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The relationship between Hb examination and body height on the incidence of stunting in elementary schools

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ABSTRACT

Stunting is known as a child's short or very short height. Stunting is a nutritional problem that can affect the quality of human resources. As a result, stunting includes increased mortality and morbidity as well as decreased growth in motor and mental abilities. Based on the monitoring results of the North Sumatra Provincial Government, the prevalence of stunting will be 18.9% in 2023. One of the global health problems, especially in developing countries, is anemia. The purpose of the study was to understand the relationship of Hb examination and anemia to the incidence of stunting in elementary schools in Medan. The method used in this study was quantitative method, namely survey with cross-sectional technique, the respondents were all public elementary school students. Sampling by cluster, namely class 1 as many as 28 samples. The results of Hb examination with the incidence of stunting p-value 0.061 which means less than 0.05 there is a relationship between Hb examination and the incidence of stunting. The results of height with the incidence of stunting p-value 2.652 which means greater than 0.05 that there is no relationship between less height and the incidence of stunting. Normal height with the incidence of stunting p-value 2.652. The type of food consumed by the body affects the absorption of iron in the body, especially non-heme iron of vegetable origin. Consumption of high doses of calcium (more than 40 mg) may inhibit iron absorption and lead to low haemoblogin and short stature in children.

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INTRODUCTION

Children aged 7 to 8 years, or first grade in elementary school, is the age at which children begin school age and the school environment in which they learn (Mar'atun Nafi'ah et al., 2018). Joining friends, regardless of culture, religion and groups of teenagers who are not included in the family

will produce rapid physical intelligence, mental and emotional growth. The development and formation of children will also affect children when they become adults. Very effective for tracking the growth and development of children who are new to school by tracking their height (TB) (Sabani, 2019).

Stunting, known as short or very short child height, is a growth and development disorder in children that occurs from early pregnancy to the first two years or thousand days of their life and is caused by nutritional deficiencies and infectious diseases (Munawaroh et al., 2022). The World Health Organization (WHO) says stunting is defined as height for age (TB/U) below 2 SD (Shorayasari et al., 2022), known through the TB/U indicator. It can also be used to evaluate the nutritional condition of children who are short or stunted. Low IQ, apathy and lack of self-confidence are the consequences of stunting (Mohamad et al., 2022). It also causes physical weakness, fatigue, pain, and difficulty concentrating while studying (Jufri, 2024). Therefore, in the future, it will be difficult to have strong human resources (Masmuri et al., 2023).

Stunting is a nutritional problem that can affect the quality of human resources (Novianti et al., 2021) (Haskas, 2020). As a result, stunting includes increased mortality and morbidity as well as reduced growth in motor and mental abilities (Rahmawati et al., 2020).

Malnutrition can cause permanent damage to brain function (Dini, 2022) (Haskas, 2020). The long-term effects of stunting include reduced cognitive and physical development, reduced productive capacity and poor health, and increased risk of diabetes and other degenerative diseases (Early, 2022). There are several factors that cause stunting in children, including insufficient intake over a long period of time, inflammation during the fetus in the womb and after birth, which inhibits the production of insulin hormones such as growth factor-1 (IGF-1), which functions as a hormone. early in life and can be used to determine the nutritional level of children who are short or stunted (Butarbutar et al., 2023). Stunting causes low IQ, apathy and lack of self-confidence, which causes physical weakness, fatigue, pain and difficulty concentrating when studying. Due to this, strong human resources in the future will be a challenge (Simamora et al., 2023).

Based on the monitoring results of North Sumatra Premprovthe prevalence of stunting will be 18.9% in 2023.One of the global health problems, especially in developing countries, is anemia. A decrease in hemoglobin levels or the number of red blood cells circulating in the body compared to normal values based on age, gender and physiological conditions is known as anemia. Nutritional problems, namely a lack of one of the important nutrients, and non-nutritional problems, such as excessive blood loss in toddlers caused by nutritional problems, can cause anemia (Sri Mawarani Hasibuan et al., 2024). The UNICEF report states that anemia in preschool-age children reaches 47.4%, and this is in the high category in developing countries (Canton, 2021). Two-thirds of children in Southeast Asia suffer from anemia (Situmorang & Johan, 2024). The increasing need for iron during the growth period makes toddlers vulnerable to iron deficiency, which is the main cause of anemia in toddlers (Sundari & Nuryanto, 2016) (Situmorang & Johan, 2024). Low intake of iron, protein, vitamin C and zinc is the main cause of anemia, and around 50% of anemia cases are caused by iron deficiency (Ayuningtyas et al., 2022). Vitamin C is another nutrient that helps the body absorb iron better (Mulyani & Sadrina, 2021). Vitamin C accelerates the absorption of iron in the intestines and the transfer of iron into the blood (Putrianti, 2020). Vitamin C plays an important role in the absorption of iron, especially non-heme iron (Setyandari & Margawati, 2017). Studies in Demak show that administration of vitamin C alone can increase hemoglobin levels and reduce the prevalence of anemia (Sri Mawarani Hasibuan et al., 2024).

The aim of the research is to understand the relationship between Hb examination and body height on the incidence of stunting in elementary schools in Medan.

RESEARCH METHOD

The method used in this research is a quantitative method, namely a survey with cross-sectional techniques, the respondents were all state elementary school students in one of the cities of Medan, both boys and girls. Sampling was taken using a cluster method, namely class 1 with 28 samples, where the data used in this study came from distributing questionnaires, questionnaires containing questions about the factors that cause anemia to occur in elementary school students in Medan and were carried out by question and answer for children who did not understand and carry out an examination using a hemoglobin examination tool, the tool uses a strip that 1 student uses 1 strip and alcohol, a sterile needle.

Anemia examination and objective examinations such as palpation, percussion, vitality and mobility tests, as well as standard deviation calculations, supported this research. Before determining the Pearson or Spearman correlation test, a data normality test is carried out first, checking height using a meter to determine the child's height.

RESULTS AND DISCUSSIONS

Table 1. Frequency distribution of respondent characteristics

Characteristics	f	%
Gender		
Woman	20	71.4
Man	8	28.5
Age		
6 years	7	25
7 years	21	75
Hb examination		
High Hb ≥ 12 gr/dl	0	0
Normal Hb 9 - 11.5 gr/dl	26	92.8
Low Hb ≤ 9 gr/dl	2	7.1
Height		
Normal height	25	89.2
Less height	3	10.8
Amount	28	100

Research results based on characteristics

Gender is the difference based on sex in elementary school, from a total of 28 respondents (100%). male and female gender. There were 20 women (71.4%) and 8 men (28.5%). Age is the number of days born each year. of the total respondents were 28 people (100%). There were 7 people aged 6 years (25%) and 7 years old as many as 21 people (75%). Hb examination is an examination using a tool to determine how much hemoglobin is in the body of elementary school students. The total number of respondents was 28 people (100%). 26 people had normal Hb (92.8%) and 2 people (7.1%) had low Hb. Height is what body size is based on body centimeters by measuring and using a body meter. There were 25 people (89.2%) of normal height and 3 people (10.8%) of less height.

Bivariate Analysis

Table 2. Hb examination with stunting incidents

Height	Stunting events				Total		P-Value
	Positive		negative				
	f	%	f	%			
Normal Hb 9 - 11.5 gr/dl	1	3.7	25	89.2	26	92.9	
Low Hb ≤ 9 gr/dl	2	7.1	0	0	2	7.1	0.061
Total	3	10.8	25	89.2	28	100	

The research is in accordance with table 2. Hb (hemoglobin level) is the independent variable in this study. If the child's blood hemoglobin level is less than 9 - 11.5 gr/dL (low), it is indicated that they have anemia, as many as 2 respondents (7.1%) with positive stunting results, normal child blood hemoglobin levels are shown to be 9 - 11.5 gr/dl as many as 26 respondents (92.9%), with positive stunting of 1 respondent (3.7%) and negative stunting of 25 respondents (89.2%). The p-value result is 0.061, which means it is smaller than 0.05, there is a relationship between Hb examination and the incidence of stunting

Table 3. Height and stunting incidence

Height	Stunting events				Total		P-Value
	Positive		negative				
	f	%	f	%			
Normal height	1	3.51	24	85.7	25	89.2	
Less Height	2	7.1	1	3.51	3	10.8	2,652
Total	3	10.61	25	89.21	28	100	

Research from table 3. Body height is one of the objects that can be seen to determine stunting. In this study, not all heights that are less will cause stunting. From the research results, it was found that height was related to the incidence of stunting. Normal height with a positive stunting incidence of 1 respondent (3.51%) and a negative stunting incidence of 24 respondents (85.7%). Less height was associated with a positive stunting incident of 2 respondents (7.1%) and 1 respondent (3.51%) had a negative stunting incident with a p-value of 2.652, which means it was greater than 0.05, meaning there was no relationship between low height and the incidence of stunting.

Discussion

Hb Checking with Stunting Events

If the child's blood hemoglobin level is less than 9 - 11.5 gr/dL (low), it is indicated that they have anemia, as many as 2 respondents (7.1%) with positive stunting results, normal child blood hemoglobin levels are shown to be 9 - 11.5 gr/dl as many as 26 respondents (92.9%), with positive stunting of 1 respondent (3.7%) and negative stunting of 25 respondents (89.2%). The p-value result is 0.061, which means that there is a relationship between Hb examination and the incidence of stunting that is smaller than 0.05.

From the research that has been carried out, the results of Hb examinations in cases of stunting are not all Hb results are normal, so the results will be normal. In this study, it was seen that there was a normal Hb with a positive incidence of stunting in elementary school students. It turns out that this stunting incident is often found in male elementary school students and is because boys are more likely to be active in playing than girls and male elementary school children because they are tired often forget to eat and also because they play and rest too. becomes reduced.

This research is in contrast to research conducted byNetta Meridianti Putriby titleRisk Factors for Anemia in Elementary School Children in Temanggung. The results of the Chi-square relationship test showed a significant relationship between daily meal frequency and students' breakfast habits and anemia status ($p<0.05$). In addition, the Chi-square relationship test showed a significant relationship between adequate energy, protein and micronutrients (vitamin A, vitamin B12 and vitamin C) with anemia status (Putri et al., 2021).

Research results The breakfast habits of elementary school students in this study were good, namely 84.9%, the availability of breakfast was always 86.79%. It was found that the availability of food for breakfast was the most dominant variable related to breakfast behavior with a value of OR = 5.67 with the title Breakfast Habits with Nutritional Status of Elementary School Children, Busyra Hanim 2020 (Alfarisi et al., 2020).

The Relationship between Height and the Incident of Stunting

From the research results, it was found that height was related to the incidence of stunting. Normal height with a positive stunting incidence of 1 respondent (3.51%) and a negative stunting incidence of 24 respondents (85.7%). Less height was associated with a positive stunting incident of 2 respondents (7.1%) and 1 respondent (3.51%) had a negative stunting incident with a p-value of 2.652, which means it was greater than 0.05, meaning there was no relationship between low height and the incidence of stunting. Hemoglobin values that are too high or too low in a person's body usually indicate health problems. Low hemoglobin values indicate symptoms of anemia, while high hemoglobin values indicate health problems, and this condition can increase the risk of cardiovascular disease such as heart attack and stroke.

This research is in line with research conducted by Dian Isti entitledThe Influence of a History of Low Birth Weight Babies and Anemic Mothers in Pregnancy on the Risk of Stunting in Toddlers Aged 0-24 Months in the Working Area of the Tanjung Bintang Public Health Center, South Lampung Regency. Babies can experience anemia if the mother experiences anemia before the third trimester and will experience a lack of nutrition and oxygen, resulting in failure to grow and develop intrauterinely and at risk of stunting when the baby is born. In addition, research was conducted on toddlers under the age of two years in Maron Kidul village, Maron District, Maron Regency. Recognizes the correlation between pregnant women who have a history of anemia and stunting. Foods that have a family history of anemia in pregnancy have a 7.67 times greater risk than other pregnancies. Compared to toddlers, older people experience stunting (Muharry et al., 2024).

The type of food consumed by the body affects the absorption of iron in the body, especially non-heme iron which comes from plants. Consuming high doses of calcium (more than 40 mg) can inhibit iron absorption, while vitamin C, meat, fish and poultry increase iron absorption (Megawati & Prihatanti, 2023). Processing food for too long at too high a temperature can also convert heme iron into non-heme iron, which has an impact on iron absorption. Apart from iron, daily food consumption must contain sufficient amounts of protein because globulin plays a role in the formation of hemoglobin. Anemia is a medical condition that can be experienced by every age group. Although it is not accompanied by mild anemia or iron deficiency (Lasmawanti et al., 2022).

CONCLUSION

Experiencing anemia, as many as 2 respondents (7.1%) with positive stunting results, normal children's blood hemoglobin levels were shown to be 9 - 11.5 gr/dl as many as 26 respondents (92.9%), with positive stunting as many as 1 respondent (3.7%) and negative as many as 25 respondents. (89.2%). The p-value result is 0.061, which means that there is a relationship between Hb examination and the incidence of stunting that is smaller than 0.05.

Normal height with a positive stunting incidence of 1 respondent (3.51%) and a negative stunting incidence of 24 respondents (85.7%). Less height was associated with a positive stunting incident of 2 respondents (7.1%) and 1 respondent (3.51%) had a negative stunting incident with a p-value of 2.652, which means it was greater than 0.05, meaning there was no relationship between low height and the incidence of stunting.

To increase height and prevent anemia, it is hoped that elementary school children can eat a good diet, which is sufficient with high protein and carbohydrates and high fiber. Foods that contain nutrients will increase blood hemoglobin. The aim of blood hemoglobin is to increase the body's immune system to be more optimal and prevent diseases from occurring, especially infections in the body.

If a child's immunity decreases, the child will often contract diseases and cause infections and when a blood test is carried out, anemia will be detected. If this problem is not addressed, anemia will occur which is even worse for the child and will damage his body's growth.

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