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THE EFFECT OF STUNTING ON TOOTH ERUPTION AND CARIES STATUS IN CHILDREN AGED 1-3 YEARS (STUDY IN JERUKSARI VILLAGE, TIRTO DISTRICT, PEKALONGAN REGENCY)

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ABSTRACT

Stunting is a condition of chronic malnutrition. Slow growth in stunted children not only affects height but also affects tooth growth and susceptibility to caries. The aim of this study was to analyze the effect of stunting on tooth eruption and caries status in children aged 1-3 years. This type of research in analytical observational with a cross sectional approach design. The research subjects were stunted children aged 1-3 years. There were 50 children divided into 2 age groups 1-2 years and 2-3 years. Tooth eruption is calculated from the number of teeth that have erupted. The caries status parameters are the def-t index according to WHO (1997) and the caries severity level according to Shimono. Research data was tested using the Mann Whitney Test. Resulted showed that :1) Tooth eruption in stunted children aged 1-3 years was 12.36 + 5.36 less than in non-stunted children 15.54 + 4.02 and showed a significant difference (p<0,005). 2) Caries index (def-t) in stunted children aged 1-3 years 3.04 + 2.84 higher than the caries index (def-t) in non-stunted children 3.10 + 3.40 aged 1-3 years and shows no significant difference (p> 0.05). 3) The severity of caries in stunted children aged 1-3 years was 33.03 + 10.17 higher than the severity of caries in non-stunted children aged 1-3 years 28.62 + 4.49 and showed a significant difference (p<0,05).

Keywords: *stunting, tooth eruption, caries index (def-t), caries severit*

INTRODUCTION

The incidence of stunting in children under five requires special attention because it is associated with the risk of decreasing children's intellectual abilities, productivity and also an increased risk of degenerative diseases in the future (Caulfield et al., 2006), The overall health of the child's body is also affected by dental caries, especially impaired chewing function which causes problems in absorption and digestion of food. Dental caries can interfere with a child's health and cause malnutrition. Long-lasting malnutrition leads to stunting and children who are too short for their age (Hlaing et al., 2016).

Parents often assume that stunting is normal and believe that children will develop according to their age. If stunting is not detected early, children will have difficulty obtaining necessary nutrition (Fitri, 2018). Nutritional factors are one of the indirect factors that influence the eruption of desidui teeth (Dale & Dale, 2005). The study of Prasetyowati (2020), found that in children with poor nutritional status, the growth of permanent teeth was slower than in children who had good nutritional status. Children and toddlers with stunting show stunted bone growth. Tooth eruption is closely related to bone growth. The process of tooth eruption involves the process of maturation and the ability of periodontal bone to support the existence of the tooth. Stunting can result in impaired tooth maturation, impaired enamel development and delayed eruption (Abdat, 2019).

In addition to tooth eruption disorders, stunted children are susceptible to caries. The etiology of caries is multifactorial, namely host, agent, substrate and time. The structure of the

enamel layer on the teeth as a host becomes a factor that determines resistance to caries. One of the effects of malnutrition is seen in the growth of tooth structure development (Marshall et al., 2003). One of the important components in the growth and development of teeth is a mineral that serves to increase the hardness of enamel and dentin structures. This situation depends on the levels of minerals namely calcium, phosphorus, magnesium and fluorine (Almatsier, 2011).

Research by Rahman et al. (2016) in Banjar Regency states that the def-t index in stunted children is significantly higher than children who are not stunted. The results of research by Delgado-Angulo et al. (2013) in Peru conducted for 3.5 years showed that stunted children experienced a high increase in the number of caries compared to children who were not stunted.

Children aged 1-5 years are included in the group of people who are vulnerable to malnutrition. The growth and development of desidui teeth need attention early because they have an important role in mastication, the development of speech, and to provide a place for eruption of permanent teeth (Casamassimo et al., 2012). The effects of stunting related to the oral cavity among others affect the time of eruption, salivary gland atrophy, salivary flow and increase the risk of dental caries (Abdat, 2019).

The local government of Pekalongan Regency strives to reduce the incidence of stunting. The health resources involved consist of village midwives, puskesmas midwives, puskesmas doctors, nutrition officers and health promotion. The number of villages in the Pekalongan Regency consists of 285 villages and 39 of them are still found stunting cases, one of which is the locus of stunting is Jeruksari village located in Tirto District. The village is located around the north coast and most of the livelihoods of its residents are fishermen. So far, the focus on overcoming stunting is still on general health, while attention to the oral cavity has never been carried out. Based on the description above, researchers are interested in conducting research on the effect of stunting in children aged 1-3 years on tooth eruption and caries status

METHOD

This type of research is analytical observation research with Cross Sectional design. The subjects of the study were all stunted children aged 1-3 years who had KMS books and since birth in Jeruksari Village, Tirto District, who met the inclusion criteria. The number of stunted children is 50 children divided into two age groups of 1-2 years and 2-3 years. As a control are children who are not stunted by the same amount. The data analyzed were tooth eruption and caries status and normality tests were carried out with the Saphiro Wilk Test because the number of subjects in each age group was less than 50. Data on the number of tooth eruptions and caries status were analyzed using the non-parametric Mann Whitney statistical test because the data were abnormal.

Parameters of stunting and non-stunting children using the WHO Growth Chart. Tooth eruption examination is calculated clinically from the number of teeth that have erupted. Caries status uses the parameters of the caries def-t index according to WHO (1997) and the severity of caries is measured according to Shimono (Shimono, 1976 sit Oyunsetseg, 2004).

RESULTS AND DISCUSSION

Research has been conducted on the effect of stunting on tooth eruption and caries status in children aged 1-3 years in Jeruksari Village, Tirto District, Pekalongan Regency. The number

of research subjects was 50 children, divided into 2 groups, namely ages 1-2 years as many as 26 children and ages 2-3 years as many as 24 children.

Table 1. Average and standard deviation of the number of tooth eruptions by stunting group and age and probability values of the Mann Whitney Test

Age group	Number of subjects (n)	Number of tooth eruptions		Probability value (p)
		Stunted children	*Children are not stunted*	
		X + SD	X + SD	
1-3 years	50	12.36 ± 5.26	15.54 ± 4.02	0.001*
1-2 years	26	9.04 ± 3.75	12.26 ± 2.96	0,002*
2-3 years	24	15.59 ± 3.79	6:96 PM ± 1.61 PM	0.001*

Table 1. shows that the number of tooth eruptions in stunted children aged 1-3 years, ages 1-2 and ages 2-3 years is less than the number of tooth eruptions in non-stunted children aged 1-3 years, ages 1-2 years and ages 2-3 years. To determine the level of significance of the difference in the number of eruptive teeth of stunted and non-stunted children, the Mann Whitney Test was carried out, because based on the Shapiro Wilk Test the distribution of data was abnormal. The results of the Mann Whitney Test showed a significant difference between the number of dental eruptions of stunted and non-stunted children, both in the age group of 1-3 years, ages 1-2 years and ages 2-3 years ($p < 0.05$). The results of the caries index (def-t) study are presented in Table 2.

Table 2. Average and standard deviation of caries index (def-t) by stunting group and age and probability value of Mann Whitney Test

Age group	Number of subjects (n)	Indeks karies (def-t)		Probability value (p)
		Stunted children	*Children are not stunted*	
		X + SD	X + SD	
1-3 years	50	3,04 ± 2,84	3,10 ± 3,40	0,772
1-2 years	26	1.81 ± 2.27	2.33 ± 3.34	0,954
2-3 years	24	4.77 ± 2.91	3.61 ± 3.39	0,082

Table 2. Shows the caries index (def-t) in stunted children aged 1-3 years, aged 1-2 years is lower than the caries index of non-stunted children. The caries index (def-t) of stunted children aged 2-3 years is higher than that of non-stunted children. To determine the level of significance of the difference in caries index (def-t) of stunted and non-stunted children, the Mann Whitney Test was carried out, because based on the Shapiro Wilk Test the distribution of data was abnormal. The results of the Mann Whitney Test showed a significant difference between the dental caries index of stunted and non-stunted children, both in the age group of 1-3 years, ages 1-2 years and ages 2-3 years ($p > 0.05$). The severity of caries is shown in Table 3.

Table 3. Average and standard deviation of caries severity by stunting group and age and probability value of the Mann Whitney Test

	Severity

Age group	Number of samples (n)	Caries (%)		Probability value (p)
		Stunted children	*Children are not stunted*	
		X + SD	X + SD	
1-3 years	50	33.03 ± 10.17	28.62 ± 4.49	0,004*
1-2 years	26	28.72 ± 8.09	27.73 ± 4.69	0,295
2-3 years	24	37.71 ± 11.31	29.61 ± 4.24	0,003*

Table 3 shows that the severity of caries in stunted children aged 1-3 years, 1-2 years and ages 2-3 years is higher than the severity of caries in non-stunted children aged 1-3 years, 1-2 years and ages 2-3 years. To determine the level of significance of the difference in the severity of caries of stunting and non-stunting children, the Mann Whitney Test was carried out, because based on the Shapiro Wilk Test the distribution of data is abnormal. The results of the Mann Whitney Test showed an insignificant difference between the severity of caries in stunted and non-stunted children, in the age group of 1-2 years ($p > 0.05$). The results of the Mann Whitney Test showed a significant difference between the severity of caries in stunted and non-stunted children, in the age group of 1-3 years and ages 2-3 years ($p < 0.05$).

Discussion

The results showed that the number of eruptive teeth in stunted children aged 1-3 years was less than the number of eruptive teeth in non-stunted children. The number of eruptive teeth in stunted children aged 1-2 years and aged 2-3 years is also less than the number of eruptive teeth in non-stunted children aged 1-2 years and aged 2-3 years. This shows that there is a nutritional influence on tooth maturation so that it affects the time of eruption teeth. According to Dale & Dale (2005), one of the indirect factors affecting eruptions is nutrition.

Protein has a distinctive function, namely building and maintaining cells and body tissues. Animal foods are good sources of protein, such as eggs, milk, meat, poultry, fish and shellfish. Vegetable protein is soybeans and the results are tempeh, tofu and beans. The nutrient carried by protein is calcium which functions in the formation of bones and teeth (Almatsier, 2011). During growth, bone mineralization is very high; low calcium intake can result in low mineralization of the matrix of new bone deposits and osteoblast dysfunction. Malnutrition has been shown to affect bone and tooth development maturity (Marshall et al., 2003).

The results showed no significant difference between the caries index (def-t) between stunted and non-stunted children. The caries index (def-t) in stunted children aged 1-2 years is lower than the caries index (def-t) of non-stunted children aged 1-2 years. The lower caries index (def-t) is caused by the late eruption of teeth of stunted children aged 1-2 years, so the level of caries experience is also less. Some stunted children do not have teeth by the age of 14 months and some have difficulty walking. The results showed no difference in caries index between stunted and non-stunted children, both aged 1-3 years, ages 1-2 years and 2-3 years because in this study the data was only the number of d, e, f so that the percentage was not visible.

The caries index (def-t) in stunted children aged 1-3 years and aged 2-3 years is higher than the caries index (def-t) of non-stunted children aged 1-3 years and aged 2-3 years although it is not significantly different. Children aged 1-3 years who were the subjects of this study were

born during the pandemic in 2019 and had never had their teeth checked at the health center. Parents also think that teeth as children will change. Children with low socioeconomic status are more likely to develop caries and cannot afford dental services or rarely go to the dentist. The prevalence of untreated caries in children aged 1-5 years with low socioeconomic status tends to be high. Children with low socioeconomic status with low maternal education levels and low family income rarely see a dentist. Behavioral habits in childhood begin at home, especially mothers who have an important role in children's dental and oral health behavior. Parents' low knowledge of maintaining oral dental hygiene affects their dental and oral health and quality of life (WHO, 2016). Some parents are also embarrassed if referred to the puskesmas because of stunting, they assume there is no problem with the child's health.

The severity of caries in stunted children aged 1-2 years is higher than the severity of caries in non-stunted children aged 1-2 years, but does not show a significant difference. Almost the same as the discussion of the def-t caries index which is also meaningless, there is no difference in the severity of caries of stunted children aged 1-2 years with non-stunted children. The number of tooth eruptions in children 1-2 years is still small so the severity of caries is also low. Food selection and healthy living behaviors cause children to be malnourished. One of the effects of malnutrition is seen in the growth of tooth structure development (Almatsier, 2011). Malnutrition can affect the body's ability to maintain homeostasis, not just sugar that causes cavities. Consumption of adequate amounts of calcium must be balanced with consumption of Vitamin D, because the body needs Vitamin D to be able to absorb calcium (Shrestha & Acharya, 2020).

The severity of caries in stunted children aged 1-3 years and aged 2-3 years is higher than the severity of dental caries in non-stunted children aged 1-3 years, aged 2-3 years and differs significantly. Malnutrition impacts dental development, especially enamel, dental, soft tissue integrity and salivary composition (Shrestha & Acharya, 2020). Dental caries is a chronic disease that is influenced by four factors, namely host factors, agents or microorganisms, substrate and time. Caries will become more severe if there is no treatment. Caries in stunted children tends to be more severe, due to the decreased rate of saliva. This is due to lack of masticatory activity (Rahman et al., 2016). If at an early age the child has experienced caries, then the consumption of protein sources, especially meat, becomes low. Research by Setiawan B. (2003), showed a decrease in chewing ability in children who had caries. The part of the teeth that serves to cut and grind food is reduced. Children who experience caries will choose food according to their chewing strength, so they cannot consume a variety of foods.

Families with low socioeconomic status are associated with purchasing power to the type of food, they tend to choose foods with low nutritional value, energy customs such as carbohydrates. Carbohydrates are a cheaper, filling source of energy and lower diet quality. Low-income households are less likely to buy fruit and vegetable supplements, as they perceive them as expensive (Frazão et al., 2007). The location in this study has high protein resources such as fish and milkfish. Fish are abundant in this location, not so daily food because it is sold as a source of livelihood. Some parents also consider that if you eat fish, the child becomes worms. Abstinence based on belief, generally contains advice that is considered good or bad which is increasingly becoming a habit.

Future research is expected to provide a better picture and other factors that influence the incidence of stunting in this area. The condition of stunting and caries is chronic, so long-term

research is needed to examine the relationship between stunting and caries. The results of this study show that the situation of people who do not understand the importance of desidui teeth. Dental care is still not part of the habit of life

CONCLUSION

Based on the results of the study, the following conclusions can be drawn: The number of tooth eruptions in the group of stunted children aged 1-3 years is less than the number of eruptive teeth of non-stunted children. There is no difference in caries index (def-t) between stunted and non-stunted children aged 1-3 years. The severity of caries of stunted children is higher than the severity of caries of non-stunted children aged 1-3 years.

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