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The Connection Between Cariogenic Foods And Dental Hygiene Status With Caries In Primary School Children At Bazartete Administrative Post Of Municipality Liquica Timor-Leste, 2024.

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ABSTRACT

Introduction: *Dental caries is one of the most common diseases found in all social levels of the Timorese population, whether male, female, elderly, adults, adolescents and children. The consumption of cryogenic foods plays an important role in the formation of meats in children between 11 and 12 years of age. Cryogenic foods are velvety foods that are easily attached to the teeth so that they quickly damage the teeth.*

Objectives: *To determine the link between cryogenic foods and dental hygiene status with the incidence of caries in primary school children in Bazartete Administrative Post of Liquiçá Timor Leste.*

Research Methodology: *An observational and analytical study with a cross-sectional design with a consecutive sampling of 300 samples. Data collection using the respondent checklist in the questionnaire and oral examination sheets. The research data were analyzed by chi-quare logistic analysis and logistic regression.*

Results: *Thus, the results showed that up to 243 [81%] children had dental caries, while 57 (19%) children did not, with two influencing variables, and there are milk with a p-value = 0.047, a deviation value or Ord Ratio of 3.017 and sweets with a p-value = 0.008., the value of is 4.315. Cryogenic foods and dental hygiene status are associated with the incidence of karst.*

Conclusion: *There is a link between cryogenic foods [milk and sweets] have a significant relationship with the incidence of carias in primary school children in Bazartete Administrative Post of Liquiçá Timor-Leste. In addition, hygiene and dentistry also play an important role related to the incidence of*

cavities in primary school children referred to in the advertisement cited by [Tilman CB § Santos J., 2024].

Keywords: Cryogenic food, dental hygiene, caries in Bazartete Administrative Post.

INTRODUCTION

Dental caries is a major public health problem globally and has been the most widespread non-communicable disease [NCD] in many cases. It is also the most prevalent condition included in the 2023 Global Burden of Disease Study, ranking first for permanent tooth decay [2.3 billion people] and 12th for deciduous teeth [560 million children] [1]. Dental caries is a disease that ranks fourth in the world as a disease that is expensive to treat and sixth in the world of diseases that are often complained about or announced by the public2. In general, children do not maintain good oral hygiene, so they quickly cause cavities when compared to adults. The most common cause of tooth decay is the use of granulated sugar in foods such as sweets, snacks, and sweet drinks. Sugar or sucrose undergo a fermentation process involving microorganisms, the result of fermentation obtains energy from the substrate releasing sucrose and by -products in the form of alcoholic compounds, so sugar is classified as having cryogenic compounds used in food manufacturing that are widely recognized as those consumed many by children[3].

The Centers for Disease Control and Prevention reports that cavities have increased, there is an increase in tooth decay from 24% to 28% in permanent teeth, while deciduous teeth or primary teeth have also increased to 70%, especially in children and preschool children4. Up to 98% of the world's population has experienced cavities, it is necessary to know that cavities or caries are focal infections of the onset of various systemic diseases, including heart and kidney diseases cited by [Tilman CB § Santos J., 2024][5]. The public perception that caries is not a serious disease, so that the level of public awareness becomes less in maintaining dental and oral hygiene. He recognizes that people tend to place dental and oral health problems at the level of secondary and tertiary needs. A study among them showed that there was a more complex relationship between the incidence of tooth decay and dietary patterns in the form of intake of carbohydrates, vitamins, proteins, fats and minerals. In general, it is known that the current diet is still the main cause of tooth decay, where the etiology is caused by streptococci and Staphylococcus bacteria6. These bacteria can come from fermented food residues that are attached to the oral cavity and are also aggravated by poor dental hygiene cited by [Tilman CB § Santos J., 2024]. There are several factors that should be considered in the form of behavior to maintain dental and oral hygiene, such as the consumption of low-carbohydrate foods, brushing techniques, proper use of fluoride and frequent dental check-ups.

Based on the theory of Parasitic Acidogenic Chemistry, that the degree of acidity depends on the content of carbohydrates consumed, the higher degree of acidity of food debris containing sucrose attached to the teeth will occur in a process of fermentative change of normal flora bacteria in the mouth to lactic acid or pyruvic acid with glycolysis process, so that it affects changes in pH in the oral cavity. In general, the normal oral pH

of 7.0 becomes more acidic and critical for pH 5.5, in this case parents are more careful in giving milk, both breastfeeding and bottled formula, because this causes the process of formation of the degree of acidity in the oral cavity and causes the formation of cavities. Children in primary school are at risk of a high incidence of cavities, because the ages of 6 to 12 is the stage of change of weakened teeth and the growth of new permanent teeth and primary school children spend most of their time in school. resulting in increased demineralization and decreased remineralization.

According to Elizabeth Slick [2021], Southeast Asian Regional [SEARO] countries often experience problems in improving dental and oral health, such as Timor-Leste, which is a developing country. in 2018, Timor-Leste's population was estimated at 1,167,242 people and with a relatively low public health status. In 2017 there was an increase in cases of tooth decay or caries in Timor-Leste with an estimated case of 42% of the entire population, where at the time there were only 10 dentists and assisted by 44 dental nurses with a ratio of 1:28,018 population[9]. Dental caries is one of the most common diseases found in all social levels of the Timorese population, in the elderly, adults, adolescents and children, so that a more in-depth study can be carried out on the link between carcinogenic diet and dental hygiene status with caries in primary school children mentioning cited by [Tilman CB § Santos J., 2024].

Research Objectives.

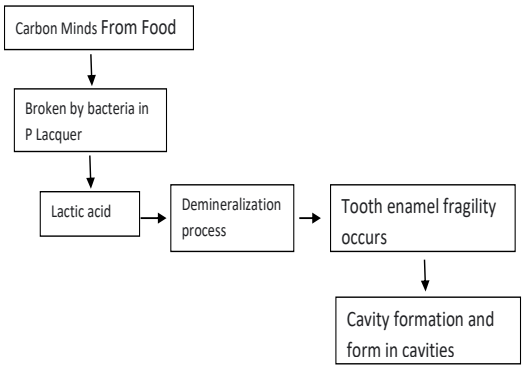
General Objective: To determine the link between cryogenic foods and dental hygiene status with the incidence of caries in primary school children at the Administrative Post of Bazartete Liquiçá Timor Leste. Thus, Specific objectives:

- To determine the prevalence of dental caries in primary school children;
- To discover the behavior of primary school children in maintaining dental hygiene;
- To determine the link between cryogenic food models and the incidence of caries.
- To determine the relationship between dental hygiene and the incidence of cavities.

THEORETICAL FRAMEWORK.

Initial harmfulness in the ornament layer, which then becomes cavities, is a process of demineralization. The initial stage of the formation of cavities is the formation of black spots that cannot be cleaned with a toothbrush and if the black spots are not controlled, they will get bigger and deeper so that they cause the death of importance and produce infection in the supporting tissues of the teeth and surrounding areas cited by [Tilman CB § Santos J., 2024]. The following is a brief description of the training process.

Tooth decay:



A study conducted by [Al-Malik, 2018 cited by Tilman CB., 2024] in Saudi Arabia, with 302 children between the ages of 6 and 7 surveyed, the prevalence of 289 (96%) children had caries and the remaining 13 (4%) did not have tooth decay. Of the 289 respondents, 143 (49.3%) were girls and 146 (50.7%) were boys, so the prevalence of carst was more in boys cited by [Tilman CB.,

2024]11. There are 4 main etiologies in the formation of caries, namely: host substrate, agent and time, in addition to these etiologies there are also factors that indirectly affect the appearance of cavities, these factors are called predisposed factors, a person consumes foods that contain carbohydrates, then the salivary pH decreases immediately because the bacteria in the oral cavity produce acidic compounds, Then the demineralization process is formed in the teeth, the process takes 15-30 minutes, during the feeding process the saliva starts to work on neutralizing acidic compounds. This results in the remineralization of the teeth. Consuming carbohydrate-rich foods can cause tooth enamel to not be able to carry out the remineralization process correctly, so small holes occur in the teeth.

Tooth decay results when plaque forms on the surface of a tooth and converts free sugars [all sugars added to foods by the manufacturer, cook, or consumer, plus sugars naturally present in honey, syrups, and fruit juices] contained in foods and beverages into tooth-destroying acids over time. Continued high intake of free sugars, inadequate fluoride exposure, and lack of plaque removal by toothbrushing can lead to tooth decay, pain, and sometimes tooth loss, and infection13. Foods that are soft and easily adherent can damage your teeth, they usually contain sucrose. Sucrose or monosaccharides and disaccharides are glucose derived from sugar or cane sugar. Chocolate contains 99.8% sucrose with 0.01-0.02% water content, 0.006-0.3% minerals, and 0.03-0.2% invert sugar. Milk contains 62.5% sucrose and 4.8% lactose. Other foods are ice cream containing 12-16% sucrose and milk containing 55-64% milk, while candies contain 62.25% sucrose. This causes children to tend to like cryogenic foods because they are more delicious to eat without knowing the impact caused by neglecting oral and dental hygiene[14]. Healthy teeth are the state of the teeth in clean condition, free of plaque and other impurities on the surface of the teeth such as food debris, tartar and food and does not smell bad in the mouth. Here are simple ways to keep your teeth clean and healthy, namely; Brush your teeth at least 2 times a day, avoid sweet and soft foods, and have regular dental check-ups every 6 months to the dentist. For dental and oral hygiene status, the SOHI- (Simplified Oral Hygiene Index) score was measured. Dental hygiene examination using the Green and Red method, namely by adding the residue index and the odontolith index. The residue index is the value of the soft deposits remaining and attached to the teeth due to the presence of these food residues. The odontolith index is the value of the hard deposits that remain and adhere to the teeth due to the presence of these food residues of each person cited by [Tilman CB Santos J., 2024].

RESEARCH METHODOLOGY.

An analytical observational study with cross-sectional design with and approximation of successive sampling. The scope of this research is the field of epidemiology of dental and oral diseases through the analysis of the incidence of dental caries in primary school children and their risk factors. Population is a generalization composed of objects/individuals that have certain quantities and characteristics and are determined[15]. The total number of samples in this study was 302 samples. The sampling technique applied in this investigation was consecutive or quota sampling. The data collection instrument was used in a questionnaire checklist and oral examination sheets. For data analysis, we used descriptive

statistics, chi-quare vicariate analysis (X^2) cross-tabulation with significant (α) = 0.05 with 95% confidential interval [CI]. At least multivariate analysis by logistic regression analysis with odds ratio [OR] value and probability value. These analyses are performed using the SPSS [*Statistical Package for the Social Sciences]* version 22 and the results are presented in the tables.

RESULTS

Table 1. Encryption on the distribution and frequency of variables gives investigation (tooth decay, dental hygiene status, food and beverages).

Variables	N=302	%
Tooth decay		
Carst Injury	244	81
No injury from Casia	58	19
Dental Hygiene		
Good, good.	56	18.7
Poor	245	81.3
Gargareja		
Yes	63	79
No	237	21
Brushing your teeth		
2x per day	201	67
1x per day	99	33
Brush your teeth at night		
Yes	60	20
No	240	80
Milk		
Drink frequently	247	82.3
Drink Rarely	53	17.7
Refrigerant		
Drink frequently	229	76.3
Drink Rarely	71	23.7
Cake		
Eat Often	191	63.7
Eat rarely	109	36.3
Chocolate		
Eat Often	205	68.3
Eat rarely	95	31.7
Ice cream		
Eat Often	223	74.3
Eat rarely	77	35.7
Sweets		
Eat Often	237	79
Eat rarely	63	21
Fast foods		
Eat Often	196	65.3
Eat rarely	104	34.7
Cheese & Nuts		
Eat Often	114	38
Eat rarely	186	62

Table 1. One shows that there was karst lesion with 81% occurrence in children and 19% no cassia lesion occurs in children. There were up to 302 children, only a small proportion of children had poor dental hygiene (18.7%), while 81.3% had poor dental hygiene. In the cryogenic type of food, the most consumed variable was the variable who often drank milk, 82.3% when compared to children who rarely drank 17.7%, according to the research result [Tilman CB § Santos J., 2024].

Table 2. Distribution of caries lesions based on tooth apprearence.

Cavity Injury	N	%
Anterior tooth (canine incisor)	42	14
Posterior tooth (premolar)	201	67
Total	**244**	**81**

Table 2. above shows that there was caries lesion in the anterior tooth [Canine Incisor] with a proportion of 14% while 67% of the caries lesion occurs in the posterior tooth [Premolar & Molar] of a total of 243 or 81% children with caries lesion, based on the result of the investigation.

Table 3. Relationship of behavior to maintain dental hygiene with tooth caries.

Variables	Cauldrons (%)		Crude OR	95% confidence interval		p-value
	No	Yes		Lower	Superior	
Gargareja Yes No	43 (75.4) 14 (24.6)	20 (8.2) 223 (91.8)	0.029	0.014	0.062	< 0.001
Brushing your teeth 2x per day 1x per day	55 (96.5) 2 (3.5)	144 (59.3) 99 (40.7)	0.053	0.013	0.222	< 0.001

Brush your teeth at night Yes No	54 (94.7) 3 (5.3)	6 (2.5) 237 (97.5)	0.001	0.001	0.006	< 0.001
Routine dental check-up Yes No	34 (59.6) 23 (40.4)	66 (27.2) 177 (72.8)	0.252	0.138	0.460	< 0.001
Total	**58 (100)**	**244 (100)**				

Table three above shows that there is a relationship between gargling behavior and the incidence of dental caries (p<0.001). The proportion of non-mouth-replenishing children who have cavities is 91.8%, while the proportion of non-mouth-replenishing children who do not experience cavities is much lower at 24.5%. Similarly, there is a difference in the proportion of children who have the habit of gargling and experiencing karsts at 8.2%, while the proportion of children who gargle and do not experience carses is 75.4%.

Similarly, there was a relationship between tooth brushing habits and the incidence of caries (p<0.001). The proportion of children who brush their teeth twice a day with cavities is 59.3%, while the proportion of children who brush their teeth twice a day is 96.5% without heart decay. The habit of brushing teeth at night before going to bed also showed an association with the incidence of tooth decay (p<0.001). The proportion of children who don't brush their teeth at night before going to bed with cavities is 97.5%, while the proportion of children who don't brush their teeth at night is only 5.3% who don't experience cavities. Rutin dental check-ups showed a relationship with tooth decay at 72.8%, while the proportion of children who did not regularly check their teeth was only a small proportion who did not experience tooth decay, which was 40.4%. In addition to dental hygiene maintenance behavior, dental hygiene status is a preventive or protective factor against the incidence of cavities, according to the result of research [Tilman CB § Santos J., 2024].

Table 4. Relationship between dental hygiene status and caries.

Variables	**Cauldrons (%)**		**Crude OR**	**95% confidence interval**		**p-value**
	No	**Yes**		**Lower**	**Superior**	
Dental Hygiene Good, good. Poor	15 (26.3) 42 (73.7)	229 (94.2) 14 (5.8)	0.022	0.010	0.049	< 0.001
Total	**58 (100)**	**244 (100)**				

Table 4 above shows that there is a relationship between dental hygiene status and dental caries (p<0.001) with the proportion of children with poor dental hygiene with a deficiency of 94.2%, while the proportion of children with poor dental hygiene who did not experience caries was 26.3% lower. Similarly, the proportion of children with good dental hygiene who did not experience caries was higher by 73.7%, according to the research result cited by [Tilman CB § Santos J., 2024].

Table 5. Relationship of carcinogenic foods with caries.

Variables	Cauldrons (%)		Crude OR	95% Confidence interval		p-value
	No	Yes		Lower	Superior	
Milk			3.846	2.000	7.98	<0.001
Drink frequently	36 (63.2)	211(86.8)				
Drink Rarely	21(36.8)	32 (13.2)				
Refrigerant			2.252	1.209	4.129	0.015
Drink frequently	36 (63.2)	193(79.4)				
Drink Rarely	21 (36.8)	50 (20.6)				
Cake			1.479	0.823	2.658	0.221
Eat Often	32 (56.1)	159 (65.4)				
Eat rarely	25 (43.9)	84 (34.6)				
Chocolate			4.014	2.204	7.312	<0.001
Eat Often	24 (42.1)	181 (74.5)				
Eat rarely	33 (57.9)	62 (25.5)				
Ice cream			2.607	1.420	4.787	0.002
Eat Often	33 (57.9)	190 (78.2)				
Eat rarely	24 (42.1)	53 (21.8)				
Sweets/Sweets			15.440	7.828	30.454	<0.001
Eat Often	20 (35.1)	217 (89.3)				
Eat rarely	37 (64.9)	26 (10.7)				
Fast foods			1.234	0.680	2.240	0.537
Eat Often	35 (61.4)	161 (66.3)				
Eat rarely	22 (38.6)	82 (34.6)				
Cheese & Nuts			0.475	0.265	0.852	0.015
Eat Often	30 (52.6)	84 (34.6)				
Eat rarely	27 (47.4)	159 (65.4)				
Total	**58 (100)**	**244 (100)**				

Table 5 above shows that there is a significant relationship between the habit of consuming milk and the incidence of caries (p<0.001). The proportion of children who often drink milk to those who have caustics is 86.8%, while the proportion of children who often drink milk to those who do not have caustics is 63.2%. Here is a relationship between soft drinks and crucibles (p=0.015). The proportion of children who often drink soft drinks for those who need it is 79.4%, while the proportion of children who often drink soft drinks for those who do not have cavities is 63.2%. There is a relationship between bolus and caries (p=0.021). The proportion of children who frequently eat cake and those who have cassia is 65.4%, while the proportion of children who eat chocolate to those who do not have cavities is 56.1%. There is a significant relationship between chocolate consumption and the incidence of caries (p<0.001). The proportion of children who frequently eat chocolate for those who have cassia is 74.5%, while the proportion of children who eat chocolate for those who do not have a cause is 42.1%. There is a relationship between ice cream consumption and the incidence of caries (p=0.002). The proportion of children who frequently eat ice cream by those who have cassia is 78.2%, while the proportion of children who eat ice cream for those who do not have cavities is 57.9%.

There is a relationship between spicy sweets and dental caries (p<0.001), with the proportion of children who frequently ate sweets or sweets with caries was 89.3% of children. While children who like to eat sweets or sweets only a small proportion do not experience cavities 35.1%. There is no relationship between fast food and dental caries (p=0.537). The proportion of children who

frequently eat fast food from those who have cavities is 66.3%, while the proportion of children who eat fast food to those who do not have cavities is 61.4%. There is a relationship between cheese and nuts with incidence of calyxes (p=0.015). The proportion of children who frequently eat cheese and nuts for those who have cassia is 34.6%, while the proportion of children who eat fast food for those who do not have caria is 52.6%. Therefore, of all dietary variables, only the results of the bivariate analysis of the variable of variants eaten did not have a relationship with the incidence of caries in children in this study cited by [Tilman CB § Santos J., 2024].

Table 6. Results of the multivariate analysis of cryogenic foods and dental hygiene status with the incidence of caries.

Variables	Adjusted OR	95% CI OR		p-value
		Lower	Superior	
Milk	3.017	1.013	8.987	0.047
Refrigerants	0.959	0.322	2.854	0.940
Cake	1.356	0.745	2.467	0.319
Chocolate	2.722	0.838	8.836	0.096
Ice cream	0.814	0.253	2.618	0.729
Sweets	4.315	1.462	12.738	0.008
Cheese & Nuts	0.357	0.132	0.963	0.042
Dental hygiene status	0.025	0.009	0.070	<0.001

Multivariate analysis is an analysis technique that expands or develops from the bivariate analysis, the objective is to see the relationship between several variables related to the incidence of caries in elementary school children at the Bazartete Administrative Post. The variables included in the multivariate analysis, which had a significant relationship with the incidence of carias in the bivariate analysis, had a p-value of <0.025. In multivariate analysis, the type of test used is logical regression, including the odd ratio value (ORV), 95% confidence interval ORV, and p-value. The above results show that milk has a p-value = 0.047 and a value /3.017, so the probability of caries occurring is 3 times in children who often drink milk when compared to children who rarely drink milk. Another carcinogenic variable is sweetness, where sweets have a p-value = 0.008 and ORV = 4.315, so that the probability of caries occurring is 4 times in children who eat sweets when compared to children who rarely eat sweets or sweets. In other types of carcinogenic foods, cheese and nuts have a p-value = 0.042 and ORV = 0.357, meaning that children who like to eat cheese and nuts are also at risk of developing tooth decay. Dental hygiene status had a p-value <0.001 and a value of 0.025, so it was significant as a factor in the prevention of caries [Tilman CB § Santos J., 2024].

DISCUSSION

There are several types of carcinogenic foods that, if consumed continuously, can cause tooth decay. Carcinogenic foods are soft foods that are easily attached to the teeth so that they quickly damage the teeth. In this study, the common carcinogenic foods commonly drunk or eaten are milk 82.3% and candy or candy 79%. The results of the bivariate analysis show that the type of food that most influences the incidence of caries is milk and sweets, because both have a p-value <0.05 and a MI value > 1. One thousand has an OR value of 3.017 with a CI of 95%, the ORV is between 1.013 – 8.987, meaning that children who drink milk frequently have 3 times the chance of experiencing cavities when compared to primary school children who rarely drink milk. Cindy has an OR value of 4.315 with 95% or between 1.462 – 12.738, so

elementary school children who frequently eat sweets are 4 times more likely to have cavities when compared to elementary school children who rarely eat sweets. This is related to the habits of primary school children to consume sweet, sticky and artificial sweeteners and foods that can increase the chances of dental caries prevalence[13]. The results of the multivariate analysis showed that the OR value < 1 was not statistically significant, although the value was $p < 0.001$ or $p < 0.05$. In this context, dental hygiene is related to the incidence of caries in primary school children in the Bazartete Administrative Post of Liquiçá Timor -Leste. Thus, dental hygiene is also a risk factor for the incidence of cavities.

CONCLUSION

Carcinogenic foods [milk and sweets] have a significant relationship with the incidence of caries in primary school children in Bazartete Liquiçá. In addition, dental hygiene also plays an important role related to the incidence of cavities in primary school children. We suggest improving the food environment in public institutions, particularly in schools, by regulating the sales of foods and beverages rich in free sugars cited by [Tilman CB § Santos J., 2024].

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