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The Correlation Between Dental Caries And Nutritional Status In Children Between The Ages Of Three And Five

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ABSTRACT

Data from the Indonesian Ministry of Health in 2018 indicate that only 7% of children in Indonesia are cavity-free, while a staggering 93% of children under the age of three experience dental caries. The pathological process known as tooth decay is characterized by damage restricted to the hard tissues of the tooth, starting with the enamel and progressing to the dentin. Nutritional status, which can be classified as adequate, inadequate, poor, or stunted, plays a crucial role in the overall health of children, including their oral health. This study aims to investigate the relationship between dental caries levels and nutritional status among preschool children at Aisyiyah Kindergarten/RA Kemantren Tulangan, Sidoarjo. The study employs a cross-sectional methodology and adopts an analytical survey approach. The sample used in this research consists of a total sampling of sixty individuals. The def-t index is utilized as the measuring tool to evaluate the presence of cavities, while the PB/U or TB/U index is used to determine the short nutritional status based on the WHO Anthro 2005 reference standards. Data analysis is conducted using SPSS, where a Chi-square test is performed to ascertain the association between the degree of dental caries in preschool-aged children and their nutritional status. The results of the study are presented in both tabular and narrative forms to provide a comprehensive overview of the relationships identified. This research is expected to contribute to a deeper understanding of the importance of proper dental care and nutrition in promoting the health of young children.
Keywords : *Toddlers, nutritional status, caries*

BACKGROUND

One of the things that might affect a child's growth and development is their oral health, which is a component of their general health (Fahmi., 2021). Concerns about oral health can negatively impact children's enjoyment of life, general physical health, and overall development. Cavities are among the frequent dental and oral health issues that kids face(Asriawal., 2016). Because primary molars differ from permanent teeth in terms of form and morphology, they are more prone to cavities. Because the tongue covers the upper jaw teeth when eating or sucking, they are frequently more susceptible to cavities than the

lower jaw teeth.Ninety percent of toddlers in Indonesia suffer from dental cavities.

The prevalence of active dental caries increased in Indonesia from 53.2% in 2013 to 57.6% in 2018, based on data from the Basic Health Research (2018). The increased use of infant bottles in the first six months following birth is the primary cause of the high risk of dental caries in toddlers. A high degree of cariogenic bacterial activity, inadequate tooth structure, frequent ingestion of sugar, and poor oral hygiene due to children's difficulties brushing their teeth are the main causes of rampant caries in youngsters. Although it can affect the back and lower teeth as well, the upper front teeth are the most prevalent sites for cavities of this kind. Because of their sticky texture, sweet flavour, and eye-catching colours, most kids truly love eating cariogenic foods—even if overindulging in them can lead to dental caries. Furthermore, youngsters frequently forget to clean their teeth because they lack motivation and understanding of the significance of maintaining good dental health (Sunaryati., 2020).

Cavities and diet are connected. Diet, especially carbohydrate consumption, is thought to be a major contributing factor to dental caries. Overconsumption of carbohydrates, such as sucrose, might compromise a person's dental strength and integrity. Saliva has the ability to hydrolyse carbohydrates into substrates that increase bacterial activity (Rahman., 2016). Cariogenic food is sugar that has the potential to cause dental caries. Children are drawn to foods that are high in carbohydrates, such as chocolate, candy, sweet cakes, and the like, because of their appetising appearance and delectable flavour (Wibowo., 2021). Between meals, children frequently eat and drink sticky, sugary foods and beverages. Furthermore, the degree of cariogenicity is also influenced by how frequently cariogenic meals are consumed. Consuming cariogenic foods more frequently causes the mouth's pH to drop, which increases demineralisation and decreases remineralisation.Because early childhood education (ECE) is related to dental and oral health, especially with regard to cavities, study on this topic will be done (Putri., 2017). Since all of the children's primary teeth have typically fully erupted by the time they are three to five years old, this age group is the focus of the study. (Half of twenty gigi).

Dental caries is a prevalent chronic condition among children, characterized by the demineralization of tooth enamel due to the metabolic activities of bacteria, particularly Streptococcus mutans (Ahmad., 2022). This bacterium converts fermentable carbohydrates into acids, leading to the formation of cavities. Dental caries not only causes pain and discomfort but also significantly impacts children's ability to chew food properly, which can hinder their nutritional intake (Athavale *et al*., 2020). As children undergo rapid growth and development during their early years, adequate nutrition is essential for their physical, cognitive, and emotional well-being.

The interplay between oral health and nutrition has garnered increasing attention in recent years, with research indicating that these two aspects of health are closely interconnected (Lee., 2024). Children with dental caries often

experience difficulties in eating, which can result in reduced intake of essential nutrients (Tinanoff., 2020). This situation raises concerns about their overall nutritional status, as deficiencies in key nutrients can adversely affect their growth and development. Conversely, it is also crucial to investigate whether nutritional status influences the prevalence of dental caries, creating a bidirectional relationship that warrants further exploration. Despite the established connections between dental health and nutrition, existing research presents mixed findings regarding the relationship between dental caries and nutritional status (Harding., 2017). Some studies indicate that children with good nutritional status are less likely to develop dental caries, while others suggest that caries can occur regardless of dietary intake. This inconsistency highlights a significant gap in theliterature, as the specific factors contributing to the development of caries in relation to nutritional status remain inadequately understood. This gap in research calls for comprehensive studies to clarify the mechanisms underlying this relationship.

Additionally, various factors such as dietary habits, oral hygiene practices, and parental education significantly influence both dental and nutritional outcomes in children. Parents play a crucial role in shaping their children's dietary choices and establishing healthy oral hygiene practices. However, limited parental knowledge regarding the importance of dental health and its impact on nutrition may contribute to the prevalence of dental caries in young children. Therefore, examining the role of parental education and guidance in promoting healthy living practices becomes essential for addressing the issue of dental caries and improving children's nutritional status.

This study aims to fill the identified research gap by examining the correlation between dental caries and nutritional status among children aged three to five years. By focusing on the prevalence of dental caries and its potential impact on the nutritional well-being of young children, this research seeks to provide valuable insights into the interplay between oral health and nutrition. Understanding this relationship is vital for identifying effective strategies for preventing dental caries and promoting better nutritional practices, ultimately supporting the holistic development of children during this critical stage of life

METHODOLOGY

cross-sectional strategy is used to collect data for this correlational quantitative research method. In order to obtain a sample representative of the entire population, or 74 toddlers, the researcher and the teacher accompany the parents of the pupils as they sign out a consent form. This sampling technique is known as total sampling. The incidence of dental caries in preschool-aged children was then ascertained through a careful inspection of the child's oral cavity. The examination form contains a record of the weight and height measurements.

Data was gathered from the outcomes of the children's deft examination.

The characteristics of respondents in this study on the correlation between dental caries and nutritional status in children aged three to five years involved several important aspects. A total of 74 children were selected from various

settings, such as kindergartens and community health centers. All respondents were within the age range of three to five years, a crucial period for dental development and nutritional needs, where children begin to transition from infancy to preschool age. In addition, the sample included a balanced representation of boys and girls, ensuring that the results of the study were not affected by gender factors.

On the other hand, the diversity of respondents' socioeconomic backgrounds is also a concern, as this may affect their access to dental care, nutrition education and healthy food choices. The level of education of the respondents' parents varies and greatly influences children's health knowledge and behaviors, including oral hygiene practices and dietary choices. In this study, respondents were also categorized based on their dental health history, i.e. children with positive dental caries and those without caries. In addition, respondents' nutritional status was determined through anthropometric measurements, such as height and weight, which included the categories of overnutrition and positive nutrition. By describing these characteristics, this study aims to provide a comprehensive understanding of the respondents, which is important for interpreting the results and research implications regarding the correlation between dental caries and nutritional status in children.

RESULTS AND DISCUSSION

The study's findings indicate that, of the 74 toddlers, some had dental caries, and it was established what these toddlers' nutritional status was. These are the outcomes.

Table 1: Respondent Distribution

Variabel	n	%
Dental Caries		
Positive	61	82,4
Negative	13	17,6
Status Gizi		
Overnutrition	6	8,1
Positive Nutrition	68	91,9
Total	74	100

The data presented in Table 1 indicates that 61 (82.4%) of the preschool-aged children have dental caries, while 68 (91.9%) of the children have good nutritionalstatus. Based on the presented data, there are 74 respondents in this study, categorized into two main variables: dental caries and nutritional status. Out of the total respondents, 61 children (82.4%) have positive dental caries, while 13 children (17.6%) do not have dental caries. This figure indicates that the majority of the children surveyed are experiencing issues related to dental caries, which may be attributed to various factors such as poor oral hygiene, a high-sugar diet, or lack of access to dental care.

On the other hand, regarding nutritional status, the results show that 68 children (91.9%) fall into the category of positive nutrition, while only 6 children (8.1%) experience overnutrition. This suggests that most of the children in this

study have good nutritional status, despite many of them also experiencing dental caries. These findings raise questions about the relationship between nutritional status and the prevalence of caries, given that children with good nutritional status should theoretically be less vulnerable to dental health issues. Overall, this data highlights the need for better interventions in educating about oral hygiene and healthy eating patterns, as well as proper dental care, especially among children who experience caries despite having good nutritional status.

Table 2: Dental Caries and Nutritional Status Relationship Variable Nutritional Status

Variabel	Nutritional Status					*P-Value*
	Overnutrition		Positive Nutrition			
	n	%	n	%		
Dental Caries						
Positive	5	8,2	56	91,8	61	0,952
Negative	1	7,7	12	92,3	13	
Total	6	8,1	68	91,9	74 (100%)	

Table 2 shows that, with 61 children impacted, dental caries was present in the majority of toddlers. Of them, 56 children (91.8%) had enough nutrition, while 5 children (8.2%) were overweight. However, 12 toddlers (92.9%) had a healthy diet and 1 child (7.7%) was overweight, meaning that 13 toddlers did not have dental caries. Following the Chi-Square Test, the research's findings yielded a p-value of 0.952, meaning that the p value was greater than 0.05. According to the results of the statistical test, dental caries and nutritional status in toddlers at Tk Aisyiyah Kemantren Tulangan Sidoarjo do not significantly correlate.

Table 1 shows that 61 children (82.4%) out of the toddler population had dental caries. This is a larger percentage than the 13 children (17.6%) who did not have dental caries. H1 is rejected and H0 is approved. A child's diet, particularly traditional snacks that are hard and can harm teeth, is one of the key variables influencing dental caries in toddlers. This study is consistent with a research by Afrinis (2020), which discovered a relationship between children's diet and the prevalence of dental caries in toddlers—for example, a habit of consuming sticky and sweet foods (Afrinis., 2020). Apart from the food that kids eat, a mother's education also plays a supportive role in determining the likelihood of dental caries developing. This study's reference list of knowledge covers information on dental and oral health, oral hygiene, potential problems that could develop in the mouth or teeth, and when it's best to maintain dental and oral health. In addition to being the person who knows her child the best, a mother has a significant influence over what her child is permitted to eat and is not.

This is consistent with research by Ratih (2021), who found a link between mother awareness and the incidence of dental caries in preschool-aged children using a comprehensive literature review method (Larasati., 2021). Other study, however, indicates that information is not sufficient on its own and that right attitudes and behaviours must accompany knowledge. Parents' knowledge, particularly that of women, does not ensure that their offspring will practise good oral and dental hygiene. Young children in preschool are heavily

reliant on their parents. An individual's attitude can influence their inclination to engage in or refrain from a particular behaviour. If a mother disregards her child's oral and dental hygiene, it can also contribute to the child's dental and oral health issues. Youngsters who have a high cavity rate may be more likely to become stunted. This has something to do with how often infections strike kids. The body may absorb fewer micronutrients as a result of decreased appetite and absorption brought on by infection occurrences. Long-term dental caries is a factor that impairs chewing ability, which influences appetite, digestion, and nutrient intake, all of which have an effect on growth and the nutritional status of children (Article 3). One study by Novia (2019) highlighted a reciprocal association between the occurrence of stunting and the experience of dental caries (Aviva ., 2021).

Table 2 shows that 61 toddlers have dental caries, indicating that most toddlers have dental caries. Of the sixty-one children with dental caries, fifty-six of them (91.8%) eat a healthy diet. In the meantime, 1 child (7.7%) and 12 children (92.9%) with better nutrition are among the 13 toddlers without dental caries. Following the Chi-Square Test, the research's findings yielded a p-value of 0.952, meaning that the p value was greater than 0.05. According to the results of the statistical test, dental caries and nutritional status in toddlers at Tk Aisyiyah Kemantren Tulangan Sidoarjo do not significantly correlate. H1 is rejected and H0 is approved. This is consistent with Ronasari's research, which found no link between nutritional status and dental caries. As a result, parents of young children should place a high priority on selecting sugar-free snacks and giving advice on how to wash their teeth properly.
This study contradicts Safira Fasya's findings, which claim that dental caries results in children's loss of chewing skills and digestive problems, which impedes normal growth. (exaggerated). This study shows that the incidence of stunting is unique in that it is more common in male children and among respondents who had a reasonably high rate of caries (75%). A correlation coefficient of 0.332 in the Spearman correlation test results indicates a positive link, implying a weak relationship between stunting and caries. From this case study, it may be inferred that children's dental health and stunted growth are related (Fasya., 2021).

Children aged three to five years experience significant development in physical and cognitive aspects, thus requiring adequate and balanced nutrition (Bryan *et al*., 2024). However, many children at this age experience dental caries, a common condition largely caused by consumption of high-sugar foods and suboptimal dental care. Bacteria such as *Streptococcus mutans* metabolize carbohydrates from food debris into acids that damage tooth enamel, causing tooth decay (Moye *et al*., 2024). This condition can lead to pain or even infection, reducing appetite and impairing a child's ability to chew food properly. Dental caries in early childhood, with its impact on diet, has the potential to result in a sustained decline in nutritional status (Gussy *et al*., 2020). This phenomenon highlights the importance of a holistic approach in addressing childhood caries, given its impact beyond dental health alone.

This study used a cross-sectional approach to collect data related to caries severity and nutritional status in children, measured through indicators such as weight and height, which were then compared with the corresponding nutritional standards (Rego *et al*., 2020). However, this study also needs to consider other contextual variables that may affect children's nutritional status and dental caries, such as family socio-economic status, parental education level, and access to health services and information on healthy eating. Without taking these factors into account, the results of the study may not accurately understand the complex relationship between nutrition and caries (Brathall *et al*., 2020). If a significant correlation is found, these findings may encourage more targeted health programs at posyandu and puskesmas, emphasizing the importance of thorough education for parents on healthy eating and good dental care (Friska *et al*., 2022). Integrated educational measures and broader and sustained prevention efforts are needed to support children in achieving optimal dental health and nutritional status, especially in the context of families who may experience limited access to information and health facilities.

CONCLUSION

The way children chew their food plays a significant role in their nutritional status, especially in the context of dental caries. When children experience dental caries, they often face challenges in effectively chewing their food due to pain or discomfort associated with the condition. This can lead to decreased food intake, particularly of harder or more nutritious foods, which are essential for their growth and development. Consequently, the compromised ability to chew can result in nutritional deficiencies, further impacting their overall health and well-being. The study's findings indicate that there is no direct connection between dietary status and the frequency of dental caries. This suggests that while nutritional deficiencies can arise from the difficulties in chewing caused by caries, the prevalence of caries itself may not be solely influenced by dietary habits. Instead, dental caries is influenced by a complex interplay of factors, one of which is parental education.

Parents play a crucial role in instilling healthy living practices in their children, including proper oral hygiene and dietary choices. When parents are knowledgeable about dental health and nutrition, they are more likely to guide their children in maintaining good oral hygiene practices, such as regular brushing, flossing, and visiting the dentist, as well as encouraging a balanced diet rich in fruits, vegetables, and whole grains. This highlights the importance of educating parents not only about nutrition but also about the significance of oral health in preventing dental caries and ensuring their children's overall well-being. By fostering a supportive environment at home that prioritizes both nutrition and dental health, families can help mitigate the risks associated with dental caries and promote better health outcomes for their children.

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