

The Effectiveness of Nutrition Education on the Improvement of Iron Intake, Protein and Hemoglobin Levels Towards Zero Stunting At Amanah Deli Serdang Private Junior High School in 2022

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ABSTRACT

Profile of Medan City Health Office, anemia survey conducted in 4 districts/cities in North Sumatra, namely Medan City, Binjai, Kab. Deli Serdang, and Langkat it is known that 40.50% of women suffer from anemia. The stunting rate in 2019 was still at 27.67%. Meanwhile, based on data from the Ministry of Health's Basic Health Research, from 2013 to 2018 there was an increase in the prevalence of anemia in the 15-24 year age group, from 18.4% to 32% or 14.7 million people. The purpose of this study was to determine the effectiveness of nutrition on improving iron intake, protein and hemoglobin levels towards zero stunting in Amanah Deli Serdang Private Junior High School in 2022. This was a quantitative study, using a quasi-experimental design with one group pretest-posttest design. The population in this study were all students of SMP Amanah Deliserdang, the sample in this study was 28 grade 2 students. Iron intake showed that the p value = 0.015. the protein intake variable shows that the p value = 0.009, Based on the hemoglobin level variable the p value = 0.009 of the three variables shows that the p value < 0.05

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INTRODUCTION

Anemia is a decrease in the quantity of red blood cells in circulation or the amount of hemoglobin is below the normal limit (Dea Indratanti 2014). The impact that occurs if the prevention of anemia is not carried out can reduce academic ability and study concentration, and decrease physical ability (Titin Caturiyantiningtiyas 2014). Cases of anemia are very prominent in school children, especially adolescent girls. Adolescent girls are at high risk of suffering from anemia, because at this time there is an increase in the need for iron due to growth and menstruation. High school activities and extracurricular activities will have an impact on irregular eating patterns, besides the habit of consuming drinks that inhibit iron absorption will affect a person's hemoglobin level (Titin Caturiyantiningtiyas 2014)

The reality of teenagers today is less like consuming foods that contain iron. Usually teenagers tend to like to consume junk food and fast food, even though these two types of food do not have complete nutritional content. On the other hand, teenagers are also proud to consume traditional foods, because they are no longer following the trend. Usually many teenagers only like to consume certain foods, so that their bodies do not get varied nutritional intake. With the diversity of foods consumed, it will trigger a decrease in the production of red blood cells, making it easy for anemia to occur. (Umi Faridah, Subiwati, 2017) Adolescent girls have a ten times greater risk of suffering from anemia. This is because young women experience menstruation every month and are in a period of growth so they need more nutritional intake. Imbalance in consuming iron is also a cause of anemia in adolescents. In addition, the factor that causes anemia in adolescent girls is knowledge. Adolescent knowledge about anemia will affect food consumption patterns which result in nutritional status. (Titin Caturiyantiningtiyas 2014).

Researchers conducted an initial survey at the Amanah Deliserdang private junior high school and conducted an assessment and collected data using a questionnaire to 10 students of the Amanah Deliserdang Private Junior High School, an examination of height and weight was carried out to determine the stunting found in students and there were 3 people with stunting and The intake of iron, protein and hemoglobin levels were checked. There are 2 students experiencing anemia and 2 people experiencing a decrease in protein and 3 people experiencing a decrease in iron and 7 students claiming that they did not get in-depth education about nutrition and students do not want to eat vegetables and fruit, students prefer fast food and only eat I like to eat snacks and the researcher intends to conduct a study with the title of the effectiveness of nutrition education on improving iron intake,

RESEARCH METHOD

This research is a quantitative research, using a quasi-experimental design with one group pretest-posttest design. This research was conducted by giving a pretest (initial observation) before being given an intervention, after being given an intervention, then a posttest (final observation) will be carried out again. After the intervention is expected to change by comparing the blood pressure pretest with posttest. (Notoatmodjo, Soekidjo. 2007)

RESULTS AND DISCUSSIONS

Results

Table 1. Characteristics

Characteristics		f	%
Gender	Woman	13	46.42
	Male	15	53.57
Age	14 years	10	35.7
	15 years	14	50
	16 years	4	14.3
Amount		28	100

From the results of the frequency distribution based on the gender characteristics of the Amanah Private Junior High School students, 28 people, 13 women (46.42%) and 15 men (53.57%) were found. Based on the age of Amanah Private Junior High School, 10 people (35.7%) were 14 years old, and 15 years old (50%) and 16 years old were 4 (14.3%).

Bivariate Analysis

Table 2. Frequency distribution by iron intake, protein and hemoglobin levels

Iron Intake	Before		After	
	n	%	n	%
Normal 18 - 270 mcg/L	10	35	25	89
Deficit < 18 - 270 mcg/L	18	65	3	11
Protein Intake	Before		After	
	n	%	n	%
Normal 6-8.3 g/dl	13	46.5	26	92.8

Deficit < 6 - 8.3 g/dl	15	53.5	2	7.1
Intake of Hemoglobin Levels	Before		After	
	n	%	n	%
Normal 13 - 14 mg/dl	9	32.1	20	71.4
Anemia < 13 - 14 mg/dl	19	67.9	8	28.6
Total	28	100	28	100

Based on table 2. the total iron intake of respondents was 28 people and those who had a normal iron intake of 18 - 270 mcg/L before education were 10 people (35%) and after education as many as 25 people (89%), iron intake deficit < 18 0 270 mcg/L before education as many as 18 people (65%) and after education as many as 3 people (11%). Based on normal protein intake of 6-8.3 g/dl before education as many as 13 people (46.5%) and after education as many as 26 people (92.8%) and who have a protein intake deficit of < 6 -8.3 g/dl before education as many as 15 people (53.5 %) and after education was given as many as 2 people (7.1%). The intake of normal hemoglobin levels was 13-14 mg/dl before education as many as 9 people (32.1%) and after education as many as 20 people (71.4%) and those with anemia had less hemoglobin intake (anemia) <

Table 3. Frequency distribution based on iron intake, protein and levels hemoglobin

Variable Iron Intake	N	mean	Std Deviation	Test results
Before	28	151.32	11.084	0.015
After	28	94.33	8,680	0.015
Variable Protein Intake	N	mean	Std Deviation	
Before	28	27,090	4.9668	0.009
After	28	28,267	5.5331	0.009
Variable Hemoglobin Level	N	mean	Std Deviation	
Before	28	13,419	1.6594	0.010
After	28	13,741	1.9341	0.010

Based on table 3. it can be seen from the variable iron intake before education as many as 28 respondents with a mean of 151.32 and a standard deviation of 11,084 and after education with a mean of 94.33 and a standard deviation of 8,680 with the results of the paired sample T-test before and after education showed that the p value = 0.015, which means p value < 0.05, the null hypothesis (Ho) is rejected, which means that there is an effectiveness of nutrition education on improving iron intake in Amanah Deli Serdang private junior high school.

Based on the variable protein intake before education, the mean is 27,090 with a standard deviation of 4.9668 and after education, the mean is 28,267, the standard deviation is 5.5331. The results of the paired sample T-test before and after education show that the p value = 0.009, which means the p value < 0.05, the null hypothesis (Ho) is rejected, which means that there is an effectiveness of nutrition education on improving protein intake in Amanah Deli Serdang Private Junior High School.

Based on the variable hemoglobin level before education, the mean is 13,419 with a standard deviation of 1.6594 and after education the mean is 13,741 with a standard deviation of 1.9341. The results of the bivariate analysis using the paired sample T-test on hemoglobin levels showed that the p value = 0.009 which means p < 0.05, then the null hypothesis (Ho) is rejected, which means that there is an effectiveness of nutrition education on improving hemoglobin levels. at Amanah Deli private junior high school, Serdang.

So from the results above, it can be stated that there is an effectiveness of nutrition education on improving iron intake, protein and hemoglobin levels towards zero stunting in Amanah Deli Serdang Private Junior High School in 2022.

Discussion

a. Characteristics by age

Age factor is very important in determining nutritional status. Errors in determining age will cause the interpretation of nutritional status to be wrong. Accurate height and weight measurement results are meaningless if they are not accompanied by an appropriate age determination. The age limit used is the year of full age (Completed Year) and for children aged 7-12 years the month of

school age is used (Completed Month) (Supariasa, et al, 2002). The sample in this study was Amanah Deliserdang private junior high school students in grade 210 people aged 14 years (35.7%) and 15 years old (50%) and 4 people aged 16 years (14.3%).

b. Characteristics by gender

The gender characteristics of Amanah Private Junior High School students are 28 people, of which 13 are female (46.42%) and 15 are male (53.57%) The nutritional needs of boys are different from girls. Boys do more physical activity, so they need more energy. While girls usually have started menstruating so they need more protein and iron (Mangunkusumo, 2009).

For this reason, parents need to pay attention to the needs of their children, both male and female. Parents also need to know the condition of their children, their children's activities, so that they can provide the appropriate nutritional intake to meet their needs. It is very important to pay attention so that the learning process that is being carried out by their children does not experience interference or obstacles. Theoretically it is also explained that gender has a relationship with nutritional status. This is related to differences in diet and nutritional intake between boys and girls.

In schoolchildren, boys tend to consume more food so that it allows for more energy intake so as to allow greater energy intake which can directly contribute to the incidence of overnutrition (Almatsier, et al, 2011). A similar statement was also expressed from the results of a study in Canada on children 7-12 years old, namely boys consume more energy, carbohydrates, protein, and fat than girls (Ball, et al, 2005).

c. Intake of iron (fe) Pre-Test and Post-Test

Low intake of iron into the body that comes from consuming iron from daily food is one of the causes of anemia (Marmi, 2013). The intake of iron into the body of adolescent girls is influenced by: Consumption of Foods Containing Iron, In food there are 2 kinds of iron, namely heme iron (40%) and non-heme iron. Non-heme iron is the main source of iron in the diet. It is found in all types of vegetables such as green vegetables, beans, potatoes and cereals as well as some types of fruit. While almost all of heme iron is found in animal foods include meat, fish, chicken, liver and other organs (Dinkes Medan 2019).

Most of the population in countries that (belum) being developed are not (yet) able to present Fe-rich materials on the dining table (Arista AD. 2017). In adolescence, especially young women, they are often very aware of their body shape, so many limit their food consumption. In fact, many are dieting without the advice or supervision of a health and nutrition expert, so that the pattern of consumption is in violation of the rules of nutrition science. Many taboos or taboos are self-determined based on hearing from friends who are incompetent in matters of nutrition and health, resulting in various symptoms and complaints that are actually symptoms. nutritional disorders (Hartanti, Diastya Putri and Ningrum, Loeh Tiara Setia. 2015).

Many young women often skip two meals and prefer snacks. Even though most snacks are not only empty of calories, but also contain very few nutrients, besides being able to interfere (eliminate) appetite. In addition, teenagers, especially young women, are increasingly fond of junk food which has very little (or even none) content of calcium, iron, riboflavin, folic acid, vitamin A and vitamins.

Consumption of Iron (Fe) Tablets, The importance of giving this iron to someone who is suffering from iron deficiency anemia and there is no absorption disorder, then in 7-10 days an increase in Hb levels can occur with taking tablets plus blood of 1.4 mg / day (Saptyasih, ARN, Widajanti, L and Nugraheni, SA 2016). In cases of excessive bleeding or normal menstrual bleeding, iron loss due to bleeding must be replaced. Since the average period bleeds 60 ml per month, which is equal to 30 mg of iron, women need an extra milligram per day to be absorbed in order to maintain balance.

Iron supplements should be taken at night, because the effects of iron supplements can cause nausea. The number of supplements given is estimated to meet the needs of women. The need for iron 3000 to 5000 mg in the body, which is excreted by the body every day is only 1 mg and only 60% (1800-3000 mg) is in erythrocytes, 30% is as iron reserves and only 20% is in various forms of iron. other organs such as muscles, enzymes and others.

d. Protein intake Pre-Test and Post-Test

Protein is a very important nutrient for the body because of its function as a source of energy in the body and also as a building material. Protein is a source of amino acids that contain elements of

C, H, O and N. Protein molecules also contain phosphorus, sulfur, and types of proteins that contain metal elements such as iron and copper. As a building block, protein is a building block for new tissues that are always occurring in the body. During growth, the process of tissue formation occurs rapidly. During pregnancy, it is protein that forms fetal tissue and embryonic growth. Protein also replaces damaged and necessary body tissues overhauled (Sulistyoningsih, H. 2011)

Protein has an important role as a building block and regulator, and functions as a component of body cells. Protein can be obtained from plants and animals. Animal protein has a higher quality than vegetable protein, because it contains a complete and optimal composition of essential amino acids to meet human needs. Apart from the quality, the amount or quantity of the protein you eat is also important to note. Protein needs in adolescence increase significantly, due to an increase in muscle mass, the need for erythrocytes and myoglobulins, as well as hormonal changes. At the beginning of adolescence, the protein needs of adolescent girls are higher than boys, because adolescent girls enter a period of growth faster. With age, Teenage girls will gain weight by tending to accumulate fat while teenage boys gain weight by increasing muscle and skeletal mass. So, protein requirements in adolescent girls are lower than adolescent boys.

Adolescent girls who have low and inadequate levels of protein intake over a long period of time can cause linear growth retardation and sexual maturation, decreased muscle mass, organ function and immunity, inhibited iron transport and reduced fat-free body mass. In addition, young women will also be at risk of experiencing SEZ. In a study (Dictara et al 2020) showed that low protein intake could be at risk for CED. This can happen because the role of protein in building the structure of body tissues becomes the final part to supply energy needs when carbohydrate and fat intake is reduced and as compensation in the event of an energy deficit.

e. Pre-Test and Post-Test Hemoglobin Level

In cases of excessive bleeding or normal bleeding during menstruation, iron loss due to bleeding must be replaced because menstruation averages 60 ml of blood per month, which is equal to 30 mg of iron, women need one extra milligram per day to be absorbed in order to balance. So there is a significant difference in hemoglobin levels between pre-test and post-test hemoglobin levels by consuming iron (Fe) tablets.

By consuming tablets plus blood of 1.4 mg/day within 7-10 days, an increase in hemoglobin levels can occur. Increased levels of hemoglobin in the blood. It can also occur in addition to supplements, namely by eating foods rich in iron, folic acid as well as B vitamins and consuming foods that easily absorb iron, for example foods that contain lots of high vitamin C and avoid foods or drinks that inhibit iron absorption. such as coffee and tea. Iron deficiency can lead to anemia and fatigue, conditions that make them unable to seize work opportunities. Adolescents need more iron and women need even more to replace the iron lost with the bloodaid (Arista AD. 2017). Based on the analysis of the paired t-test in the control group, it shows that p value is 0.010, this means $p < 0.05$, then there is a significant difference in hemoglobin levels between pre-test and post-test hemoglobin levels.

This is in accordance with the theory which states that young women who have experienced menarche. If the blood that comes out during menstruation is very large (many are not aware that there is a lot of menstrual blood) there will be iron deficiency anemia, because the amount of blood lost during one menstrual period ranges from 20-20cc, this amount implies iron loss of 12.5-15 mg/month, or approximately equal to 0.4-0.5 mg/day. If this amount is added to the basal loss, the total amount of iron lost is 1.25 mg/day.

Usually, many young people only consume certain foods, so that their bodies do not get a varied and balanced nutritional intake. With the diversity of foods consumed, there can be a decrease in the production of red blood cells, making it easy for this to happen anemia. Delivery of health messages and information can be provided through videos, animations, games. The education provided is by using leaflets and lectures in front of the class.

CONCLUSION

Based on the results and analysis conducted by researchers regarding the effectiveness of nutrition education on improving iron intake, protein and hemoglobin levels towards zero stunting at

Amanah Deli Serdang Private Junior High School in 2022, the following conclusions can be drawn: Based on table 1, the results of the frequency distribution based on the gender characteristics of Amanah Private Junior High School students amounted to 28 people, of which 13 were female (46.42%) and 15 people were male (53.57%). Based on table 1. the results of the distribution by age in Amanah Private Junior High School are 10 people (35.7%) and 15 years old (50%) and 4 people aged 16 years (14.3%). Based on table 2. it can be seen from the variable iron intake before education as many as 28 respondents with a mean of 151.32 and a standard deviation of 11,084 and after education with a mean of 94.33 and a standard deviation of 8,680 with the results of the paired sample T-test before and after education showed that the p value = 0.015 which means p value < 0.05 then the null hypothesis (Ho) is rejected, which means that there is an effectiveness of nutrition education on improving iron intake in Amanah Deli Serdang private junior high school. Based on the variable protein intake before education, the mean is 27,090 with a standard deviation of 4.9668 and after education, the mean is 28,267, the standard deviation is 5.5331. The results of the paired sample T-test before and after education show that the p value = 0.009, which means the p value < 0.05, the null hypothesis (Ho) is rejected, which means that there is an effectiveness of nutrition education on improving protein intake in Amanah Deli Serdang Private Junior High School. Based on the variable hemoglobin level before education, the mean is 13,419 with a standard deviation of 1.6594 and after education the mean is 13,741 with a standard deviation of 1.9341. The results of the bivariate analysis using the paired sample T-test on hemoglobin levels showed that the p value = 0.009 which means p < 0.05, then the null hypothesis (Ho) is rejected, which means that there is an effectiveness of nutrition education on improving hemoglobin levels. at Amanah Deli private junior high school, Serdang. So from the results above, it can be stated that there is an effectiveness of nutrition education on improving iron intake, protein and hemoglobin levels towards zero stunting in Amanah Deli Serdang Private Junior High School in 2022.

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