyzed using the normality test using the *Kolmogorov-Smirnov* test. The normality test showed a $P < 0.05$, so it can be concluded that the variable data distribution was abnormal. Because the data was not normally distributed, the analysis used was non-parametric analysis *Man-Whitney* test to compare changes in plaque score after being treated with brushing teeth using miswak and the *bass* method.

RESULTS

The results of the examination of groups that brush their teeth using miswak can be seen in Table 1 and Table 2

Table 1 Characteristics of Respondents Before Brushing Teeth Using Miswak

No	Score Category	Frequency	Percentage %
1	Good	3	5,55
2	Fair	26	48,1
3	Poor	25	46,2
Total		54	100

Table 2 Characteristics of Respondents After Brushing Teeth Using Miswak

No	Score Category	Frequency	Percentage %
1	Good	16	29,6
2	Fair	30	55,5
3	Poor	8	14,8
Total		54	100

Based on the data in Table 1 shows the PHP Index of class X students at SMA N Darul Hijrah showed that the highest dental and oral hygiene with fair criteria was 26 people (48.1%). In table 2, an increase in the PHP Index of class X students at SMA N Darul Hijrah indicated that the highest oral and dental hygiene with fair criteria increased by 26 people (48.1%) to 30 people (55.5%).

The results of the examination of groups that brush their teeth using the *bass* method can be seen in Table 3 and Table 4

Table 3 Characteristics of Respondents Before Brushing Teeth Using the *Bass* Method

No	Score Category	Frequency	Percentage %
1	Good	7	12,7
2	Fair	25	45,5
3	Poor	23	41,8
Total		55	100

Table 4 Characteristics of Respondents After Brushing Teeth Using the *Bass* Method

No	Score Category	Frequency	Percentage %
1	Good	41	74,5
2	Fair	13	23,6
3	Poor	1	1,8
Total		55	100

Based on the data in Table 3, the PHP Index of class X students at SMA N Darul Hijrah showed that the highest dental and oral hygiene with medium criteria is 25 people (45.5%). In table 2, an increase in the PHP Index of students in class X showed that the highest oral and dental hygiene with good criteria increased by 7 people (12.7%) to 41 people (74.5%).

The results of the Comparison of Plaque Scores Between Traditional Brushing (Miswak) and Bass Methods in Students of the Pondok Pesantren Darul Hijrah Putera can be seen in table 5

Table 5 Comparison of Plaque Scores Between Traditional Brushing (Miswak) and Bass Method in Students of the Putra Darul Hijrah Islamic Boarding School

Group	Plaque Score			
	Before	After	Difference between plaque scores before and after	*p-value*
Miswak	3,081	2,376	0,705	0,000
Bass	2,991	1,107	1,884	

The results showed a change in plaque scores after brushing teeth with miswak and the *bass* method. The Man Whitney test results in the table showed a p value is 0,000 and this value was below 0.05 ($p<0.05$), so that it can be said that there was a significant difference between the plaque scores after the tooth brushing treatment with miswak and the *bass* method. The data also showed that the average ratio of plaque scores in the miswak group was 2,376 while in the *bass* method group was 1,107. It could be seen that in both groups, brushing teeth could decrease plaque scores. Results Comparison of the average plaque score after brushing teeth using miswak and brushing teeth using the bass method was 0.705 and 1.884.

DISCUSSION

Plaque Score Before Brushing Teeth Using Miswak

Based on the results of data analysis in Table 1, the PHP index of class X SMA N Darul Hijrah showed that the dental and oral hygiene of student X Darul Hijrah Putra with the fair criteria 26 people (48.1%) out of a total of 54 (100%). The results of the research that have been conducted, many students have a high plaque score which means student have low levels of dental and oral hygiene. This is due to a lack of knowledge on how to maintain dental and oral hygiene. Knowledge about health is a predisposing factor for health behavior. Kamran (2014) said that there was a relationship between attitudes and behavior, a good attitude and knowledge of brushing teeth can improve oral and dental hygiene behavior. [6,10]

Plaque Score After Brushing Teeth Using Miswak

Based on the results of the study in Table 2, 54 students of class X of Darul Hijrah Putra were seen to be different after brushing their teeth using miswak, which was a good criterion of 3 people (5.55%) to 16 (29.6%), fair criteria were 26 people (48 , 1%) to 30 people (55.5%), while the poor criteria were 25 people (46.2%) to 8 people

(14.8%). These results indicated that the most dental and oral hygiene of student X Darul Hijrah Putra with the fair criteria was 30 people (55.5%).

The use of miswak can reduce plaque as the etiology of periodontal disease. Miswak is effective in reducing plaque according to Masood's (2010) study of miswak tree which shows that miswak contains natural minerals that can kill bacteria, remove plaque, prevent cavities and maintain gums. Miswak has chemical ingredients such as *Trimethylamine*, chloride, fluoride, tiosan, silica, vitamin C, tannin, saponins, flavonoids, salvadorine and various other ingredients. [11]

How to brush your teeth using miswak needs to be considered because it was obtained from the results of previous studies that the results of poor plaque scores despite having used miswak for a long time. Triyanto's (2016) study of the description of knowledge about miswak that with a good level of knowledge, poor dental hygiene is obtained. This is due to a lack of knowledge about the technique of using miswak, so it is not effective when cleaning teeth. It also shows that people are less aware of the importance of dental hygiene even though using miswak. [12]

Plaque Score Before Brushing Teeth Using the Bass Method

Behavior and knowledge in maintaining dental health have an effect on the score of plaque. Based on the results of the research data in table 3, the PHP Index of class X students at Darul Hijrah fair has the highest criteria, which is currently 25 people. Based on the results of Puspita's (2017) research, behavioral factors are one of the factors that influence a person's health status. Health behavior consists of closed behaviors such as knowledge of health and open behavior in the form of health actions or practice, such as brushing teeth, so that the maintenance of dental and oral health indicators are a variable of brushing teeth, which is the time and technique of brushing. The cleanliness of the teeth and mouth is often overlooked, so that there is a buildup of leftover food which certainly affects a person's plaque score. Plaques form from the rest of food deposits that are not cleaned and accumulate on the surface of the teeth to form biofilms / thin layers. [13]

Plaque Score After Brushing Teeth Using the Bass Method

In table 4 shows that dental and mouth hygiene of student X SMA Darul Hijrah Putra after being given education on how to brush their teeth using the bass method got the most results with good criteria 41 people (74.5%). The *bass* group had lower plaque scores than the miswak group. This result is in accordance with Rizkika's research (2014) who reported brushing teeth with the *bass* method were more effective in cleaning the gingival and sulcus margin. The bass method is more effective because the bristles tip can reach the gingival margin to remove supragingival plaque and subgingival plaque. [14]

Comparison of Plaque Scores after Brushing Teeth Using Miswak and the Bass Method

The results of the analysis can be seen in table 5 showing a decrease in plaque scores. The group score for brushing teeth using miswak at the start was 3.081 and after brushing using miswak it was 2.376, so that the plaque score decreased by 0.705 (p=0.000). Table 5 shows that there were significant differences between before and after brushing teeth using miswak. According to Haque's research (2015), miswak bristles are located along the long axis of the handle. As a result, there is a reduction in access to the lingual surface or interdental space, but the labial surface of the tooth can be reached more easily. It is difficult to reach the entire surface of the teeth brushing teeth with miswak. The Bramanti et al. (2014) reported that brushing teeth using miswak was able to inhibit dental plaque formation. The advantages of miswak in cleaning teeth and mouth are caused by mechanical effects of stem fibers and also due to the ability of miswak to release beneficial active compounds. Miswak *(S. persica)* contains more than 10 substances *(Trimethylamine, Salvadorine,* saponins, tannins, vitamin C, silica, resins, sterols) needed to improve oral hygiene. [2.15]

The tooth brushing group using the bass method had an initial score of 2.991 and after brushing teeth using the bass method a score of 1.107 was obtained which meant a decrease in the average plaque score of 1.884 (p=0.000). Table 5 shows that there were significant differences between before and after brushing teeth using the bass method. According to Sari's research (2012) the *bass* method is proven to be able to remove dental plaque or inherent debris because it can clean between teeth effectively. The *bass* method is more effective for removing plaque around and below the edge of the gingiva. Controlled movements are used to get rid of plaque and avoid trauma to the gingiva. [14.16]

The use of miswak or brushing teeth using the *bass* method has a significant effect on reducing dental plaque. Darout research (2014) said that like toothbrushes, miswak is also capable of cleaning plaques with mechanical effects. Toothbrush with a better and more functional form causes better plaque scores for toothbrush users than for miswak users. [17,18] Based on the research that has been done, it can be concluded that the *bass* method group has a lower plaque score than the miswak group.

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