



## The Relationship Between Toothbrushing Habits and the Prevalence of Caries and Calculus in School-Age Children Grades 1-6 at Galilea Hosana School Elementary School, Medan Selayang District of North Sumatra, Indonesia

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### ABSTRACT

School-aged children constitute a demographic that encounters dental and oral health issues. Poor oral and dental hygiene is associated with the development of caries and calculus. The objective of the study was to establish the relationship between teeth brushing practices and the occurrence of dental caries and calculus in elementary school children from grades 1-6 at Galilea Hosana School, located in the Medan Selayang District of North Sumatra. The research conducted at Galilea Hosana School Elementary School, Medan Selayang District, is a descriptive-analytic study with a cross-sectional design. The research sample consisted of 64 elementary school pupils enrolled at Galilea Hosana School, located in the Medan Selayang District. The students were from grades 1 to 6. The data were gathered through the administration of questionnaires and the physical inspection of the mouth cavity and teeth. The Kruskal-Wallis statistical test was employed to examine the data. The research findings indicated that the mean calculus score for students was  $1.40 \pm 0.74$ , which falls within the category of moderate calculus. On the other hand, the average scores for caries DEFT and DMFT among students were  $2.02 \pm 2.36$  and  $1.42 \pm 2.06$ , respectively, placing them in the low caries category. Out of the total number of students, 29 (45.3%) had sufficient tooth-brushing habits, while 19 kids (29.7%) had commendable tooth-brushing practices. Only 16 students (25%) had inadequate tooth-brushing habits. The Kruskal-Wallis test revealed a statistically significant association ( $p \leq 0.05$ ) between teeth brushing behaviors and the occurrence of caries and calculus in school-age children in grades 1-6 at Galilea Hosana School Elementary School, located in the Medan Selayang District of North Sumatra. The research findings indicate a direct relationship between poor tooth-brushing habits and increased levels of calculus and caries.

### 1. Introduction

Caries is a prevalent condition that primarily affects children, particularly those between the ages of 6 and 9. By the age of 6, the permanent molars begin to emerge, making them more susceptible to tooth decay. The mixed dentition period, which begins at age 9, is characterized by the presence of both permanent

and primary teeth in the mouth. Dental caries is a pathological condition affecting the hard tissues of the teeth, specifically the enamel, dentin, and cementum. The metabolic activity of microbes in fermentable carbohydrates is what causes it. Several factors contribute to the development of caries, with the primary culprits being inadequate dental hygiene,

frequent intake of sucrose, the practice of using sugar-containing pacifiers, particularly before bedtime, compromised tooth structure, and elevated levels of cariogenic bacteria.

Prompt treatment of caries is essential to alleviate symptoms and address the primary causes while implementing preventative measures to ensure the preservation of dental and oral health. Numerous factors, such as improper tooth brushing methods, a lack of knowledge about ideal brushing times, and the consumption of cariogenic foods and beverages, can contribute to the increased incidence of dental caries and calculus. While this is true, factors other than oral and dental hygiene also contribute to dental caries in children aged 6 to 12. At this stage, there is a transition from milk teeth to permanent teeth, which also contributes to the occurrence of dental caries. In order to mitigate dental and oral issues such as tooth decay, tartar buildup, and numerous other oral ailments, there are multiple approaches one may take, with one of the most efficacious being the appropriate technique of tooth brushing. Proper dental hygiene involves the practice of brushing your teeth a minimum of two times every day, specifically after breakfast and before going to bed at night.<sup>1-5</sup>

Properly executing the act of brushing your teeth is the most efficient method for eradicating the underlying factors responsible for a range of dental health issues. Tooth brushing serves the purpose of eliminating food particles that adhere to the teeth, as well as plaque and debris. Tooth brushing is a process of eliminating dirt or debris that adheres to the tooth surface, particularly after breakfast and before bedtime, in order to minimize dental health issues.<sup>6-10</sup> The objective of this study is to establish the correlation between teeth brushing practices and the occurrence of caries and calculus in children attending grades 1-6 at Galilea Hosana School

Elementary School, located in the Medan Selayang District of North Sumatra, Indonesia.

## **2. Methods**

This study is a cross-sectional analytical-observational investigation. This study utilizes primary data acquired from research participants. The participants of this study were pupils from grades 1 to 6 at Galilea Hosana School Elementary School, located in the Medan Selayang District of North Sumatra, Indonesia. This study involved a cohort of 64 research participants. The study has obtained approval from the medical and health research ethics committee of Universitas Prima Indonesia. This study performed sociodemographic and clinical observations.

The examination of caries is conducted using DEFT and DMFT scores, while the evaluation of calculus is done by calculus scoring. The data analysis was conducted using SPSS version 26. The analysis was conducted using both univariate and bivariate methods. The objective of the univariate analysis is to assess the frequency and proportion of chewing behaviors, as well as calculate the average value and standard deviation of caries and calculus scores among the participants. This will be achieved through the use of descriptive statistical tests. The purpose of this study is to use the Kruskal-Wallis statistical test to investigate the relationship between teeth brushing practices and the development of caries and calculus at Galilea Hosana School Elementary School in the Medan Selayang District.

## **3. Results and Discussion**

This research investigates the student characteristics of age and gender. The comprehensive findings of the study on student characteristics are presented in Table 1.

Table 1. Student's characteristics.

Characteristics	n	Percentage (%)
Age (years old)		
6	7	10.9
7	15	23.4
8	11	17.2
9	12	18.8
10	9	14.1
11	7	10.9
12	3	4.7
Total	64	100.0
Gender		
Male	34	53.1
Female	30	46.9
Total	64	100.0

According to Table 1, the largest group of students is those who are 7 years old, with a total of 15 individuals accounting for 23.4% of the total. The second largest group is students who are 9 years old, with 12 individuals making up 18.8% of the total. The group of 8-year-olds consists of 11 individuals, representing 17.2% of the total. There are 9 individuals who are 10 years old, accounting for 14.1% of the total. The groups of 6-year-olds and 11-year-olds each consist of 7 individuals, making up 10.9% of the total. Finally, there are only 3 individuals who are 12 years old, representing 4.7% of the total. The research findings revealed that the male student population outnumbered the female students, with 34 individuals (53.1%) compared to only 30 female students (46.9%).

The mean difference between students with good, sufficient, and bad dental brushing behaviors is 0.79, 1.48, and 2.44, respectively. The mean DMF-T values for children with good, adequate, and poor tooth-brushing behaviors were 0.74, 2.21, and 0.81, respectively. Meanwhile, pupils with good, adequate, and bad dental brushing routines exhibited average calculus scores of 0.76, 1.54, and 1.92, respectively. The results of the Kruskal-Wallis test indicate a statistically significant association between tooth brushing habits and the occurrence of caries and

calculus in school-age children in grades 1-6 at Galilea Hosana School Elementary School, located in the Medan Selayang District of North Sumatra ( $p \leq 0.05$ ).

Dental plaque is a biofilm that develops on the surface of teeth following the consumption of food. Plaque harbors bacteria capable of metabolizing sugars and carbohydrates into acids, leading to the erosion of tooth enamel and the development of caries. Regularly brushing your teeth aids in the removal of plaque, thereby decreasing the likelihood of developing caries. Failure to eliminate plaque through brushing might lead to its solidification into calculus or tartar. Calculus refers to the accumulation of hardened deposits that can cause gum irritation and serve as a breeding ground for bacteria. Calculus can exacerbate gum diseases and contribute to additional dental issues. Using toothpaste that contains fluoride aids in fortifying tooth enamel. Fluoride aids in safeguarding teeth from acid erosion and has the ability to restore areas that have initiated demineralization. Strong and well-maintained gums provide a protective barrier against tooth decay and the buildup of plaque and tartar. Plaque and calculus can induce gingivitis, an inflammation of the gums, which can progress into periodontitis, a more severe form of gum disease. Consistent brushing aids in the prevention of gum infections and the preservation of gum health.<sup>11-15</sup>

Regularly brushing teeth helps prevent the buildup of plaque and calculus. Regular tooth brushing reduces the likelihood of dental issues in children. Providing dental health education to youngsters can enhance their comprehension of the significance of tooth brushing and the maintenance of oral hygiene. This can build enduring positive behaviors that individuals will sustain throughout their lifetime. By developing effective dental hygiene practices and recognizing the significance of preserving oral well-being, children can minimize the likelihood of tooth decay and tartar formation both during their school years and in the future. The role of parents and educators in exemplifying and imparting knowledge about oral care is crucial.<sup>16-20</sup>

#### 4. Conclusion

There is a significant relationship between tooth brushing habits and the incidence of caries and calculus in school-age children in grades 1-6 at Galilea Hosana School Elementary School, Medan Selayang District in North Sumatra ( $p \leq 0.05$ ).

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