Analysis of Risk Factors affecting Stunting at Sub-District Health Center Galesong Takalar Regency

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Abstract

Stunting (short) is a linear growth disorder caused by malnutrition of chronic nutrient intake or chronic or recurrent infectious diseases indicated by a z-score of height by age (TB/U) of less than -2 elementary school. The purpose of this study is to find out the analysis of risk factors that affect stunting in Sub-District Health Center Galesong Takalar Regency. The types of research used in this study are stunting case studies in toddlers as dependent variables whereas the independent variables studied are birth weight, energy intake, protein intake, age and gender of toddlers, maternal education, number of household members, residential areas and family economic status. The sample is a baby that has complete data according to the research variables (nothing is missing). As recorded in Sub-District Health Center Galesong Takalar Regency 2019 using Lemesshow formula N = 298. The results showed that psychosocial stimulation affects stunting problems with a risk of 33.84 times. These results showed that the four free variables tested found no correlation with each other, so they were declared free of multicollinearity.

Keywords: *Risk Factors, Stunting, Nutrition, Mother, and Child*

Introduction

Stunting in Indonesia has been widely done to analyze the risk factors of stunting at the individual or household level. Based on the PSG Survey held as a monitoring and evaluation of activities and achievements of the program. Based on PSG's 2015 results, the prevalence of short toddlers in Indonesia is 29%. This decreased in 2016 to 27.5%. But the prevalence of short toddlers again increased to 29.6% in 2017. Based on the background above, researchers need to research to find out what risk factors affect stunting cases[1].

Stunting is a failure to achieve linear growth potential due to insufficient nutrition or low levels of health (World Health Organization., 2003)[2]. The usefulness of this indicator is to measure the nutritional imbalances that have occurred over a long period of time that lead to shortness. Growth retardation due to lack of incense and repeated infections tends to be more at risk of causing morbidity and mortality in children (Oktarina, Z., & Sudiarti, 2014)[3]. Malnutrition can be caused by imbalance/inadequacy, or due to medical conditions such as infections affecting digestion of food or absorption of nutrients from food (Wilson, PWF., D'Agostino, RB., Sullivan, L., Parise, H., Kannel, 2002), or socio-cultural factors (World Bank 2006)[4]. The term stunting is to indicate a low age-based height index (TB/U). This indicator describes malnutrition that occurs over a long period (Reinhard I et al., 2002)[5]. Children are considered stunting when they have a TB/U index value below -2 of 2005 WHO anthropometric standard SD. For children under the age of 12 months, the term used is body length, not height (World Health Organization., 2003)[6].

The assessment of nutritional status itself is directly and there are indirect. The assessment of nutritional status directly is by anthropometric method (Supariasa et al, 2001a)[5]. In society, the most commonly used method of measuring nutritional status is anthropometry. Anthropometric methods relate to a wide range of measurements of body dimensions and body composition of varying levels of age and nutritional levels. The use of anthropometry in general is to look at imbalances. The determining factors of stunted growth are family income, maternal nutrition knowledge,

parenting practices, history of infection, immunization, protein intake, and maternal education. Meanwhile, under-20s primary school children have low academic achievement. The higher the stunting rate, the lower the academic achievement of elementary school children (Picauly, I., & Toy, 2013)[6].

This imbalance is seen in physical growth patterns and the proportion of body tissues such as fat, muscle, and amount of water in the body. There are two types of nutritional anthropometric measures, linear and tissue mass. Linear growth describes the nutritional status associated at the time and the growth of tissue mass describes the nutritional status associated at present or at the time of measurement (Supariasa et al, 2001b)[5]. The shape of the linear size is the size associated with the length. Examples of linear size are body length, chest circumference, and head circumference. Low linear size usually indicates poor nutritional state due to lack of intake suffered in the past. The most commonly used linear size is height or length.

Anthropometry is the most commonly used method in community nutrition programs because it has advantages such as the tools are cheap, easy to bring, easy to obtain and use, durable, can be ordered and made in the local area; simple user procedure; measurements can be repeated easily and objectively; not only done with special professional personnel / relatively do not need experts; relatively cheap cost; can evaluate changes in nutritional status in a given period, or from one generation to the next; the result is easy to infer; scientifically recognized truth because the method is precise and accurate, standardized; the result can be used for the screening of nutrient-prone groups (Supariasa et al, 2001b)[5].

In addition to the above advantages, anthropometry also has drawbacks, among others: insensitive, factors beyond nutrition such as disease, genetics, and decreased energy use can decrease the specification and sensitivity of anthropometric measurements; errors that occur during measurement can affect the precision, accuracy, and validity of nutritional anthropometric measurement. Errors can be caused by erroneous measurements, analyses, and assumptions. The source of the error is usually due to insufficient training of officers, errors of tools or tools are not marked with a test, and difficulty measuring (Supariasa et al, 2001b)[5].

Anthropometry as an indicator of nutritional status can be done by measuring several parameters. Parameters are the single size of the human body, among others: lifespan, height, and length (Supariasa et al, 2001b)[5]. The age factor is very important in determining nutritional status. Age-defining errors can lead to incorrect interpretation of nutritional status. Accurate measurements of height and weight become meaningless when not accompanied by proper age determination. According to (World Health Organization., 2003)[7], the age limit used for children aged 0-2 is the month of full age (completed month)[8]. The example of the calculation of the full age month as follows: the age of 4 months 5 days is considered to be 4 months and the age of 3 months 27 days is considered to be 3 months. In rural areas, many families do not have a record of their child's date of birth or write down numbers easily for example 1 or 1.5 years. If after trying to dig up the date of birth information but still can not be known precisely, while the month and year are known, then the date of birth of the child can be determined the date of the 15 months in question (Supariasaetal. 2001)[5]. The recommended age grouping for data analysis and interpretation, especially in the under-two age group is 0-5 months, 6-11 months, 12-23 months (World Health Organization., 2003)[9].

Height is an important parameter to describe past circumstances and current circumstances if age is not known appropriately. Besides, height is an important second measure, because, by linking weight to height, age factors can be ruled out. Measurements for toddlers who are already able to stand are done by measuring the height of the child. Install the measuring instrument according to the instructions. Place the measuring instrument on a flat floor or surface. Remove the footwear, headgear/hat, or hat/cap from the respondent to be measured. Respondents to be measured were asked to go up to the base of the measuring instrument with the position of the measuring instrument. Respondents were asked to stand perpendicular, straight-forward views. Note, the back wall of the measuring instrument must be in the middle of the measured back body, do not go left or right. Five parts of the body namely the head, shoulders, back of the buttocks, and heels attached to the wall of the measuring instrument. When this is not possible at least 3 parts are attached to the wall of

the measuring instrument. The gauge position is in front of the measured one. When measured higher than the gauge use a tool such as a seat. The movement of the sliding tool until it touches the head, do not press too much.

Note that the back of the sliding tool should stick tightly to the back wall of the measuring instrument. When a high number is read from the front: see the scale number in the reading window located at the front of the slide right on the red line. When a high number is read from a scale located next to: read the number located at the bottom of the slide tool. As for babies or children who have not been able to stand, the way used is to measure the length of the baby. Combine the measuring parts (only 2 rods combined)[10]. Install the support iron so that the sliding tool can move freely. The installation of this support iron should be in the direction of the protruding part of the fixed elbow (the motionless elbow at the end of the measuring instrument)[11]. Select a flat floor or table to place the measuring instrument. The body length scale number should be in the top position for easy reading. The fixed elbow position should be to the left of the gauge, and the measuring helper position is behind the fixed elbow. The child is laid down with his head attached to the elbow fixed. The measuring helper holds the child's chin and cheeks from behind the fixed elbow. The imaginary line (from the point of the ear hole to the tip of the eye) must be perpendicular to the floor where the child is laid. The gauge holds the child's knee so that the child's feet are attached to the floor. While holding the child's knee, the gauge moves the sliding device towards the soles of Luanda's feet.2014[12].

The position of both soles of the child's feet should be tight and perpendicular when attached to the sliding tool. The gauge should quickly move the sliding device until it attaches to the sole of the child's foot, and immediately read the scale of the length of the body[13]. Read the body length scale located to the left of the slide tool. Moving the sliding and reading scale should be done quickly because the child is often fussy and moving. The combination of several parameters is called the anthropometric index (Supariasaetal. 2001)[5]. Nutritional status is a condition caused by the balance between the amount of nutrient intake and the amount needed by the body for various biological functions such as physical growth, development, activity, and health maintenance (Kartini, S., & Abdurrab, 2016)[14].

Nutritional status is one of the factors that determine human resources and quality of life. Therefore, the nutrition improvement program aims to improve the nutritional quality of food consumption, to improve the nutritional status of the community (Muchtadi, 2002)[15]. While according to (Almatsier, 2010)[16] nutritional status is the state of the body as a result of food consumption and nutritional use adriato and ningrum, 2019[17]. Toddlerhood is a rapid growth process that requires attention and compassion from parents and their environment. Besides, toddlers need balanced nutrition to have good nutritional status, as well as the growth process is not inhibited, because toddlers are the age group that suffers most from malnutrition (Wijayanti, 2008)[18].

Toddlers are declared a critical period to obtain quality human resources, especially in the first 2 years is the golden age for optimal brain growth and development, therefore at this time, it needs serious attention. Around the world, protein-energy shortages such as marasmus, kwashiorkor, and stunting remain one of the main nutritional problems in children. Lack of energy contributes to brain growth and long-term development. The impact of protein-energy deficiency (KEP) on each individual is strongly influenced by several factors such as age, length of malnutrition, the speed of recovery to normal nutrition, the home environment, and nutritional rehabilitation, and the absence of disease-related and micronutrition deficiencies[19].

Chronic energy deficiency in children can cause toddlers to be weak, physical growth is late, and subsequent development is disrupted. In adults it is characterized by decreased weight and decreased work productivity. Malnutrition at all ages can lead to the easily affected by infections and other diseases as well as the slow process of regeneration of the body's cells (Veriyal N, 2010)[20].

Hunger and inadequate food supplies still affect a portion of the world's population with serious impacts on health and well-being, especially in children. Malnutrition in children interferes with physical and mental development. Adequate nutrition from an early age is a prerequisite for the prosperity of a society. Diet plays a special role because of the importance of

micronutrition for growth and development. So far, efforts to combat malnutrition and malnutrition, and make progress towards the Millennium Development Goal (MDG), which aims to 'eradicate poverty and hunger'. Thus, the proportion of children under the age of 5 with malnutrition has been lowered from 33% in 1990 to 26% in 2006. Around the world, however, the number of malnutrition continues to increase (Team, 2010)[21].

Malnutrition in children is a result of a variety of factors, which are often associated with poor food quality, insufficient food intake, and severe and recurrent infectious diseases, or often some combination of all three. This condition, in turn, is very closely related to the overall standard of living and whether a population can meet its basic needs, such as access to food, housing, and health care (World Health Organization., 2003). The state of malnutrition in children has an impact on the slowness of growth and development that is difficult to heal. Therefore, children who are malnourished can learn and work and behave more limited than normal children (Santoso, S and Ranti, 2004)[8].

Stunting is a short and very short state of the body that exceeds the deficit of -2 elementary school below the median length or height (Manary, M. J., and Solomons, 2009)[13]. Stunting can be diagnosed through a high-age anthropometric index that reflects the linear growth achieved in pre and postpartum with indications of long-term malnutrition, as a result of inadequate nutrition and or health. Stunting is a linear growth that fails to reach genetic potential as a result of poor diet and disease (ACC/SCN, 2000)[15]. Stunting is defined as an indicator of TB/U nutritional status equal to or less than minus two standard deviations (-2 SD) below the average of standards (WHO, 2006a)[14]. It is an indicator of the health of chronically malnourished children who provide an overview of nutrition in the past and which is influenced by the environment and socioeconomic circumstances. Worldwide, 178 million children under the age of five (toddlers) suffer from stunting with the majority in South Central Asia and sub-Saharan Africa. Stunting is a major public health issue in low- and middle-income countries due to its association with an increased risk of death during childhood, (Irmawaty Bentian, N. Mayulu, 2015)[19]. In addition to causing death in childhood, stunting also affects the physical and functional of the body (Boerma, T., Mathers, C., AbouZahr, C., Chattergi, S., Hogan, D., & Stevens, 2015)[14]. Stunting is a form of the stunted child growth process. Until now stunting is one of the nutritional problems that need attention.

In 2003, 27.5% of toddlers in Indonesia suffered from moderate and severe skinnyness, or only 10 percentage points lower than in 1989, and nearly half were stunting. Children suffering from low birth weight and stunting in turn grow into adolescents and undernourished adults, thereby perpetuating a cycle of malnutrition (Nuraini B., 2015)[13]. In 2005, for all developing countries, an estimated 32% (178 million) children under the age of 5 had tb/U scores with a Z Score of less than -2. The highest prevalence in the UN sub-region is east and middle Africa at 50% and 42%, respectively, with the highest number of children affected by stunting, 74 million, living in South Central Asia. Stunting risk factors include birth weight length, intake, disease, and infection, genetic, and socioeconomic status of the family. Stunting especially in children over the age of 2 is difficult to overcome, so research on stunting risk factors in children over the age of 2 is required.

The prevalence of stunting in Asia in 2007 was 30.6 %. In developing countries, 11.6 million child deaths under the age of five, an estimated 6.3 million (54%) from the death of children is associated with malnutrition, which is largely caused by malnutrition (Dalimunthe, 2003)[11]. The prevalence of skinny and stunting is highly correlated, moving together through time, and telling the same story. However, for Central and South America, the prevalence of stunting remains substantial and is an issue that must be addressed. In Africa, the prevalence of malnutrition is 20% and the prevalence of stunting is 39%. In Asia, the prevalence of malnutrition is 22% and the prevalence of stunting is 31%. But in South and Central America & the Caribbean, the prevalence of malnutrition is only 4%, while the prevalence of stunting is 15%. Most countries start with a high prevalence of malnutrition and stunting from about 30-60%, which will probably continue to drop at up to 0.5 percentage points per year (Zahroh, 2016)[21].

There are several reasons why stunting happens in toddlers. In toddlerhood, the nutritional needs are greater, concerning weight gain, than in adolescence or adulthood. High nutritional needs for rapid growth,

including growth in adolescence. Thus, the chance of failed growth is greater in toddlers, as more growth occurs Martorell: 1994

Research Methods

The types of research used in this study are stunting case studies in toddlers as dependent variables whereas the independent variables studied are birth weight, energy intake, protein intake, age and gender of toddlers, maternal education, number of household members, residential areas and family economic status. The sample is a baby that has complete data according to the research variables (nothing is missing). As recorded in Sub-District Health Center Galesong Takalar Regency 2019 using limes show formula N = 298. Data processing will be done data editing, data coding, tabulation. Data analysis activities that include entering, processing, and analyzing data using computer software. Analysis of the data used in this study includes univariate and bivariate.

Results of Research and Discussion

The use of parametric statistical tests and nonparametric tests are based on the distribution of data used as one of the data assumptions. Population data will be distributed normally if the average value is the same as the mode and equal to the median and as the score collects in the middle position. According to the Kolmogorov-Smirnov test, the Asymp Sig (2-tailed) value of 0.001 > 0.05 is declared normal distributed. Multicollinearity testing aims to see no link between free variables that are biased to influence the prediction of regression results. A data is declared free of multicollinearity if, the tolerance value is greater than 0.01 and the VIF value is not greater than 10. Based on the results of multicollinearity testing stated this research data is free of multicollinearity with the following values:

Table 1: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.527	.615		2.481	.015		
	feeding practices	.051	.036	.129	1.440	.152	.975	1.026
	Psychosocial disorder	.138	.053	.232	2.598	.011	.984	1.016
	hygiene practices	-.101	.059	-.160	-1.727	.087	.923	1.084
	breastfeeding	-.077	.087	-.080	-.881	.380	.959	1.043

a. DependentVariable: status stunting

Based on the table above for the variable feeding practice obtained a value of tolerance = 0.975 and a value of VIF = 1,026. The psychosocial stimulation variable obtained a tolerance value = 0.984 and a value of VIF = 1,016. Variable practice hygiene tolerance value = 0.923 and value VIF = 1,084. The breastfeeding variable values tolerance = 0.959 and the value VIF = 1,043. These results showed that the four free variables tested found no correlation with each other, so they were declared free of multicollinearity. Univariate analysis was conducted to get an overview of each variable in the form of frequency distribution i.e. parental work, parental education, parental income, and number of family members.

Table 2: Family Income

Variable	Case		Control	
	N	%	N	%
Mother's Education				
Not school	2	3,3	3	5
SD	31	51,7	33	55
SMP	15	25	13	21,7
SMA	9	15	7	11,7
DIPLOMA	3	5	2	3,3
SARJANA	0	0	2	3,3
Family Income				
500.000	40	66,7	39	65
1.000.000	13	21,7	15	25
2.000.000	6	10	1	1,7
>2.000.000	1	17	5	8,3
Number of Family Members				
3	23	38,3	20	33,3
4	17	28,3	17	28,3
>5	20	33,3	23	38,3
Parental Work				
URT	57	95	59	98,3
Honorer	3	5	1	1,7

Parental Education

Based on the above data obtained results that the education of parents of children with stunting 3.3% is not attended school; 51.7 % of primary school education; 25% are middle school educated; 15% are high school educated and only 5% are diploma educated and 0% are undergraduate educated. The education of parents of normal children 5 % do not attend school; 55% are elementary school educated; 21.7% are middle school educated; 11.7% are high school educated; 3.3% are diploma educated and 3.3% are undergraduate educated.

Family Income

Based on data on the income of parents of stunting children with a total of 500,000 as much as 66.7%; 1,000,000 by 21.7 %; 2,000,000 by 10%; and <2,000,000 by 17%. While the income of parents of normal children with the amount of 500,000 as much as 65%; 1,000,000 by 25%; 2,000,000 by 1.7 % and 2,000,000 by 8.3%.

Number of Family Members

From the above data obtained that the number of family members of children with stunting is 3 people as much as 38.3%; 4 with 28.3% and 5 33.3%. While the number of family members of normal children is 3 people as much as 33.3%; 4 as many as 28.3% and 5 people as many as 38.3%.

Parental Work

From the above data obtained results that the work of parents of children with stunting is URT as much as 95% and 5% as honorer. While the parental work of a normal child is 98, D3% is URT and 1.7% honorer.

Concurrent Test of Logistics Regression Parameters

Concurrent tests are tests that have a function to know the signification of parameters on constants narrowly. Below is a table describing the results of concurrent tests with the hypothesis:

Table 3: Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	13.082	5	.023
	Block	13.082	5	.023
	Model	13.082	5	.023

Based on the table above it is obtained a significant model value of 0.023 because this value is smaller than 5% so reject Ho so it is concluded that the free variables used together affect stunting. The formation of models on simultaneous bias tests is seen in the table above. In the test, it is expected that Ho is rejected so that the variables that are being tested go into the model. For a partial test, bias is seen in which significant value is greater than alpha. The corresponding significant value on the table is psychosocial variables (psychosocial stimuli).

Model Conformity Testing

This test was conducted to find out if there is a difference between the observation results and the possible results of the model prediction. Based on the logistic regression model above to further test the design of the model as follows:

Table 4: HosmerandLemeshowTest

Step	Chi-square	df	Sig.
1	13.288	8	.102

The Chi-Square value is close to 13,288 with a significant value of .102 then accept Ho, so it can be concluded that the resulting model on binary logistic regression that is stunting is influenced by the free variable factor. In other words, there is no significant difference between the observation results and the model prediction because it is seen from the table that the value of sig = 0.102 which means greater than 0.05 (accept Ho) with a confidence rate of 95% can be believed that the logistic regression model used has been sufficiently able to explain the data/ accordingly.

Table 5: Contingency Tablefor Hosmerand Lemeshow Test

		status = stunting		status = normal		Total
		Observed	Expected	Observed	Expected	
Step 1	1	12	10.089	1	2.911	13
	2	7	8.652	6	4.348	13
	3	6	7.045	6	4.955	12
	4	10	7.867	4	6.133	14
	5	8	6.085	4	5.915	12
	6	5	5.135	6	5.865	11
	7	2	4.334	8	5.666	10
	8	2	5.109	11	7.891	13
	9	4	3.662	8	8.338	12
	10	4	2.022	6	7.978	10

Based on the table above can be seen the frequency of observation and the expectation of the data that the observation 1 for stunting cases out of 12 observations diagnosed is 10 so it can be concluded that the difference between the two does not pass far so that the model can be said to be appropriate. While on observation 1 for case-control from 1 diagnosed observation there are 2 so it can be concluded that the model is not suitable.

Conclusion

The conclusion in this study was that psychosocial stimulation affected stunting problems with a risk of 33.84 times. These results showed that the four free variables tested found no correlation with each other, so they were declared free of multicollinearity. The univariate analysis was conducted to get an overview of each variable in the form of frequency distribution i.e. parental work, parental education, parental income, and the number of family members.

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