

## Differences in plaque index among children aged 6-12 years before and after acquiring a habit of brushing their teeth before bedtime

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### ABSTRACT

**Introduction:** The habit of brushing teeth before bedtime is very important to keep the teeth and mouth clean and healthy this can be evaluated from the plaque index. The objective of this study was to analyzed differences of plaque index among children aged 6-12 years old in Panti Sosial Asuhan Anak William Booth and Rumah Perlindungan Sosial Asuhan Anak (RPSAA) Ciumbuleuit Bandung before and after acquiring a habit of brushing their teeth before bedtime. **Methods:** This study was a quasi-experimental and it was analyzed statistically using the t test. Total subjects of 31 children consist of 22 children in Panti Sosial Asuhan Anak William Booth and 9 children in Rumah Perlindungan Sosial Asuhan Anak (RPSAA) Ciumbuleuit Bandung. Data was obtained through clinical examination with the PHP (Personal Hygiene Performance) plaque index of Podshadley and Haley. **Results:** The mean plaque index before acquiring a habit of brushing teeth before bedtime is 2.247 and after, is 0.591. **Conclusion:** There is a difference in plaque index in children aged 6-12 years in Children's Orphanage William Booth and RPSAA Ciumbuleuit Bandung before and after acquiring a habit of brushing before bedtime.

**Keywords:** plaque index, the habit of brushing teeth before bedtime

### INTRODUCTION

Teeth is a vital part of the human body. Damage to teeth can affect the health of the other parts of the body so as to interfere with daily activities. The teeth and mouth play a role in initial process of digestion of food, verbal communication, and as an aesthetic element of the face.<sup>1</sup> The mouth is an important part of the body and as a picture of the health of the body because many common diseases have symptoms that can be seen inside mouth.<sup>2</sup>

Causes of dental and oral health problems in the community one of them is behavioral factor or attitude to neglect tooth and mouth hygiene

especially in children. Children are still very dependent on adults in terms of maintaining their health and oral hygiene due to poor knowledge of dental health compared to adults.<sup>3</sup>

The oral hygiene of children is generally worse than adults because children eat more food and drinks that cause caries. Children are have a tendency to consume candy, hence when children eat too much candy and rarely brush their teeth, they tend to experience caries.<sup>3</sup>

Plaque is an important factor affecting oral hygiene. Plaque control is very important in oral health programs because dental plaque is a major cause of caries and periodontal disease.<sup>4</sup> Plaque is a soft, non-calcified, stacked layer of bacteria

attached to the teeth and to other objects in the mouth such as restorations, prostheses, and calculus.<sup>5</sup> Plaque is generally invisible and can only be seen with the help of disclosing solution.<sup>4</sup>

Thick plaque is seen as a yellowish or grayish deposit that cannot be removed by rinsing or irrigation but can be removed by brushing.<sup>6</sup>

Mostly plaque is found in the cervical third near the gums and interproximal surfaces of the teeth. Plaque often accumulates in the interdental region because it is difficult to clean so that gum inflammation tends to begin in the interdental papilla region and spreads around the tooth.<sup>7</sup>

Brushing your teeth before bedtime has yet to become a habit in the Indonesian society. Indonesia Basic Health Research / RISKEDA Survey in 2007 showed that 90.7% of people brush their teeth during morning and evening showers.

It is recommended to brush at least twice a day, after breakfast and before bed at night. Other surveys show that in general 77.2% of the population brush their teeth, but only 8.1% of said population brush according to recommendation.<sup>8</sup>

Brushing your teeth before bed is very influential in prevention of dental and mouth disease because when asleep bacteria in the mouth develops twice as much. The flow of saliva decreases during sleep, making the teeth become more susceptible to caries or cavities preceded by plaque formation.<sup>9,10</sup>

Therefore, it is very important to have a habit of brushing our teeth before bedtime. Other important factors in the maintenance of dental and oral health other than the proper tooth brushing time is the use of toothbrush, brushing method, and the frequency of tooth brushing.

The 2004 Habit & Attitude survey results in Indonesia showed that tooth brushing habit before bedtime was low. Groups of 5-10 year olds recorded only 13% who had a habit of brushing their teeth at night just before bed, and in the 11-15 year old age group only 22%.

It can be said that the children still lack knowledge and understanding to maintain their oral health, as proven from the result of surveys on periodontal disease and dental caries in Indonesia throughout 1994 -1999 showed that in the 12 year old age group, the prevalence of periodontal disease attacks was 80.8% and dental caries disease 72.1%.<sup>8</sup>

Primary school age is an ideal time to train a child's motor skills, including tooth brushing.<sup>11</sup> Children aged 6-12 begin learning from the environment to shape their character and personality. The behavior of the child will often change after imitating what he sees, hears and feels.<sup>12</sup>

Therefore, the maintenance of oral and dental health, especially in the group of school children needs special attention because at this age the child goes through growth and development.<sup>13</sup>

The condition of the child's teeth will have an effect in the development of dental health until adulthood. Support from family members and the environment is desirable.

Children living in an orphanage also need support and encouragement from institutions that play an important role in the formation of their character. The benefits to an institution such as an orphanage are to promote health through prevailing regulations such as by promoting a tooth brushing program before bedtime.

Interaction with caregivers and friends in the orphanage can be a motivation for children to brush teeth diligently to improve the dental health of children in William Booth's Children Orphanage is one of the orphanages in Bandung.

This orphanage was established since the Dutch era around 1917 so that including the oldest orphanage in the city of Bandung. The orphanage is still high though off because the discipline instilled. Rumah Pembindung Sosial Asuhan Anak (RPSAA) Ciumbuleuit Bandung is also one of the oldest orphanages in Bandung.

This orphanage was established in 1964 and is under the supervision of Bandung City Social Service directly. All the needs and maintenance of the orphanage are paid directly by the government through Social Services. Thus, it is expected that children living in William Booth's Children Orphanage and RPSAA Ciumbuleuit Bandung have a higher awareness in terms of maintaining their oral health.

Based on the above description, aim of this research is to analyze differences in plaque index among children aged 6-12 years before and after acquiring a habit of tooth brushing before bed, who are staying William Booth's Children Orphanage and RPSAA Ciumbuleuit Bandung in 2011.

## METHODS

The type of research conducted is quasi-experimental by measuring plaque index in children aged 6-12 years before and after acquiring a habit of tooth brushing before bedtime.

The study population were children in William Booth's Children Orphanage and RPSAA Bandung. Sampling technique is by purposive sampling, a sample selection technique based on consideration of criteria of a group of experts in the field under study.<sup>4</sup> The sample of this research is children at Children's Orphanage William Booth and RPSAA Ciumbuleuit Bandung who have the following population criteria: age 6-12 years old, good general condition, willing to participate in research, not using prosthesis or orthodontic appliance, not using antibiotics or other drugs and do not have a habit of tooth brushing before bedtime. The variables studied were plaque index, tooth brushing habit before bedtime, and age 6-12 years.

The tools and materials used in this research are informed consent sheets, check sheet, stationery, basic tools (glass, explorer, and tweezers), masks, gloves, flashlights, 70% alcohol, disclosing solution, tissue, toothbrushes and toothpaste. The data of research result are plaque index value in the form of number. Data are collected and calculated to find the average value, then collected and processed in tabular form and also diagram. The statistical test used in this research is t test

## RESULTS

The results were obtained from a sample of 31 children consisting of 22 children from William

Table 1 Distribution of Orphaned Children by Gender and Age

Age	Gender		Total
	L	P	
6	0	1	1
7	0	2	2
8	0	4	4
9	0	1	1
10	2	8	10
11	2	4	6
12	3	4	7
Total	7	24	31

Booth Orphanage and 9 children from Child Care Social Protection Home (RPSAA) Ciumbelueit. The distribution of children from both orphanages by gender and age can be seen in Table 1.

Based on Table 1 the group with the highest samples is age 10 year and female, that is as many as 8 people (25.8%). Table 1 also shows no samples for 6 to 9 year old boys (0%).

8 visits were conducted in this study is 8. Measurement of plaque index conducted in this study is twice, before the child has a habit of brushing before bed on the first day, and on the eighth day after acquiring a habit of brushing before bed. The second day until the seventh day the author exercises control of the brushing of the teeth before bedtime followed by good practice of brushing teeth correctly.

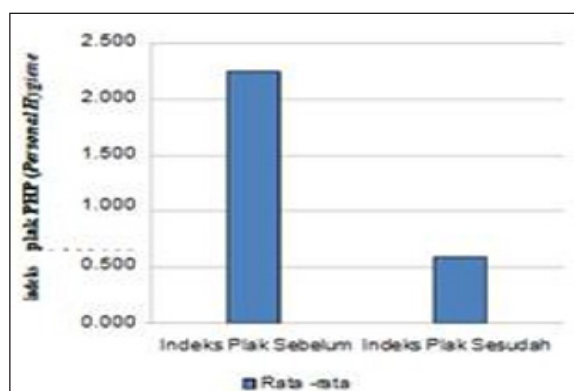


Figure 1 Mean Scores of Plaque Index Before and After Children Acquired Habit to Brush Teeth Before Bedtime

The average plaque index before the child has a habit of brushing before bedtime was 2,247 and 0.591 after acquiring the habit. The average plaque index before and after having a habit of brushing before bedtime in the form of a diagram can be seen in Figure 1.

The significance test of plaque index differences before and after having a habit of brushing before bed was done using a t-test of dependent data. The statistical value of t test was obtained to test the difference of mean plaque index before and after having the habit of brushing before bed 17,382 with significance 0.000.

The results showed a significant difference in mean plaque index before and after having a habit of brushing before bedtime. The value of t-count is greater than t-table ( $17.382 > 2.042$ ) and can also be seen from the significance value of  $t = 0.000$  test is smaller than  $\alpha = 0.05$  so it can

be concluded that there is significant difference of plaque index before and after having brushing habit before sleep at night. The median plaque index value before having a habit of brushing before bed was greater than the plaque index after having a habit of brushing before bedtime.

## **DISCUSSION**

The results of the study and statistical calculations showed significant differences in mean plaque indices measured before and after acquiring a habit of brushing before bedtime. The results showed that the habit of brushing before bedtime was an effective way of maintaining hygiene and dental and oral hygiene seen from a significant change in mean placebo index decline from day one to day 8 of 2,247 to 0.591.

This cannot be separated from the second to seventh visit which is the control of tooth brushing and education about brushing properly and correctly that is practiced directly to the orphanage children in a way so that the orphanage children sampled in this study can brush their teeth well and correctly independently after being accustomed for a week.

Most of the orphanage children also seem to have their own initiative to brush their teeth before bedtime before being controlled. The results of the initial interview through the questionnaire given to each subject showed that at first no child had a habit of brushing his teeth before bedtime. This study demonstrates conformity with Downie's (1996) <sup>11</sup> theory that children, especially school-aged children, are quite easy to adopt a new health behavior promotion rather than changing the pattern of adult life that has become a habit.

The average plaque index of orphanage children before having a habit of brushing their teeth before bedtime of 2,247 indicates the moderate category. Many factors cause the high value of a person's plaque index.

One of the factors affecting the mean value of plaque index in both orphanages is in the medium category is that in both orphanages there has not been any education and demonstration about brushing teeth properly consequently the children the knowledge in maintaining oral hygiene is still low. The results of the questionnaire also showed that no child used aids to clean teeth other than

tooth brushing. This is in accordance with the theory put forward by Carranza (2006) <sup>2</sup>, which states that brushing your teeth using aids such as dental floss, toothpicks, etc. is an effective way to remove dental plaque. Frequency and tooth brushing time also affects plaque index values. The correct brushing frequency is twice a day after breakfast and before bedtime

Measurements on the eighth day after the children have acquired a habit of brushing their teeth before bedtime showed an average grade of 0.591, putting it in the good category. This could be due to the way the children brushed the orphanage that had been repaired from previous mistakes through the education process.

The process of learning about tooth brushing has been done over and over again for a week so that children begin to understand and implement the correct brushing technique. This study has an educational process and results similar to that of Riyanti et al. (2005) <sup>12</sup> on the relationship of dental brushing education to the level of oral hygiene of the students of SDIT Imam Bukhari. The research conducted by Riyanti et al is measuring the plaque index decrease from 4 visits conducted at SDIT Imam Bukhari with the education process on how to brush teeth at each visit<sup>12</sup>.

Based on the results, this study showed a significant change between the plaque index decline during the first visit and the fourth visit. This shows that the average plaque index decline is better than the second and third visits, and there is an increase in oral hygiene which is included in either criterion. This is because during the first visit, the students still do not understand how to brush their teeth properly and correctly.

The average plaque index decline on the first day was 0.233 and on the fourth day was 0.462. These results indicate the effect of learning process and time to obtain a result of behavior change as well as increased oral and dental hygiene as measured through plaque index. Research conducted by the author for 1 week showed an average decrease in plaque index value of 1.6559.

## **CONCLUSION**

There is difference of plaque index in children aged 6-12 years at William Booth Orphanage and

RPSAA Ciumbuleuit Bandung before and after having the habit of brushing their teeth before going to bed at night.

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