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Stunting Case Study In Grogol Bejiharjo Karangmojo Gunungkidul D. I. Yogyakarta, Indonesia Based On Routine Blood Examination

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ABSTRACT

Stunting is defined as the condition of the nutritional status of toddlers who have a height that is classified as less when compared to age. The prevalence rate of stunting under five nationally in 2021 is 24.4%. The research aims to describe stunting cases in Grogol Bejiharjo Karangmojo Gunung Kidul D.I.Yogyakarta Indonesia based on routine blood tests. The design of this study used observational analysis with the independent-T test. The number of respondents involved as many as 14 respondents with the purposive sampling method. The number of respondents categorized as stunting based on measurements of height per age (TB/U) was 64.3% consisting of concise and short nutritional status. This number is higher than those who are not stunted (normal), which is 35.7%. The number of leukocytes in the low-stunted group tends to be lower than in the normal (non-stunted) group, as well as the parameters of the lymphocyte count examination that the average result is higher in the stunting group compared to the normal (non-stunted) group. There was a significant difference in the average hemoglobin level between the stunting and non-stunted groups because of the p-value <0.05. A significant difference was also found in the mean hematocrit value between the stunted and non-stunted groups because of the p-value <0.05. Statistical differences in hemoglobin levels and hematocrit values between groups. Other blood test parameters were not statistically different.

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1. INTRODUCTION

Stunting has both short and long-term impacts. In the short term can result in the inhibition of cognitive development. the child with stunting experienced a 7% decrease in optimal cognitive development, compared to children who were not stunted (RR= 0.93; 95%CI 0.83, 0.98) (Ekholuenetale, et al., 2020). Impact in the long term, stunting can increase the risk of various non-communicable diseases, including cancer, diabetes, and hypertension, so that the quality of life of children as adults decreases. Based on the report from the nutrition section of the Gunung Kidul Health Office in 2020, it shows that the prevalence highest number of cases stunting toddlers are in the Bejihar Village, jo. Stunting has the highest prevalence compared to other nutritional problems such as malnutrition, being underweight, and obesity (DIY Health Office, 2020).

Many studies on stunting risk factors have been carried out. Research in Indonesia shows that babies with Low Birth Weight (LBW), male gender, history of neonatal disease, and poverty factors are factors that influence stunting cases in children aged 12-23 months (Aryastami, et al., 2017). Stunting can give an impact on the child during good periods short nor period long. Disturbed development of the brain, intelligence, disorder growth physical and metabolic disorders of the body. Stunting can also lower the immunity body in the child (Anggraini, 2019)(Helmyati, 2020).

This Study aim to describe cases of child stunting in the Grogol Bejiharjo hamlet Karangmojo Gunungkidul based on an inspection of blood routine. As for the profile studied blood surface number of leukocytes, number of lymphocytes, Hb levels, total erythrocytes, the value of hematocrit, and the number of platelets.

2. METHOD

Method study uses an approach analytic observational with a design cross-sectional. The population is all child toddlers 12-60 months with stunting. retrieval technique sample with purposive sampling method. Amount sample as many as 14 respondents. The independent variable is a child with stunting and the dependent variable is profile blood routine (lymphocytes, Hb levels, total erythrocytes, value hematocrit, and the number of thrombocytes). Characteristic data from respondents was collected using a questionnaire. Nutritional status data obtained with to do measurement weight based on age. Sample blood is taken for inspection blood routine (leukocytes, lymphocytes, Hb levels, erythrocytes, hematocrit, and platelets).

The study was carried out in the hamlet of Grogol village Bejiharjo Kapanewon Karangmojo Gunungkidul, Daerah Istimewa Yogyakarta, Indonesia. Before the study was done, more formerly has to get an ethics statement. Characteristic data retrieval respondents conducted with an Interview with mother toddler uses questionnaire. Stunting data was obtained by doing a measurement of toddler height. Taking blood in toddlers performed on vessels venous blood. Analysis profile blood with the use hematology analyzer to determine the number of leukocytes, lymphocytes, Hb levels, erythrocytes, hematocrit, and platelets. Next data was analyzed using the independent T-test. This study was approved by the Institutional Review Board (IRB) of STIKES Guna Bangsa Yogyakarta (No. 007/KEPK/VI/2022). Informed consent was obtained from all participants.

3. RESULTS AND DISCUSSION

The total number of respondents is 14 respondents and based on individual characteristics is dominated by types of female sex as 8 respondents (57.1%), age 25-36 months as many as 5 respondents. A respondent with a history of normal birth weight is more than the history of less birth weight, namely 8 respondents (57.1%). Nutritional status according to body weight per age (BB/U) was mostly categorized as normal as many as 12 respondents (85.7%). Mother's education is dominated by low education, namely ≤ SD as many as 9 people (64.3%). The mother's occupation of all respondents is as a housewife.

Table 1. Frequency distribution of respondents based on individual characteristics

Individual Characteristics	Amount	Percentage (%)
Gender		
man	6	42.9
woman	8	57.1
Age (months)		
13-24	4	28.6
25-36	5	35.7
37-48	4	28.6
49-60	1	7.1
Birth weight		
low	6	42.9
normal	8	57.1
Nutritional status (W/W)		
not enough	2	14.3
normal	12	85.7
Mother's education		
low ≤ SD	9	64.3
moderate >elementary ≤ high school	5	35.7

Individual Characteristics	Amount	Percentage (%)
Mother's work		
Housewife	14	100

A respondent with a history of normal birth weight is more than a respondent with a history of low birth weight i.e. 57.1% (table 1). Heavy baby born low (LBW) has a risk caught infection like diarrhoea, infection channel respiratory, anaemia, disease lungs chronic fatigue and loss of lust eat as well as experiencing Dead neonate or disturbance growth. Research results previously mention that there is a connection between LBW and stunting in toddlers (Beal, et al., 2018). This thing also supported by h results research in Pakistan, that LBW children were significantly more likely to be moderately underweight (OR = 1.5, CI = 1.3–1.6) and very thin (OR = 1.6, CI = 1.3–2.0) and both (pygmy and underweight, OR = 2.0, CI = 1.7–2.3) compared with children of normal birth weight (Abbas, et al., 2021).

Stunting is determined based on Z-score values less than -2SD or standard deviation (stunted) and less than -3SD (severely stunted). Amount respondents with more stunting were many compared to toddlers not stunting (Table 2). Stunting toddlers are at risk occur obstacles to growth physical and vulnerability to disease, development cognitive and productivity future child (Ministry of Health Republic of Indonesia, 2018). Stunting children will experience a 7% decrease in optimal cognitive development, compared with non-stunted children (RR = 0.93; 95%CI 0.83, 0.98) (Ekholuenetale, et al., 2020).

Table 2. Number of respondents based on the nutritional status by height per age (TB/U)

Nutritional status (TB/U)	Amount	Percentage
Stunting	9	64.3
No Stunting	5	35.7

The number of respondents in the stunting category based on the measurement of height per age (TB/U) was 9 respondents (64.3%) consisting of very short and short nutritional status. This number is higher than those who are not stunted, namely 5 respondents (35.7%).

Profile blood on the respondent has a score lower score than the respondent without stunting (table 3). This result is by research by Khan et al. (2020) that occur change profile blood in children with severe acute malnutrition. The majority of platelet counts were significantly lower than normal, the mean hemoglobin, hematocrit and red blood cell index were lower and the mean ± (SD) hemoglobin was 8.703 ± (1.9271) (Khan, et al., 2020).

Table 3. Average results of routine blood examination of research respondents

Routine Blood Profile	Average Routine Blood Profile		Unit
	Stunting	No Stunting	
Leukocytes _	6.76	8.54	thousand
Lymphocytes	3.81	3.96	thousand
Hemoglobin	11.01	12.04	gram%
Erythrocytes	4.39	4.44	million
Hematocrit	33.41	36.1	percent
Platelets	370	369	thousand

The number of leukocytes in the stunting group tended to be lower than in the non-stunted group, as well as the average lymphocyte count was lower in the stunting group compared to the non-stunted group.

Table 4. Results of normality test of profile data blood routine

Routine Blood Profile	df	*Shapiro-Wilk test* p-value
Leukocytes		
Stunting	9	0.444
Not stunting	5	0.425
Lymphocytes		
Stunting	9	0.115
Not stunting	5	0.515
Hemoglobin		
Stunting	9	0.369
Not stunting	5	0.217
Erythrocytes		
Stunting	9	0.479
Not stunting	5	0.752
Hematocrit		
Stunting	9	0.739
Not stunting	5	0.403
Platelets		
Stunting	9	0.574
Not stunting	5	0.315

The normality test of the data using the Shapiro-Wilk test obtained p>0.05 in each of the blood profiles of the stunting and non-stunted groups. The data can be concluded to be normally distributed, to determine the influence of the respondent's nutritional status with stunting and non-stunted blood profiles were tested for the mean difference between each group.

Table 5. Results of the Independent-Sample T-Test for routine blood profiles in the stunting and non-stunted groups

Routine Blood Profile	p-value
Leukocytes	0.27
Lymphocytes	0.90
Hemoglobin	0.01
Erythrocytes	0.77
Hematocrit	0.02
Platelets	0.99

Based on Table 5. There is a significant difference in the average hemoglobin level between the stunting and non-stunted groups because of the p-value <0.05. A significant difference was also found in the mean hematocrit value between the stunted and non-stunted groups because of the p-value <0.05. Thus, there were statistical differences in hemoglobin levels and hematocrit values between groups. Other routine blood profiles, namely the number of leukocytes, the number of lymphocytes, the number of erythrocytes, and the number of platelets did not have statistical differences.

According to the World Health Organization (WHO), children under 5 years of age are considered anaemic when their Hb level is less than 11 g/dl. Lack of folate, vitamin B12, lack of protein, nutrients and some other diseases (malaria, diarrhea) can increase the risk of anaemia. Lack of hemoglobin causes the condition, somebody, to deficiency substance iron. If one child experiences a deficiency substance iron could impact the disruption of function cognitive, behavioral, and growth (Anggraini, 2019). This thing supported by the results of studies previously mentioned that stunting toddler has hemoglobin level, and intake substance more iron and zinc low than non-stunted toddlers. The implication of the condition the is mother toddler, preferably increase variation in intake source substances iron and zinc (Losong and Adriani, 2017). Stunting children and women with low BMI

significantly increase the likelihood of developing anaemia, with OR 1.76 (95% CI:1.10-2.83) and 1.81 (95% CI: 1.11-3.48) (Rahman, et al., 2019).

Research results show that there is a different amount of hematocrit in stunting toddlers and in not stunting (table 5). Hematocrit is a measurement result that states the ratio of red blood cells to blood volume. The amount of hematocrit stunting toddlers is low compared to not stunting (table 3). This result by research on toddlers at Bukit Sileh Public Health Center that there is an effect of hemoglobin levels and hematocrit values in the category of short and very short children with the average hematocrit level in very short children being 32.31±1.27 (Riaty, et al., 2022).

4. CONCLUSION

There is a difference in hemoglobin level and value hematocrit between groups by statistics. Profile blood routine other than the number of leukocytes, number lymphocytes, number erythrocytes, and the number of platelets does have a difference in statistics.

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