The Effect of Saliva Zink Levels with Nutrition Status

By Mohammad Zulkarnain

The Effect of Saliva Zink Levels with Nutrition Status of Elementary School Children in Air Beliti Puskesmas Year 2021

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Abstract

Malnutrition in children is a very important problem because it has a direct impact on the growth and development of children. The most influential factor on nutrition is diet. Malnutrition in children can lead to micronutrient deficiencies, especially zinc and iron. The prevalence of stunting in children under five in Indonesia has decreased but is still above the stunting threshold set by the world at 20%. The purpose of this study was to examine the relationship between salivary zinc and iron levels with the nutritional status of elementary school children in the Air Beliti Health Center work area. Methods: Laboratory observational study. The study was conducted on 76 respondents who met the inclusion criteria. The measuring instruments used in the research are observation sheets, and laboratory examinations with data analysis using Univariate, Bivariate, and Multivariate. The study was conducted in March 2021. Results: The research showed that there was an effect of salivary zinc examination on the nutritional status of elementary school children (p value = 0.002). Conclusions and Suggestions: Based on the results above, it was concluded that there is an effect of salivary zinc examination in examining the nutritional status of elementary school children, from the above findings, there are more efforts to produce accurate data on the nutritional status of school children, so that zinc deficiency problems occur can be controlled.

I. Introduction

School children often experience various health problems and nutritional problems such as malnutrition. Nutritional problems or malnutrition are closely related to children's diet. One of the nutritional problems experienced by school children is stunting (Purnamasari, 2018). According to data from the United Nations Children's Fund (UNICEF, 2019). in 2018, almost 3 in 10 children under five were stunted or short and very short for their age, while 1 in 10 children were underweight or too thin. One-fifth of primary school-age children are overweight or obese, and millions of Indonesian children still suffer from high stunting, experiencing a 'double burden' due to malnutrition. The double burden of malnutrition is a serious problem in Indonesia. This is a big challenge, because as many as 12% of children in Indonesia under the age of 5 years are stunted and (UNICEF, 2017).

The World Health Organization (WHO) stunting is above the stunting threshold set by WHO, which is 20%. Meanwhile, the prevalence of stunting in children under five in Indonesia reached 43.8%. Indonesia is the second largest country with high stunting cases.

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Based on nutritional status records (PSG) in 2017, stunting children under five were recorded at 26.6%, 9.8% for very short children under five, and 19.8% in the short category (WHO, 2019). Riskesdas 2018 data shows that the prevalence of stunting in children under five in Indonesia is 30.8%. However, when compared with the results of the 2013 Riskesdas, it decreased, stunting in 2013 was recorded at 37.2%. Meanwhile, in South Sumatra Province, the prevalence of stunting in children under five in 2018 was 36.7% (Riskesdas 2018). Most students bring food to school, but the provisions do not meet the balanced nutrition of students, there are still many students who do not add vegetables and fruit in them lunch. Besides carrying supplies, they also buy a snack in cafetaria. Researchers looked snacks in schools does not meet the nutritional balance, due to the low in vitamins and minerals in these snacks, only high in carbohydrates and fats such as meatball skewers, pop noodles, fried noodles, light snacks, and milk cans. (Adinda, D. 2019)

This is compared to the results of Riskesdas in 2013 which also decreased, in 2013 stunting in South Sumatra was recorded at 32.0%. Despite the decline, the prevalence of stunting is still high when compared to the WHO standard, which is <20% (Dinkes Sumatera Selatan, 2020). Zinc is an important mineral for humans. This mineral is the second most abundant mineral after iron in the human body. Zinc deficiency can also lead to failure to thrive, decreased appetite, and slow wound healing. Giving zinc supplements can improve growth in children. Zinc supplementation has a positive response to weight and height gain, and is able to increase linear growth in stunted children (Ayuningtyas et al., 2018). Iron (Fe) is a mineral that plays an important role in the human body. In the human body there are about 4 grams of iron, three quarters of the iron associated with protein and the formation of hemoglobin. Deficiency of iron (Fe) is a micronutrient that is very common in the world, which has an impact on impaired growth and cognitive development (Ghazian et al., 2016). Therefore, zinc and iron (Fe) are needed by children as nutrients that help increase growth and cognitive development in children.

Research conducted by (Bening et al., 2017) states that the incidence of stunting in children aged 2-5 years is more common in families with high socioeconomic status. This is due to the low level of adequacy of iron, zinc and food consumption so that they are at risk of experiencing stunting. Research conducted by (Mamiro et al., 2005) also stated that children with stunting had an average zinc concentration of 10.0 ± 6.2 g/g and had an iron deficiency of 76%. Iron deficiency is a strong predictor of anemia in children aged 12-23 months, so iron deficiency can affect the growth, development, cognitive abilities and immune system of children. Research conducted (Jagannathan et al., 2012) who examined salivary ferritin levels stated that salivary ferritin was found to be significantly higher in iron-deficient subjects compared to controls. Research conducted by (Widita et al., 2017). Stated that salivary zinc levels were correlated with the nutritional status of children (r=0.410, p=0.000). According to (Maharani & Kusumastuti, 2017)

Zinc in saliva is not only a regulator of appetite, but can also regulate body weight, especially in the nutritional status of children and toddlers. Musi Rawas Regency in 2019 was 1.09% for malnourished children, 9.33% for children affected by malnutrition, while 10.42% for children with severe malnutrition and malnutrition. Data from community-based nutrition records and reports (e-PPBGM) in 2019, regarding the nutritional status of toddlers in 19 Musi Rawas District Health Centers, from the number of toddlers as many as 2003 toddlers, 321 toddlers (0.16%) and short of 819 children under five (0.40%). At the Air Beliti Health Center there are 115 toddlers (0.05%) who are stunted (Musi Rawas Health Office, 2020). Musi Rawas Regency was once one of the areas experiencing food insecurity, and also included the last locus of stunting in South Sumatra Province in 2018. Therefore, it is necessary to conduct further research to analyze the relationship between zinc and iron levels

with the nutritional status of elementary school children. in Musi Rawas Regency. However, not all research subjects are willing to have blood drawn, especially for schoolchildren research subjects. Therefore, the use of saliva can be used as an alternative examination to determine the levels of micronutrients in the body.

II. Research Methods

This research is quantitative with analytical survey method with cross sectional design of laboratory observational study. The location of the research is the elementary school working area of Air Beliti Health Center. The population in this study was elementary school children in the working area of the Air Beliti Health Center. The sample in this study were elementary school children in Air Beliti District in Musi Rawas Regency as long as they met the inclusion criteria and passed the exclusion criteria. The sampling technique used was purposive sampling in the selection of schools and random sampling in the sampling of elementary school children who were adjusted to the inclusion and exclusion criteria, with a total sample of 76 people. By using a questionnaire and laboratory tests (Elisa) and measurements of height, weight (Anthropometry). Collection/research stage how to collect data using questionnaires and laboratory examinations, as well as measuring height, weight using the anthropometric method. Data analysis with Univariate, Bivariate, Multivariate.

III. Results and Discussion

3.1 Univariate Analysis

Table 1. Frequency Distribution of School Children Characteristics

No	Variable	N	%
1.	**Age**		
	a. 9-11 Year	53	69,8
	b. 12-14 Year	23	30,2
2.	**Gender**		
	a. Man	36	47,4
	b. Woman	40	52,6
3.	**Father's Education**		
	a. Low	51	67,1
	b. Tall	25	32,9
4.	**Mother's Education**		
	a. Low	51	63,2
	b. Tall	28	36,8
5.	**Father's occupation**		
	a. Farmer	40	52,6
	b. Not a Farmer	36	47,2
6.	**Mother's Job**		
	a. Does not work	8	10,5
	b. Work	68	89,4
7.	**Parents' Income**a.		
	a. Low	25	32,9
	b. Tall	51	67,1
8.	**Nutritional status**		
	a. Stunting	35	46,1
	b. No Stunting	41	53,9

In Table 1. The results show that most of the respondents aged 9-12 years were 53 (69.8%), female sex was 40 (52.6%), father's education was low at 51 (67.1%), mother's education was low low of 51 (63.2%). For the work of farmer fathers by 40 (52.6%), working mothers by 68 (89.4%) and high parental income by 51 (67.1%) and abnormal nutritional status by 41 (53.9%) .

3.2 Bivariate Analysis

Table. 2 Differences in zinc and Fe Saliva examination in elementary school children

Group	N	Mean-Sum Rank	p value
Zink Saliva	76	2.2192	0,002

In table 2. The p value of 0.002 is obtained, it can be concluded that there is a significant difference between the salivary zinc examination and the nutritional status of elementary school children.

3.3. Multivariate Analysis

Tabel 3. Anlsisi Mutivariat mentode regeresi logistic

Independent variable	B	p	OR	95%CI	
Age	.071	.799	1.074	.653	1.764
Gender	1.886	.060	6.593	.927	46.888
father's education	.017	.958	1.017	.545	1.897
Mother's Education	-.043	.885	.958	.537	1.708
Parents' income	-.085	.904	.918	.228	3.690
Znsaliva	.832	.014	2.298	1.179	4.477
Constant	-6.406				

In Table 3. Binary logistic regression shows the absence of the most influential variable on nutritional status.

Based on the results of the study, most of the respondents aged 9-12 years were 53 (69.8%), female sex was 40 (52.6%), father's education was low at 51 (67.1%), mother's education was low of 51 (63.2%). For the work of farmer fathers by 40 (52.6%), working mothers by 68 (89.4%) and high parental income by 51 (67.1%) and abnormal nutritional status by 41 (53.9%). The results of the analysis showed that there were differences in the results of zinc saliva on the nutritional status of elementary school children. For multivariate results that there is no dominant factor from the independent variables tested. (Kotian & Gurunathan, 2021). Malnutrition is a common risk factor that causes infectious diseases. Dental and oral problems in preschool children will affect saliva, the results of the examination obtained that the incidence of stunting is 13.5% (Vieira et al., 2020). This research is not in line with the research conducted (Yani et al., 2020). That there is no significant difference between malnutrition and the child's age after salivary flow examination. Malnutrition that occurs has a negative effect so that there is an increase in malnutrition in children.

Saliva is one of the components of bio-fluid containing various important components that have been successfully used for health research, one of which is the examination of nutritional status in the body. It was found that there was a positive correlation between the levels of firitin and saliva (p=0.004). Research explains that early caries disorders in children affect salivation, thereby increasing the risk of anemia related to iron deficiency in children (Hashemi et al., 2018).

Research conducted (Gibson et al., 2007) states that, the low socioeconomic status of households is at risk of having stunting children by 80% so that it affects children's nutrition. Based on Sibarani (2019), the results showed that there was a relationship between zinc and iron intake with the incidence of stunting in elementary school children, p value of 0.016. According to research (Damayanti, R.A, Muniroh, L, 2016) that with a lack of appetite and low intake of nutrients, especially zinc and iron, it can cause a lack of energy in children so that it affects the nutritional status of children.

IV. Conclusion

From the results above, it can be concluded that most of the respondents are aged 9-12 years 53 (69.8%), female sex is 40 (52.6%), father's education is low at 51 (67.1%), mother's education is low of 51 (63.2%). For the work of farmer fathers by 40 (52.6%), working mothers by 68 (89.4%) and high parental income by 51 (67.1%) and abnormal nutritional status by 41 (53.9%) . The results of the analysis showed that there were differences in the results of zinc saliva on the nutritional status of elementary school children. For multivariate results that there is no dominant factor from the independent variables tested.

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