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Relationship Between Dental Caries And Children's Nutritional Status Elementary School In North Tanimbar District, Tanimbar Islands

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ABSTRACT

Background: Dental caries is a disease in the oral cavity that occurs due to the interaction of bacteria that convert carbohydrates in food debris into acids through the fermentation process. In school children, dental caries is an important problem because it causes pain complaints, spreads infection to other parts of the body, resulting in decreased productivity. Stunting is a condition that affects the growth and development of children, caused by long-term malnutrition, so it is a National Priority Program. This study aims to analyze the relationship between dental caries and nutritional status in primary school children in North Tanimbar District, Tanimbar Islands. Methods: Analytical observational research with a cross-sectional design, using the simple random sampling method in 16 elementary schools in North Tanimbar District in February-March 2024, with a sample of 328 children. Determination of nutritional status based on anthropometric measurements of nutritional status (length-for-age and BMI-for-age). Dental caries examination is done by looking at teeth that have caries or not. Results: 124 (37.8%) children had dental caries and had stunting nutritional status, 17 (5.2%) children did not have dental caries and had stunting nutritional status. Chi-square test results of dental caries and stunting nutritional status, p value = 0.000. 78 (23.8%) children had dental caries and had an thinnes nutritional status, 7 (2.1%) children did not have dental caries and had an thinnes nutritional status. Chi-square test results of dental caries and thinnes nutritional status, p value = 0.000. Conclusion: There is a relationship between dental caries and nutritional status in elementary schools children in North Tanimbar District.

Keywords: Dental Caries, Nutritional Status, School

INTRODUCTION

Oral health is an important component of comprehensive body health. A healthy oral cavity can facilitate proper consumption of nutritious food, maintain quality of life, and preserve productivity. Children's oral health is a complex concept and involves various factors, such as genetic, biological, behavioral, social, and environmental. Maintaining children's oral health is one of the important steps that parents must take in comprehensively maintaining children's health and growth.

Dental caries is a disease in the oral cavity that occurs due to the interaction of bacteria that convert carbohydrates in food debris into acids through the fermentation process. Caries is caused by various factors such as the host (tooth), microorganisms (bacteria), substrate (carbohydrates), and time.

Dental caries occurs due to food debris attached to the tooth surface which causes calcification of the teeth. And finally, the tooth becomes brittle, perforates and becomes damaged.

In addition, the causes of caries can also be oral hygiene, bacteria, saliva, diet, age, gender, geographic, social status and behavior. Sugary foods that contain sugar, especially carbohydrates, namely sucrose, fructose, and galactose, increase the risk of dental caries.[3] In school children, dental caries is an important problem because it not only causes pain, but also spreads infection to other parts of the body resulting in decreased productivity. This condition will certainly reduce the frequency of children's attendance at school, disrupt their concentration on learning, affect their appetite and intake.

Dental caries in primary teeth can affect a child's overall health, especially in terms of impaired chewing function which can interfere with the absorption and digestion of food. Therefore, dental caries can affect children's nutrition, causing malnutrition, and over a long period of time causing failure of optimal growth or stunting.

Dental and oral health is part of the body health that affects each other. The degree of health can be assessed using several indicators, one of which is nutritional status which can be measured through anthropometric assessments. The variables of length-for-age and body mass index for age can be used to determine the prevalence of nutritional status of school children and adolescents and can be associated with the occurrence of dental caries.

Basic Health Research (Riskesdas, 2018) shows that the prevalence of caries in elementary school students in Indonesia is still high at 47.55%. [3,15] Based on Indonesian Health Survey (SKI) data in 2023, it shows that the prevalence of dental caries in Indonesia is 43.6% at the age of ≥ 3 years. The prevalence of dental caries in Maluku is still very high than the national average, which is 51.0% at the age of ≥ 3 years. From the age groups, it shows that the 5-9 year age group is the age group with the highest prevalence of 49.9%.

Stunting is a condition that affects the growth and development of children, caused by long-term malnutrition and repeated infections. The characteristic features of stunting are the child's height is below the normal limit. Stunting that occurs in the preschool period (first five years) can continue until school age. Apart from factors related to pregnancy and childbirth, there are other factors that also play a role in the occurrence of stunting in childhood, including environmental factors, diet, and the child's medical history also have a significant influence on the development of stunting in children. Children who have tooth decay feel pain in the area of the tooth decay. Therefore, this will reduce food consumption.

In general, nutritional status is the main problem that is a national priority program. The prevalence of stunted children stated by Word Health Organitation, Indonesia is the third highest country in the Southeast Asia region. Based on SKI data 2023 in Indonesia, 4.6% of children aged 5-12 years experienced severe stunting, 14.1% of children aged 5-12 years are experienced stunting (length-for-age). The prevalence of stunting in Maluku Province is 7.6% of children aged 5-12 years experienced severe stunting, 19% of children aged 5-12 years experienced stunting (length-for-age). Based on length-for-age indicators : Severe Stunting : Z-score < -3,0; Stunting Z-score -3,0 s/d -2,0; Normal Z-score ≥ -2,0.

Based on Indonesian Health Survey data (SKI,2023) in Indonesia, 3.5% of children aged 5-12 years experienced Severly Thinnes, 7.5% of children aged 5-12 years experienced Thinnes, and 11.9% of children aged 5-12 years experienced overweight (BMI-for-age). The prevalence of undernutrition in Maluku Province is 4.9% of children aged 5-12 years experiencing Severly Thinnes, 11.3% of children aged 5-12 years experienced Thinnes, and 6.7% of children aged 5-12 years experienced overweight (BMI-for-age). Based on BMI-for-age indicators < -3 SD Severe Thinnes, -3 SD s/d <-2 SD Thinnes, - 2 s/d 1 SD Normal, > 1SD s/d 2 SD Overweight, >2 SD Obesity.

The results of this study are in line with Wardani,et.al, (2022), who states that there is a significant relationship between dental caries and stunting in Bantuil 3 Banjarmasin elementary school children. Research by Ramdhanie,et.al, (2022) found that there is a relationship between nutritional status and dental caries in school-age children. Research by Lutfi,et.al, (2021) stated that there is a significant relationship between nutritional status and the severity of dental caries in children aged 10-12 years in Musi Rawas Regency. This study aims to analyze the relationship between dental caries and nutritional status in elementary school children in North Tanimbar District, Tanimbar Islands.

METHODS

This research is an analytic observational research with a cross-sectional design. This research was conducted in all elementary schools in North Tanimbar District, Tanimbar Islands. The research was conducted in February-March 2024, with a total population of 1,823 students. The number of research samples was calculated using the Slovin formula with a value of $\alpha = 0.05$, which was 328 people. Students were randomly selected using the simple random sampling method. Height measurement using Microtoise staturemeter, Body weight using OneMed digital scales. Grouping of stunting children based on Z-score value based on length-for-age measurement results. Grouping of malnourished children is based on the standard deviation value based on the results of BMI-for-age measurements. Then a caries examination was recorded on the examination status card according to WHO standards to determine the condition of the teeth and mouth, especially the number of child caries. Informed consent was given to the respondent's parents to ask for approval. The analysis used Chi Square test to analyze the relationship between dental caries and nutritional status in elementary school children in North Tanimbar District, Tanimbar Islands.

RESULTS

Table 1 shows the characteristics of elementary school children in North Tanimbar District in 2024 based on gender, age, nutritional status length-for-age, BMI-for-age, and dental caries.

Table 1. Frequency Distribution of Characteristics

Characteristics	Total (N=328)	Percentage (%)
Gender		
Male	178	54,30%
Female	150	45,70%
Age		
6 years old	22	6,70%
7 years old	36	11%
8 years old	57	17,40%
9 years old	38	11,60%
10 years old	54	16,50%
11 years old	65	19,80%
12 years old	56	17,10%
Nutritional Status (length-for-age)		
Normal	187	57%
Stunting	141	43%
Nutritional Status (BMI-for-age)		
Thinnes	85	25,90%
Normal	223	68%
Overweight	20	6,10%
Dental Health		
No caries	132	40,20%
Dental caries	196	59,80%

Table 2. Relationship between dental caries and nutritional status (stunting/ length-for-age)

Variable	Nutritional status (length-for-age) (n (%))		p
	Normal	*Stunting*	
Dental Health			
No caries	115 (35%)	17(5,2%)	0.000
Dental caries	72 (22%)	124 (37,8%)	

Table 3. Relationship between dental caries and nutritional status (BMI- for-age)

Variable	Nutritional Status BMI-for-age (n (%))			p
	Thinnes	Normal	Overweight	
Dental Health				
No Caries	7 (2,1%)	109 (33,2%)	16 (4,9%)	0.000
Dental Caries	78 (23,8%)	114 (34,8%)	4 (1,2%)	

DISCUSSION

Based on table 1, the results show that elementary school students in North Tanimbar District are 178 male (54.3%) and 150 female (45.7%). Furthermore, table 1 shows that 6 years old as many as 22 people (6.7%), 7 years old as many as 36 people (11%), 8 years old as many as 57 people (17.4%), 9 years old as many as 38 people (11.6%), 10 years old as many as 54 people (16.5%), 11 years old as many as 65 people (19.8%), and 12 years old as many as 56 people (17.1%). Nutritional status data (length-for-age) was obtained children who have normal nutritional status as many as 187 people (57%) and who experience stunting as many as 141 people (43%). Nutritional status data (BMI-for-age) found that 85 children (25.9%) had a thinnes nutritional status, 223 children (68%) had a normal nutritional status, and 20 children (6.1%) had a overweight nutritional status. The number of dental caries found 132 children (40.2%) did not have dental caries and 196 children (59.8%) had dental caries. These nutritional status results are higher when compared to the 2023 SKI data in Maluku Province, where 26.6% of children aged 5-12 years were stunted (length-for-age) and 11.3% of children aged 5-12 years were thinnes (BMI-for-age). Meanwhile, the 2023 SKI data for dental caries in Maluku Province was 51.0% at the age of ≥ 3 years. This may also be caused by other factors such as poor consumption of nutritious food, socioeconomic level, parental education which greatly affect these results.

In Table 2, the relationship between dental caries and length-for-age nutritional status, it can be seen that 124 (37.8%) children had dental caries and had stunting nutritional status, 72 (22%) children had dental caries but had normal nutritional status. In contrast, 115 (35%) children did not have dental caries and had normal nutritional status, 17 (5.2%) children did not have dental caries but had stunting nutritional status. With a p value = 0.000, it can be concluded that there is a relationship between dental caries and nutritional status (length-for-age) in elementary school children in North Tanimbar District. This is because good dental and oral health is a protective factor for stunting, meaning that the better the oral hygiene, the more normal the growth and the incidence of stunting will be reduced.12

These results are in line with research by Abdat,et.al who reported that oral health and stunting are strongly correlated. Children who are stunted are very likely to experience dental caries because their salivary conditions change, for example the flow and pH of their saliva, and children who experience dental caries have higher risk factors for experiencing stunting nutritional status. Abadi & Abral stated that stunting patients show a specific pattern of dental caries, and there is a strong correlation between risk factors and caries index in these patients. Studies in Nigeria also reveal that malnutrition, including stunting, thinnes is a risk factor for dental caries.

In Table 3, the relationship between dental caries and BMI-for-age nutritional status, it can be seen that 78 (23.8%) children had dental caries and had thinnes nutritional status, 114 (34.8%) children had dental caries and had normal nutritional status, 4 (1.2%) children had dental caries and had overweight nutritional status. In contrast, it was seen that 7 (2.1%) children did not have dental caries and had thinnes nutritional status, 109 (33.2%) children did not have dental caries and had normal nutritional status, 16 (4.9%) children did not have dental caries and had overweight nutritional status. With a p value = 0.000, it can be concluded that there is a relationship between dental caries and BMI-for-age nutritional status in elementary school children in North Tanimbar District. This is because dental caries will affect the quality of children's sleep and eating patterns due to the pain felt. This condition will affect children's nutrition, growth and weight gain (Abubakar 2021). Dental caries can interfere with children's ability to eat comfortably, which in turn can affect their nutritional intake.7 Children's nutrition, development and weight gain will be directly affected by this condition. Good nutritional status occurs when the body receives sufficient nutrient intake so that it can be used by the

body for optimal physical growth, brain development, intelligence, work productivity and resistance to infection (Asmawati, 2018). In addition, children's quality of life and the adverse effects of dental caries may occur. Caries will make children sick and uncomfortable. Children's activities at school can be hampered by this. The child's learning ability decreases. Another impact that arises from caries is that children can experience acute or chronic infections. Dental infections affect appetite and nutrient absorption, which can lead to reduced micronutrients in the child's body. This emphasizes the importance of maintaining children's oral health as an important factor in maintaining good nutritional status.

CONCLUSION

This research concluded that there is a relationship between dental caries and the nutritional status of length-for-age and BMI-for-age in elementary school children in North Tanimbar District. However, with the high prevalence of dental caries (59.8%), it is necessary to pay special attention to intervene through regular monitoring, pay attention to children's food consumption and provide education to parents and schools. In addition, it is also hoped that schools can optimize the School Dental Health Program. (UKGS) and students are accustomed to implementing Clean and Healthy Living Behavior (PHBS) through oral health maintenance by always brushing their teeth.

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