

ICASH-A036

DIFFERENCE OF MODERATE AND HARD-BRISTLED TOOTHBRUSH IN PREVENTING PLAQUE AMONG SCHOOL CHILDREN

Karsum Udin^{1*}, Bedjo Santoso¹, Ida Rahmawati², Emilda Sari², Dedy²

1) *Postgraduate Applied Science Program in Oral Health Therapist Poltekas
Kemenkes Semarang, Semarang, Indonesia*

2) *Poltekas Kemenkes Banjarmasin, Indonesia*

*Corresponding author's e-mail: karsum123udin@gmail.com

ABSTRACT

Background: Oral health is very important, some oral and dental problems occur because we do not maintain oral hygiene and teeth. Plaque is a major etiologic factor of caries and periodontal disease. Efforts to prevent plaque buildup is called plaque control, by mechanical, chemical and natural, mechanical ventilation is a tooth brush. In general, the bristles are soft, moderate, and hard.

Aims: This research aims to know the differences using a moderate and hard-bristled toothbrush against plaque.

Methods: This is a quasi-experiment with *pretest-post-test control group design* between the bristles medium and hard bristles using independent test T-test.

Results: *Independent t-test* for hard toothbrush has an average value of 2.08 decrease in the number of plaques, while the toothbrush being has an average value of 1.35 decrease in the amount of plaque. The p-value ($0.000 < \alpha (0.05)$), no difference using a toothbrush moderate and hard-bristled against plaque.

Conclusion: There is a difference of tooth brushing plaque by using the medium tough and hairbrush medium tough hairbrush and hairy on the students of class VII B and VII C in Public Junior High School 3 Banjarbaru. The use of hard bristled toothbrushes is better 72.22% than the use of medium toothbrushes is only 47.37%. But a hard hairy toothbrush can cause gums to drop (recession gingival) if done continuously.

Keywords: tooth brush, moderate, hard-bristled, Plaque, oral health.

INTRODUCTION

Health is the most important part of human life. It includes both of physical and spiritual health. Every parent wants their children to grow and develop optimally. This can be achieved if their bodies are healthy. Some kind of health that needs to be considered in addition to general health are dental and oral health. It is due to the health of teeth and mouth affects the overall body. Dental and oral health is very important. Some mouth and teeth problems occur because we do not keep them clean. Awareness of maintaining oral hygiene is very necessary and is the most potential cure for oral problems. Prevention is better than cure [1].

According to WHO 2012, the prevalence of dental caries in school-age children reaches 60%. The prevalence of dental and oral health problems is 25.9%. South Kalimantan prevalence of dental and mouth health problems is quite high (> 35%). According to Research health basic 2013, 2.3% of Indonesian people brush their teeth correctly, however only 1.7% of them belong to the age group of 10-14 years old [2]. Dental health is a part of the general health that have to be maintained because the teeth and mouth health

affect the overall health of the body [1]. Some problems of dental and oral diseases occur due to the lack of maintaining oral hygiene. Teeth are the hardest tissue of the body. It consist of multilayer structures ranging from harsh enamel, dentin (tooth bone) in it, and pulp which contains blood vessels, nerve vessels, and other parts that strengthen the teeth. However, teeth are easily damaged if it do not getting a proper care [3].

Maintaining healthy teeth can be done by brushing. The goal is to remove plaque on the tooth surface so that oral hygiene remains good [4]. The level of oral hygiene can be seen from the process of plaque formation. Plaque is a major etiologic factor in caries and periodontal disease because it contains pathogenic bacteria attached to the surfaces of teeth and gingiva [5]. Plaque cannot be removed by gargling with water. To remove plaque, brushing teeth needs to be done. A large number of tartar, plaque and food debris attached to the neck of the teeth indicate poor oral hygiene due to its position that makes it difficult to be cleaned, for example, the crush from the food [6]. Tooth surface consists of loose epithelial cells, bacteria, organic and non-organic, soft blood cells that are attached [7]. One way to maintain oral health is to brush the teeth. By brushing the teeth, oral hygiene will be maintained. In addition, it will be able to avoid the formation of holes in the teeth and gum disease. Many types and varieties of toothbrushes are sold in the market, either manual or electrical [1].

Current toothbrushes on the market vary in shape, size, and degree of stiffness of its bristles. Toothbrush bristles generally divided into three types based on the degree of its stiffness that are soft, moderate, or hard. Effectiveness in removing plaque for each degree of stiffness are also different. In fact, many diseases can be started from toothache. The mouth is the window of our health. Not only the correct brushing techniques, tools and materials used have be be correct as well. Now there is a toothbrush with tongue cleaner feature. Of all the existing types of toothbrushes, user have to understand how to use it properly since it will affect its effectiveness.

Method to prevent plaque buildup is called plaque control. There are several kinds of plaque control, that are mechanical, chemical and natural [8]. Mechanical plaque control is done by brushing the teeth. Brushing the teeth properly is important for the maintenance of oral health [9]. The association of bristle stiffness and dental cleanness is a matter that needs to be investigated.

Based on the preliminary study conducted by researchers at Public Junior High School 3 Banjarbaru, students of VII A class, it was examined the plaque score of 10 students. There are 4 students with bad plaque score (3.6 in average), 3 students with moderate plaque score (1.9 in average), and 3 students with good plaque score (0.7 in average). Based on the previous research, the authors want to know the difference of plaque score between using a toothbrush medium and hard of students in class VII B and C of Public Junior High School 3 Banjarbaru.

METHODS

This research used analytic design with quasi-experimental method. Statistical method is based on independent samples T-test. Then from the result the probability value (p value) of the test shows 0.000, so it is smaller than (α) (0.05) or ($p = 0,000 < \alpha = 0.05$). Researchers conducted experiments in order to determine a symptom arose as a result of certain treatment. This form of treatment is in the form of a pretest-posttest draft controls group design. The population in this study is 285 students of class VII in Public Junior High School 3 Banjarbaru. We selected 36 students from the population by using purposive sampling technique [10] with criteria

1. Index tooth is present
2. Not using stirrup / braces
3. Having plaque

Research materials used are disclosing, alcohol, cotton, toothpaste, gloves, and mask. Research instrument used are diagnostic tool (sonde, glass mouth, tweezers), plaque card, medium and hard toothbrush, and precision tools such as tooth phantom and toothbrush, nierbekken, and dappen glass.

RESULTS

Plaque before and after brushing using medium hairy tooth brush

Plaque score average is calculated based on the results of plaque on the respondent before and after brushing using medium toothbrush.

Table 1 Mean value of plaque score before and after brushing teeth using medium hairy tooth brush

furry being	N	Mean
Before	36	2.85
After	36	1.50

Based on Table 1, it can be seen that the results before treatment by using a hairy toothbrush is 2.85. Plaque mean value after brushing with a medium-toothbrush is 1.50. There is a difference between before and after treatment by brushing the teeth with a medium toothbrush.

Plaque before and after brushing using hard hairy tooth brush

Plaque score average is calculated based on the results of plaque on the respondent before and after brushing using hard toothbrush.

Table 2 Mean value of plaque score before and after brushing teeth using hard hairy tooth brush

hard-bristled	N	Mean
Before	36	2.8867
After	36	0.7997

Based on Table 2, it can be seen that the results before treatment by using a hairy toothbrush is 2.88. Plaque mean value after brushing with a medium-toothbrush is 0.79. There is a difference between before and after treatment by brushing the teeth with a medium toothbrush.

Difference in average plaque score between the use of medium and hard toothbrush

Calculation of the difference between the average value of the plaque in medium and hard toothbrush are shown in Table 3.

Table 3 Difference of average plaque score in medium and hard toothbrush

No.	Tooth brush	Before	After	difference
1	Average	2.85	1.50	1.35
2	Loud	2.88	0.79	2.08

Based on Table 3, it can be seen the difference in the mean value of plaque score. Brushing plaque with medium bristled toothbrush having difference 1.35, while the difference in mean plaque score of brushing tooth with hard toothbrush is 2.08, so the difference is 0.73.

In order to know the difference of the effect of effectiveness in reducing the amount of plaque between medium and hard toothbrush we use independent T-test which the result can be seen in Table 4.

Table 4 Independent test results of T-test to determine the difference in reducing the amount of plaque between toothbrush medium with a hard-bristled toothbrush

Brushing difference	Mean
Average	1.3539
Loud	2.0869

Based on Table 4, the difference of brushing teeth using medium hairbrush toothbrush has an average of 1.3539 while toothbrush average 2.0869. The probability value (p value) of the test shows 0.000 value, so it is smaller than (α) (0.05) or ($p = 0,000 < \alpha = 0.05$).

DISCUSSION

From Table 1 it is known that the average plaque scores before brushing using a medium toothbrush is 2.85 and after brushing is 1.50 thus the mean difference is 1.35. A decrease in this value indicates the plaque score is better after brushing with a medium toothbrush. This is align with the research from Hamsar Adriana 2005 that medium toothbrush is effective in removing plaque. After calculation on children aged 9-12 years in public elementary school, the annihilate field was found to decrease plaque score on medium toothbrush. In this case a hairy toothbrush is better at removing plaque according to the opinion of Margaretha Suharsini and Jhon Besford. Medium toothbrush is more effective in reducing the amount of plaque on a child's teeth [11].

In Table 2 the mean plaque score before brushing with a tough-bristled toothbrush is 2.88 and after brushing is 0.79, thus the mean difference is 2.09. This decrease in value indicates a plaque score is better after brushing. Hard toothbrush hair has a high effectiveness in eroding plaque on tooth surfaces, but often resulting in inflammation of the gingiva. Research conducted by Ahmed Khocht [12] stated that there are differences between the groups that use hard tooth brush with the group using soft to medium bristles. In groups using hard bristles there is an increase in the prevalence of gingival recession in line with the improvement of brushing brushing. Whereas in groups using soft and moderate toothbrushes there is no increase in the prevalence of gingival recession although brushing frequency is increased [13].

Brushing too hard is the majority of the cause of sensitive teeth. Many people assume that the use of hard bristles and strong brushing pressure will make the teeth cleaner. That opinion is not entirely correct, because with the use of hard bristle brush and strong brushing pressure will even erode the enamel layer, causing irritation to the gums and gum meat will decrease from the neck of the teeth. It will make the tooth root will open (gingival recession) which is the trigger of the occurrence of sensitive teeth [14].

Some people prefer the harder toothbrush in order to remove plaque and dirt on the teeth. However, hard toothbrush can damage tooth enamel and allow the tooth to become perforated and cause other dental problems. However too soft toothbrush may not clean the plaque perfectly. Many people do not realize if the toothbrush on the market comes with a variety of bristle brush hardness, that are soft, medium, and hard. Every hardness bristle brush has a specific purpose suitable with the user's teeth determined by dentist's examination. Soft bristles are used for people with inflammatory diseases of the gums or tooth support tissues, such as gingivitis or inflammation of the dental supporting tissues (periodontitis). This is because

people with inflammations have a tendency to have gum bleeding if the gums exposed to the stimuli of hard objects, for example hard feather brush. Medium bristle brush is intended for the teeth without disorders / inflammation, but it requires a rather strong pressure to clean the stains that may be attached to the teeth. While hard bristle is intended for user's teeth without disease and especially without a tooth enamel disorder, such as brittle enamel. In general, toothbrush hardness that should be used is medium. However different hardness may be needed, for example soft or hard [15].

Based on Table 3 the use of medium toothbrush can remove plaque by 1.35 while the hard toothbrush can remove plaque by 2.08. This result indicates that the use of hard toothbrush is 72.22% better than the use of medium toothbrushes which is only 47.37%.

Based on Table 4 there is a difference between using a medium toothbrush and hard toothbrush against the decrease of the plaque. Meanwhile, to determine which toothbrush has a higher effectiveness in decreasing the number of plaque on students of class VII B and VIIC, mean column is shown in the Table 4. The result of the mean column shows the average ratio of the decrease of plaque score before and after brushing the teeth in different stiffness level. It can be seen in the Table 4 that the mean result of hard toothbrush is higher than medium toothbrush, thus hard-bristled toothbrushes have a higher effectiveness in lowering plaque than medium toothbrushes.

CONCLUSION

There is a difference on the plaque score by brushing the teeth using medium and hard toothbrush on the students of class VII B and VII C in Public Junior High School 3 Banjarbaru. The use of hard bristled toothbrushes is 72.22% better than the use of medium toothbrushes which is only 47.37%. However a hard hairy toothbrush can cause gums to drop (recession gingival) if using continuously.

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