The Analysis on Protein Energy Supply Concerning Stunting Incidents in Young Children Under Five Year Old at Primary Care Unit of Tanah Kali Kedinding Surabaya

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Abstract: The most common problem infectious diseases that can reduce energy and protein intake and could impact on stunting on toddlers. The highest prevalence of stunting among children under five in Surabaya City in 2016 is found at Tanah Kali Kedinding Primary Care Unit. The purpose of this study is to analyze the intake of protein energy to stunting events in toddlers. The design is cross-sectional approach with simple random sampling. The sample size is 71 children. The study population was Toddlers aged 2-5 years who are stunted. Independent variables are the status of infectious diseases (diarrhea and RTI), economic status, energy and protein intake . The dependent variable was the incidence of stunting. Microtoise and questionnaire used to measure the variables with multinomial logit approach. The results showed that there was a significant relationship between energy intake and incidence of stunting in toddlers with p = 0.001 and there was a significant correlation between protein intake with the incidence of stunting in under five years, with p-value = 0.006. The primary prevention of stunting events is prenatal and postnatal maternal and infant interventions in the first 1000th days of life by meeting protein energy requirements.

1 BACKGROUND

Infancy is an important period in the process of human growth and development. Growth and development in this age occurs in a rapid period and will never be repeated, because it is often called the golden age, but is in this period when they are susceptible to a disease which affects the nutritional status of their future. A common problem these days is that the emergence of infectious diseases can reduce the intake of toddlers, by consequent it will have an impact, one of them is stunting(Soetjiningsih, 2013). Observations and interviews with health workers in Primary Care Unit of Tanah Kali Kedinding Surabaya, the incidence of stunting were higher in the PHC; the main cause is that the education factor is low (60% majority of junior), odd jobs such as street vendors and daily workers whose Minimum Wage income is far from the other people, only about 500 thousand to 1 million per month. Many mothers also work to supplement the family income, so it affects the feeding, nutrition, and parenting / childcare.

Basic Health Research noted that the national prevalence of stunting was 37.2%, showing an increase compared to 2010 (35.6%) and 2007 (36.8%), which is composed of 18.0%, is very short and 19.2 % short, which means there has been an increase of 1.6%. The prevalence of stunting (height / Age) is higher than the prevalence of underweight or malnutrition (W / A) (19.6%) and the prevalence of wasting or underweight (weight / height) (5.3%) among children under five in Indonesia(Kemenkes RI, 2013). One of the three health centers which have the highest prevalence of stunting in Surabaya is Primary Care Unit of Tanah Kali Kedinding Surabaya equating to 25.37%. In 2013, the prevalence of stunting in Primary Care Unit of Tanah Kali Kedinding reached 21.86% and increased in 2014 to 22.69%, and increased again in 2015 to reach 23.63%. The latest data in 2016, shows that the prevalence of stunting in the health center reached 25.37%. Low energy intake on the incidence of children at risk of stunting 2.52 times higher compared to the good or normal energy intake. While the protein intake of <80%. Nutritional Adequacy Rate (AKG) is at risk of stunting 6.4

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times higher than in children with ≥80% protein consumption. LBW children who experience indigestion because the gastrointestinal tract is not functioning properly,(Trihono et al, 2015) , WHO set of interventions that can be used to combat stunting is prenatal and postnatal intervention. Mothers play an important role in supporting efforts to address nutritional issues, especially in the family nutritional intake, ranging from food preparation, selection of groceries, to the food menu. One of the important programs that should be done by health workers is Maternal & Child Health Centre. Health workers should form a cadre of the best goal for the implementation of education to mothers with young children effectively and height measurements reported by appropriate age. The most important education was exclusively breastfed until 6 months of age, and from the age of 6 months, in addition to breastfeeding infants should also be given a Complementary feeding (MP-ASI) and continued breastfeeding until the baby is 2 years old or more.

The purpose of this study is to analyze the intake of protein energy to stunting events in toddlers in the area of the Tanah Kali Kedinding Surabaya Primary Care Unit

2 METHODS

This study was design utilizes observational analysis with cross-sectional approach. The study population was Toddlers aged 2-5 years who are stunted at Primary Care Unit of Tanah Kali Kedinding Surabaya. Probability Sampling with Simple Random Sampling. The sample size in this study was 71 respondents. Independent variables in this study the status of infectious diseases (diarrhea and RTI), economic status, energy and protein intake. The dependent variable in this study was the incidence of stunting. For this study is utilize dan microtoise instrument used to measure the height of a toddler with a precision of 0.1 cm and questionnaires in research Arini Diyah on the Relationship between breastfeeding patterns with the frequency of diarrhea and acute respiratory infection in children 6-12 months of Primary Care Unit at Balongpangganng Gresik(Arini Diyah, 2011), to determine the status of infectious disease that affects children under five as well as a food frequency questionnaire / FFQ semiquantitative, food intake Furthermore, the data were processed using software. The researchers began collecting data after obtaining informed consent from the parents with stunting toddler. the researchers measured the height of the child and provided a questionnaire about the factors that influence stunting. The questionnaire did not name each of the toddlers but was given a code to keep confidentiality. The analysis of data was multinomial logit approach.

3 RESULTS

3.1. General Data

Table 1: Distribution of respondents by age of the children, the father's height, mother's height, and length of infants born at Primary Care Unit of Tanah Kali Kedinding Surabaya

Characteristics of Respondents	Frequency (f)	Percentage (%)
Age Toddler		
2-3 years	31	43.7
3-4 years	25	35.2
4-5 years	15	21.1
Height Dad		
≤ 150 cm	5	7.0
151-160 cm	25	35.2
161-170 cm	31	43.7
> 170 cm	10	14.1
Height Mrs.		
≤ 150 cm	26	36.6
151-160 cm	37	52.1
161-170 cm	8	11.3
> 170 cm	0	0
The number of infants in the family		
<2	37	52.1
≥ 2	34	47.9
The number of children dependent parent		
1 person	17	23.9
2 persons	40	56.3
≥ 3	14	19.7
Born Body Length		
≤ 45 cm	6	8.5
46-50 cm	49	69.0
51-55 cm	16	22.5
> 55 cm	0	0

3.2 Custom Data

Table 2: Distribution of respondent toddler based on primary care unit of Tanah Kali Kedinding Surabaya

Height	Frequency (f)	Percentage (%)
Stunting	57	19.7
Severe stunting	14	80.3
amount	71	100

Table 3: Distribution of respondents by status of infectious diseases at primary care unit of Tanah Kali Kedinding Surabaya

Infectious Disease Status	Frequency (f)	Percentage (%)
There is	50	70.4
No	21	29.6
amount	71	100

Table 4: Distribution of respondents by economic status in primary care unit of Tanah Kali Kedinding Surabaya

Family Economic Status	Frequency (f)	Percentage (%)
Low	50	70.4
secondary	20	28.2
High	1	1.4
amount	71	100

Table 5: Distribution of respondents by energy intake in primary care unit of Tanah Kali Kedinding Surabaya

Energy intake	Frequency (f)	Percentage (%)
Low	44	62.0
Enough	27	38.0
amount	71	100

Table 6: Distribution of respondents by protein intake on primary care unit of Tanah Kali Kedinding Surabaya

Protein intake	Frequency (f)	Percentage (%)
Low	43	60.6
Enough	28	39.4
amount	71	100

Table 7: Distribution of respondents by measurement results based on the factors that influence the incidence of stunting in primary care unit of Tanah Kali Kedinding Surabaya

Variables	*Score*	*Sign*
Status of infectious diseases	7.324	0.007
Family Economic Status	6,918	0.009
Energy intake	10.701	0,001
Protein intake	7.614	0,006

Table 8: Distribution of respondents by measurement results based on the factors that most influence the incidence of stunting in primary care unit of Tanah Kali Kedinding Surabaya

Dependent Variable	Independent Variable	*p value*	*Exp (B)*	*95% CI*	
				Lower	*Upper*
Stun-ting	Status of infectious diseases	0.998	3x 108	0,001	
	Family Economic Status	0.998	6x 107	0,001	
	Energy intake	0.998	3x 108	0,001	
	Protein intake	.120	65x 102	.613	68. 95

The results of the multinomial logit analysis conducted last modelling results can be inferred from the 4 factors that affected to the incidence of stunting in Primary Care Unit of Tanah Kali Kedinding Surabaya. protein obtained showed the p-value = 0.12 with OR 65x102 means of protein intake in infants have risk factors for 65x102 times higher than any other factor.

4 DISCUSSION

There is a significant association between infectious disease status in this regarding the incidence of diarrhea and acute respiratory infection in infants. This can be seen from the value of p = 0.007 (p <0.05). The results showed that 36 toddlers and 14 toddlers severe stunting have ever experienced infectious diseases (diarrhea or RTI) in the past year. Infectious diseases is one of the direct causes of infant nutritional status in addition to the consumption of food.

Children who do not consume the nutrients needed by the body will result in a low immunity, so

susceptible to disease infection, otherwise infections such as diarrhea and RTI will result in the intake of nutrients cannot be absorbed properly.(Ernawati Dwi, 2014). The Research on stunting in the UK shows the results of ongoing analysis of diarrhea to stunting. Based on 24-month old children who continuously experienced diarrhea for more than 14 days have a greater chance of experiencing stunting, than children aged 24 months who had diarrhea for less than 14 days(Checkley *et al.*, 2008)

Toddlers who often suffer acute diarrhea will be at greater risk of growing into *stunting*. During diarrhea, bacteria get into the small intestine and undergo multiplication. The bacteria release toxins that will affect small intestinal mucosal cells (stimulates enzyme adenilsiklase). These enzymes transform Adenosine Tri Phosphate (ATP) to cyclic Adenosine Mono Phosphate (cAMP) and cAMP increased the expected increase in Cl ion secretion into the intestinal lumen. Isotonic solution secretion by intestinal mucosa (hypersecretion) as a result of the formation of toxins will make the function more absorption of intestinal mucosa impaired (decreased number sakaridase enzyme, lipase, and protease)(Almatsier Sunita, 2011). This results in malabsorption of nutrients, dehydration and loss of nutrients. If the condition is not treated immediately and be balanced with adequate food intake, then there will be severe dehydration, malnutrition and failure to thrive. Diarrhea impact on linear growth in children. If the child often had diarrhea within the first 24 months of life, the child tends to be shorter on 1.5 times(Checkley *et al.*, 2008). Based on previous research, on the 20 largest countries in the world there is an 80% of children who had suffered stunting, child malnutrition is accompanied by cases of diarrhea by 51%, in the case of malaria by 57%, cases of pneumonia by 52%, and measles cases by 45% ending in death(Hussein and Adam, 2015)

There is a significant correlation between the economic status of families with incidence of stunting in children under five in Primary Care Unit of Tanah Kali Kedinding Surabaya, this can be seen from the value of $p = 0.009$ ($p < 0.05$). Showed that 36 toddlers and 14 toddlers severe stunting stunting have parents with low economic status. Research in Indonesia and Bangladesh show that children from low-income families have higher risk of stunting compared to children from families of higher socioeconomic. This indicates that the family economic circumstances affect the incidence of stunting among children under five(Semba, 2016), Social and economic factors include per capita income, parental education, mother knowledge about nutrition has also indirectly associated with the incidence of stunting (Dian Hidayati, T. M. Thaib, 2010).

There is a significant relationship between energy intake with stunting under-fives in Primary Care Unit of Tanah Kali Kedinding Surabaya, this can be seen from the value of $p = 0.001$ ($p < 0.05$). Showed that 30 toddlers and 14 toddlers severe stunting has a low energy intake. The body is experiencing a shortage of energy will experience negative energy balance will be reduced so that the weight of body weight should be. This will inhibit growth in children and cause weight loss and tissue damage in adults(Siagian Albiner, 2010), The intake of nutrients that children need a complete continue during the growth process continues because the growth process is influenced by the food given to children. The food given should be appropriate both type and quantity to their nutritional content. The child's body still needs all the main nutrients are carbohydrates, fat, protein, fiber, vitamins and minerals, if the lack of the growth of children, including his height will be disrupted(Almatsier Sunita, 2011), Adequate nutrition is necessary to ensure optimal growth and development of infants and children. Daily nutritional needs are used to run and maintain the normal function of the body can be done by selecting and food intake was good (quality and quantity)(Sutomo Anggraini, 2010).

Food is a source of energy to support all human activities. Their burning carbohydrates, protein, and fat in the human body produces energy. Therefore, in order that adequate human energy needed food into the body adequately. Nutrient intake is not adequate, especially of total energy, protein, fat and micronutrients, are associated with physical growth deficit in pre-school children(Almatsier Sunita, 2011), However, consumption, diet enough not guarantee normal physical growth, because the incidence of other diseases, such as acute or chronic infection, can affect a complex process to the occurrence or maintenance of growth deficits in children. RISKESDAS data analysis in 2013 showed no significant relationship between energy consumption with the incidence of stunting in children aged 12-59 months in Sumatra (Almatsier Sunita, 2011).

There is a significant correlation between protein intake with the incidence of stunting in children under five in Primary Care Unit of Tanah Kali Kedinding Surabaya, that can be seen from the value of $p = 0.006$ ($p < 0.05$). Showed that 30 toddlers and 13 toddlers with severe stunting has a low protein intake. Malawi has a child stunting in serum

concentrations of total 9 amino acids that are required only 10-20 percent lower than a child who is not stunting. Moreover, stunting children have low serum concentrations of significant conditions required amino acids (arginine, glycine, glutamine), amino acids that are not needed (asparagine, glutamate, serine), and 6 different sphingolipid than children who are not stunting (Semba, 2016).

Other studies have shown that there is a relationship type and amount of consumption can affect the nutritional status that the end result appears stunting in infants as in Budiarti research that the type and amount of food is related to the incidence of malnutrition in children under five in Maternal & Child Health Centre of Kenanga 3 Bulak Banteng Surabaya(Budiarti Astrida, Hastuti Puji, 2017) RISKESDAS shows the results of data analysis in different provinces, there is a significant correlation between protein intake with the incidence of stunting in children under five (Kemenkes RI, 2013).

Basic health research data consistently shows that the average intake of calories and protein in toddlers are still under Nutritional Adequacy Rate (AKG). As a result of these circumstances, children under five women and children under five Indonesian men have an average height of each 6.7 cm and 7.3 cm shorter than the WHO reference standard, 2005. Protein is needed for physical growth, especially in height, because proteins are the main component of bones. Protein is essential for the normal functioning of almost all cells and metabolic processes, thus a deficit in this nutrient has many clinical effect(Kemenkes RI, 2013). Interventions to address stunting in Indonesia has strived good government through the Ministry of Health and related agencies. Interventions related to energy and protein intake is agriculture ministry efforts to fortify foodstuffs (Salt, Flour and cooking oil) and the efforts of the health ministry of education and nutrition through Maternal & Child Health Centre so that the incidence of stunting in Indonesia soon declined and did not happen again (Tim Nasional Percepatan Penanggulangan Kemiskinan, 2017).

5 CONCLUSIONS

The analysis showed that the factor protein intake has a protein intake in infants with risk factors for 65x102 times higher than the factor of infectious disease status, economic status, and energy intake. The primary prevention of stunting events is prenatal and postnatal maternal and infant interventions in the first 1000th days of life by meeting protein energy requirements.

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