

COMPARISON OF CARIES STATUS OF CHILDREN WHO BRUSH TEETH WITH RIVER WATER AND CLEAN WATER FOR PREVENT HIGH DENTAL CARIES INDEX IN WETLANDS COMMUNITIES, CENTRAL KALIMANTAN (OVERVIEW OF GRADE 1 STUDENTS AT TAHAI JAYA ELEMENTARY SCHOOL, MALIKU DISTRICT, PULANG PISAU REGENCY)

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Abstract: Most of the people living in the wetlands of Maluku District, Pulang Pisau Regency were still use river water to brush their teeth. Based on the content of water chemical parameters, pH, fluorine characteristics of wetland river water were not suitable for brushing teeth, because it can cause caries.: This research were research and Development method. Samples were taken using simple random sampling technique. The population of this study were 22 grade students of SD Tahai Jaya. The number of respondents was 22 students, which were divided into 2 groups, 11 students who brushed their teeth using river water and 11 students who brushed their teeth using water that met the requirements for toothbrushes. Then followed up for 6 months to examine the Caries index. There were significant differences in students who brushed their teeth using river water and clean water. From the research results it can be concluded that there were a significant difference in the caries index of students who brushed their teeth using river water and students who brushed their teeth with clean water.

Key Words: Caries, Clean Water, River Water, Wetland

1. INTRODUCTION

Oral and dental health is a part of body health that cannot be separated from one another because oral health will affect the overall health of the body. The biggest problem faced by the Indonesian population as in other developing countries in the field of oral health is hard tissue disease besides gum disease (**Rosedewi, 2015**).

Oral health is often not a top priority in health problems. However, based on the Basic Health Research in 2013, it was found that the prevalence of caries in the population in Indonesia was 72.6%, the population with teeth and mouth problems who received care and medication was 31.1% and the tendency of the DMF-T index was 4.5.

The level of caries index according to Blum's (1974) theory is determined by 4 main factors, namely behavior, health services, heredity and the environment. One of the environmental factors that influence the caries index is the water source used to brush teeth (**Riskesdas, 2013**).

Wetlands are areas where the environment is saturated with water, such as swamps and peat, both permanent and temporary. The large amount of swamp water flowing into the river causes the water to be acidic, with an acidity level between pH 3.5-4.5.

Swamp areas in rivers that have clear physical characteristics show high levels of Fe and Sulfate, whereas if the water is cloudy it shows a high humic acid content. The content of wetlands found in peatlands will produce an acidic pH, due to the decomposition of organic matter which causes the formation of phenolic and carboxylate compounds. Peatlands have characteristics, namely high color intensity (yellow or brownish red), high organic matter content, and sour taste with a low pH between 2-5. These acidic conditions play a role in the tooth decay process, using acidic water to brush. teeth can reduce the surface hardness of tooth enamel (**Hapsari et al, 2013**).

The quality of water used for brushing teeth must meet physical, chemical, and microbiological requirements. Several chemical parameters that are thought to affect dental health include the elemental acidity (pH), fluorine, and calcium (**Adhani et al, 2015**).

Geographically, Elementary school of Tahai Jaya is a school located in Maluku District. Most of the students who attend Elementary school of Tahai Jaya live in Maluku District. The neighborhood where these disciples live is surrounded by river water, which is called the Kapuas river. The river cannot be separated from the various activities of the people living on the banks of the Kapuas river, such as bathing, washing, consuming, gargling, including brushing their teeth with river water (**Adhani et al, 2015**).

2. METHODS AND MATERIALS

This research method is Research and Development. Samples were taken using simple random sampling technique. The population of this study were 22 grade students of elementary school of Tahai Jaya. The number of respondents was 22 students, which were divided into 2 groups, namely 11 students who brushed their teeth using river water and 11 students who brushed their teeth using water that met the requirements for tooth brushes. Furthermore, it was followed up to 6 months and then looked at the caries index.

The caries index examination was carried out by instructing the respondents to open the mouth then examining it with a glass mouth and sonde starting from the right side of the posterior maxillary teeth then to the anterior and left posterior of the upper jaw, the left posterior teeth of the lower jaw then to the anterior to the lower jaw and to the right posterior lower jaw.

The caries index was assessed using the def-t index, decayed (d) caries teeth that could still be filled, Exfoliative (e) teeth that were missing due to eruption permanent teeth and filled (f)

teeth that were filled because of caries. The results of the def-t index were recorded on the caries examination sheet. The classification of caries severity can be classified into 5: 0.0 - 1.0 (very low), 1.2 - 2.6 (low), 2.7 - 4.4 (moderate), 4.5 - 6.5 (high) and very high severity with DMF-T value > 6.6.

The data obtained were then performed a parametric test using the t test with the Package for the Social Science (SPSS) program version 20

3. RESULTS AND DISCUSSION

The results of the study on the caries index of grade 1 students at elementary school of Tahai Jaya who brushed their teeth using river water and students who brushed their teeth using water that met the toothbrush requirements can be seen in table 1.

Table 1. Comparison Of Caries Status Of Children Who Brush Teeth With River Water And Clean Water

Water	n	£ Decay	£ Exfoliative	£ Filled	£ Def-t	X def-t
River Water (pH 4,7 and fluor scale 0,08)	11	61	18	5	80	7,27
Clean Water (pH 7 anf fluor 0,10)	11	18	5	3	26	2,36

Based on table 1, it can be seen that the average def-t index of students who brushed their teeth using river water was higher than that of students who brushed their teeth using clean water.

The results of the independent T-test data analysis showed a sig value of 0.000 ($p < 0.05$), which means that there was a significant difference in the caries index of students who brushed their teeth using river water and students who brushed their teeth using clean water.

The results of the research that had been conducted showed that the def-t index of students who brushed their teeth using river water was higher than students who brushed their teeth using clean water for toothbrushes, this is because there are different factors from contains the chemical parameters of water used for brushing teeth.

The results of the pH value of Kapuas river water obtained a pH value of 4.7 (< 7). The pH value shows that the water is not in a neutral state, while the pH value of river water that has been made clean is 7 which means that the water is in a neutral state. The pH value of water that is below 7 indicates acidic water which can reduce the surface hardness of tooth enamel. The lower the pH of the water used for brushing teeth, the higher the reaction rate for the release of calcium minerals from tooth enamel, which is called demineralization (Prasetyo, 2005).

Enamel demineralization occurs through a diffuse process, namely the process of moving ions that dissolve in water from the saliva, because there is a difference in the concentration of the acidity of the water with that in tooth enamel. When the environment becomes acidic or below a critical pH, which is below 5, demineralization becomes dominant, causing the release of enamel minerals which will cause teeth to become prone to caries. Barito river which has an acidic pH due to peat swamps (Merida, 2013; Khan et al., 2019).

Based on research studies, acidic pH can also be caused by local community activities such as disposal of factory waste, because on the banks of the Kapuas river there are several industrial factories such as iron, wood and rope factories. Organic and inorganic industrial waste can raise carbonic acid and organic acids in the waters, so that the water has a low pH. The def-t index of students who brushed their teeth using clean water was lower, this was because clean water had been filtered and coagulated to neutralize the water's pH **(Rochgiyanti, 2011; Nurdawati et al, 2007; Jabarullah et al., 2019; Munir et al., 2019)**.

Fluorine plays a role in the tooth remineralization process. Fluorine works by inhibiting the metabolism of plaque bacteria, which can ferment carbohydrates, which will be inhibited by fluorine, which works by inhibiting it through the conversion of hydroxy apatite in enamel to fluorine apatite. The chemical reaction is $\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_2 + \text{F} \rightarrow \text{Ca}_{10}(\text{PO}_4)_6(\text{OHF})$. Fluorine apatite produces enamel that is more resistant or resistant to acid, so it can inhibit the demineralization process and increase remineralization which stimulates repair and cessation of carious lesions. Water fluorine levels are categorized into four, namely very low (0.0 - 0.3 mg / L), low (0.3 - 0.7 mg / L), moderate (0.7 - 1.5 mg / L), high (> 1.5 mg / L) **(Rahayu, 2013; Leondra et al, 2014; Noorollahi et al., 2019)**

The chemical parameter content of river water fluorine in the results of this study has an average value of 0.08 mg / L and clean water fluorine has an average value of 0.10 mg / L. Both groups of students who brushed their teeth using river water and students who brushed their teeth using clean water both had very low fluorine content, so they would easily experience caries. Fluorine will benefit if the level is around 0.7 mg / L which will be enough to strengthen tooth enamel, but fluorine content > 1.5 mg / L can causes fluorosis in the teeth. The fluorine content in river water tends to be lower, this is due to local hydrogeological differences. The calcium content in clean water is better for remineralizing teeth because clean water is in a neutral pH, this is because remineralization can only occur when the pH is in a neutral state (pH 7) Ca^{2+} will inhibit the process of decomposing hydroxyapatite and will rebuild or rebuild some hydroxyapatite crystals. dissolved **(Leondra et al, 2014; Noreen et al., 2019)**.

The environmental factors that affect caries is the water source used for brushing teeth, in areas with sufficient fluorine content in water (0.7 mg / L to 1 mg / L) have a low caries prevalence. The water used by grade 1 students of elementary school of Tahai Jaya who brushed their teeth using river water and students who brushed their teeth using clean water both had very low fluorine content, but this was only one of the factors that could cause caries **(Merida et al, 2013)**

The def-t index for grade 1 elementary school of Tahai Jaya students who brushed their teeth using river water was in the low category, while the Def-t index for grade 1 students at elementary school of Tahai Jaya who brushed their teeth using clean water was in the low category, this shows the condition of the students' teeth. the student is in good condition. The level of the def-t index is influenced by several factors, namely behavior, environment, health services and heredity. Education obtained by each person will affect attitudes and behavior towards dental health care. Of the four factors, behavior plays an important role in influencing the health status of teeth and mouth. Apart from directly affecting the oral health status, behavior can also influence environmental factors and health services **(Merida, 2017)**.

Bloom (2002) states that apart from environmental factors, behavioral factors can also influence dental caries. This is supported by Budisuari's (2010) statement that there is a relationship between tooth brushing behavior and dietary habits with oral health. Tooth brushing behavior is wrong due to lack of knowledge of the right time to brush teeth. People have a habit of brushing their teeth in the morning shower and evening shower, not after breakfast and at bedtime, even though brushing their teeth before bed is the most effective time to reduce dental caries.

Judging from the environmental factors that affect caries is the water source used for brushing teeth, in areas with sufficient fluorine content in water (0.7 mg / L to 1 mg / L) have a low caries prevalence. The water used by grade 1 students of elementary school of Tahai Jaya who brushed their teeth using river water and students who brushed their teeth using CLEAN water both had very low fluorine content, but this was only one of the factors that could cause caries.

Apart from environmental factors that influence a person's behavior, health services also play a role in supporting the community's dental health status³. The closer the health service place is, the easier it will be to access health services. Based on the researcher's study, access in Maluku District to get dental and oral health services is not optimal. There are not yet several Puskesmas that are easy to reach and dental practice places, so grade 1 students of elementary school of Tahai Jaya who live around Maluku District still find it difficult to get dental and oral health services.

4. CONCLUSION

From the research results it can be concluded that there were a significant difference in the caries index of students who brushed their teeth using river water and students who brushed their teeth with clean water.

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