The Correlation between Iron, Vitamin, and Protein intake with the thinking ability of the fourth and fifth grade students

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Abstract

The ability to think and successful in education are two interrelated things. One's thinking intelligence is closely related to one's nutritional status. Children who have good nutritional status and have a good habit pattern will also have good intelligence. The objectives to figure out the correlation between iron, vitamin and protein intake with the thinking ability of fourth and fifth grade students at 01 Kotayasa Elementary School, Sumbang Subdistrict, Banyumas District.

This research is an analytical survey with correlation studies. The population in this study were all fourth and fifth grade students of 01 Kotayasa Elementary School, using total sampling techniques and a total sample of 70 students. Data analysis using chi square test.

The gender characteristics of respondents who are mostly male 43 respondents (61.4%), the age characteristics of respondents are mostly 11 years, as many as 32 respondents (45.7%), most respondents have iron intake good vitamins and proteins, as many as 39 respondents (55.7%), most of the respondents have good thinking ability, as many as 44 respondents (62.8%), there is a correlation intake between iron, vitamin, and protein with students' thinking ability in fourth and fifth grade in 01 Kotayasa Elementary School, Sumbang Subdistrict, Banyumas District. Based on Chi Square test obtained ρ-value = 0,000 (<0,05).

Keywords: Iron intake, Protein, Students, Thinking ability, Vitamin

1. Introduction

Children who have good nutritional status and have good habits, will also have good intelligence. Nutritional status will affect a person's level of intelligence and a person's ability to capture lessons in school, so that someone who has a good nutritional status will have a better grasp and can get good achievements at school. Conversely, if someone has a nutritional status that is less will have an impact on intelligence so that it is not optimal in capturing lessons at school so that learning achievement is not good.

One of the factors that influence the decrease in learning concentration is iron deficiency (Benoist B, Et al, 2008). Foods that can increase absorption of iron, especially nonheme iron are certain vitamins and sources of animal protein, such as meat and fish (Adriani and Wirjatmadi, 2012). Protein is the main source of iron in food. Iron absorption that occurs in the small intestine is aided by protein transport, namely transferrin and ferritin. Transferrin contains ferro-shaped iron which functions to transport iron to the bone marrow to form hemoglobin (Almatsier, M, 2009). So that students' ability to concentrate becomes better.

Based on the data obtained from one of the fourth grade mathematics teacher of 01 Kotayasa Elementary School, that the average grade of the 2016/2017 even semester final test, which is 61.04 with the minimum completeness criteria (MCC) is 70. The average value obtained by fourth and fifth grade is still relatively low, namely not achieving the minimum completeness criteria (MCC) specified. In addition, in an interview with the mathematics teacher of 01 Kotayasa Elementary School. The teacher said that during the teaching and learning process students tend to be passive, students are easily discouraged in completing tasks or problems, especially problems that require reasoning such as story problems, and students prefer to chat with their peers and play alone rather than paying attention to the teacher's explanation. The purpose of this study was to determine the relationship of iron intake, vitamins, and protein with the thinking ability of fourth and fifth grade students of 01 Kotayasa Elementary School in Sumbang Subdistrict, Banyumas District.

2. Materials and Methods

This research is an analytical survey with correlation studies. Analytical survey is a study that tries to explore how and why health phenomena occur then analyzed whether there is a relationship between the two and correlation study is a study of the relationship between two variables in a situation or group of objects (Notoatmodjo, 2010). In this study the researchers want to analyze the relationship of iron intake, vitamins, and protein with the ability to think.

The type of approach used is cross sectional, namely the type of research that emphasizes the time of measurement / observation of independent and dependent variable data only once at a time (Nursalam, 2008). In this study the researchers wanted to examine the relationship between iron intake, vitamins, and protein with the thinking ability of fourth and fifth grade students at 01 Kotayasa Elementary School, Sumbang Subdistrict, Banyumas District.

The location of the study is conducted at 01 Kotayasa Elementary School. Data retrieval was carried out on April 2018. The population in this study were fourth and fifth grade students of 01 Kotayasa Elementary School totaling 70 students. The sample that is desired to answer the research problem is part of the affordable population (Saryono, 2013). The sample consists of a portion of the affordable population that can be influenced as the subject of research through sampling (Nursalam, 2008). The sample in this study were 70 students of fourth and fifth grade. The sampling technique in this study using total sampling technique is a sampling technique that is carried out thoroughly from the population (Notoatmodjo, 2010). The research instrument is a tool or facility used by researchers in collecting data so that their work is easier and the results are better (meticulous, complete and systematic) so that they are easier to process (Saryono, 2013). The researcher used a data collection tool in the form of a questionnaire to obtain information from respondents. There were 2 questionnaires in this study, namely a questionnaire to measure nutritional intake and thinking ability.

The final step of a study is to do data analysis. Data analysis was carried out in stages and carried out through a computerized process (Notoatmodjo, 2010). The analysis in this study includes.

2.1 Univariate Analysis

Univariate analysis is analysis using frequency distribution. With frequency distribution we can find out the percentage of a group in all observations. After the data is obtained, the percentage calculation is carried out using the formula:

$$P = \frac{F}{N} \text{ x}100\%$$

Information:
P = Percentage
F = Frequency
N = Number of samples

2.2 Bivariate Analysis

Bivariate analysis is an analysis performed on two variables that are thought to have a relationship or correlate (Notoatmodjo 2010). Bivariate analysis in this study was used to determine the relationship of iron intake, vitamins, and protein with thinking skills of fourth and fifth grade students of 01 Kotayasa Elementary School. To find out the existence of a relationship, Chi square (X^2) test was performed. The formula used was as follows:

$$x^2 = \sum_{i=1}^{k} \frac{(F_0 - F_h)^2}{F_h}$$

Information:
X^2 = Chi squared
F_0 = observed frequency
F_h = Expected frequency
According to Santjaka Aris (2009), in making decisions based on the assessment criteria as follows:

a. Ha is accepted if p-value <α (0.05) for a significant level of 5% means that there is a relationship between iron intake, vitamins, and protein with the thinking ability of fourth and fifth grade students of 01 Kotayasa Elementary School.
b. Ha is rejected if p-value> α (0.05) for a significant level of 5% means that there is no correlation between iron intake, vitamins, and protein with the thinking ability of fourth and fifth grade students of 01 Kotayasa Elementary School.

3. Result and Discussion

3.1 Result

After conducting research on "Relationship between iron intake, vitamins, and protein with the thinking ability of fourth and fifth grade students of 01 Kotayasa Elementary School in Sumbang Subdistrict, Banyumas District conducted on April 2018 with a sample of 70 student respondents the following results were obtained :

3.1.1 Univariate Analysis

3.1.1.1 Characteristics of respondents

From the results of the research that has been done, the data related to the characteristics of respondents based on gender, age, iron intake, vitamins, and protein and the ability to think in table 1 are obtained.

Table 1 Characteristics of Respondents

Variable	Frequency (n = 70)	Percentage(%)
Gender of Respondents		
Man	43	61,4
Women	27	38,6
Total	70	100
Age of Respondents		
10 years old	12	17,2
11 years old	32	45,7
12 years old	26	37,1
Total	70	100

Source: Primary Data

Based on table 1, it is known that the characteristics of the respondents' sexes were mostly male, 43 respondents (61.4%). The age characteristics of the respondents were mostly 11 years old, namely 32 respondents (45.7%).

3.1.1.2 Description of Variables

From the results of the research that has been done, the data related to the description of the variables in table 2 is obtained.

Table 2 Description of Variables

Variable	Frequency (n = 70)	Percentage (%)
Intake of Iron, Vitamins and Proteins		
Well	24	34,2
Is being	31	44,3
Less	15	21,5
Total	70	100
Ability to think		
Well	28	40
Enough	23	32,8
Less	19	27,2
Total	70	100

Source: Primary Data

Most of the respondents have good nutritional intakes as many as 31 respondents (44.3%). While the respondent's thinking ability are mostly good, namely 28 respondents (40%).

3.1.2 Bivariate Analysis

The results of bivariate analysis about the relationship of iron intake, vitamins, and protein with the thinking ability of fourth and fifth grade students of 01 Kotayasa Elementary School in Sumbang Subdistrict, Banyumas District using the Chi Square test, and obtaining the following results :

Table 3 Analysis of the relationship between iron intake, vitamins, and protein with the thinking ability of fourth and fifth grade students at 01 Kotayasa Elementary School in Sumbang Subdistrict, Banyumas District.

Intake of Iron, Vitamins and Proteins	Ability to think			Total		*ρ-value*
	Well	Enough	Less			
	f	f	f	f	%	
Well	17	19	0	36	100	
Is being	13	0	2	15	100	0,009
Less	5	6	8	19	100	
Total	35	25	10	70	100	

Source: Primary Data

*Description: Significant at ρ-value of 0.05, n = 70

Based on table 3 above, it can be seen that out of 36 respondents who have good intake there are 17 respondents who have good thinking skills and 19 respondents who have sufficient thinking ability, and 0 respondents have less thinking ability, than 15 respondents who have moderate intake of 13 respondents those who have good thinking skills and 0 respondents have sufficient thinking skills, and 2 respondents have less thinking skills, than 19 respondents who have less than 5 respondents who have good thinking skills. 6 respondents have sufficient thinking skills, and 8 respondents have less thinking skills. Based on the Chi Square test, the ρ-value = 0.009 (<0.05) which means that there is a relationship between iron intake, vitamins, and protein with the thinking ability of fourth and fifth grade students of 01 Kotayasa Elementary School, Sumbang Subdistrict, Banyumas District.

3.2 Discussion

3.2.1 Characteristics of Respondents

The results of research conducted in fourth and fifth grade of 01 Kotayasa Elementary School, Sumbang Subdistrict, Banyumas District with 70 respondents indicated that the majority of respondents were male, as many as 43 respondents (61.4%). The results of this study are also in line with the results of the study of Soedibyo and Gunawan (2009), showing that the proportion of boys and girls is almost balanced, namely 53.4% and 46.6%. Piaget's theory states that female students have advantages in accuracy, accuracy, accuracy and accuracy in thinking, while male students excel in logical reasoning (Mutammam and Budiarto, 2013).

Characteristics of respondents based on age, that is, most respondents aged between 11 years were 32 respondents (45.7%). In this range the age of the child enters the age of school-age children. School-age children are children aged 6-12 years who begin to enter elementary school education which means that school becomes a child's core experience. The period when children are considered to begin to take responsibility for their own behavior in relationships with their parents, peers, and other people. School age is a period of childhood obtaining knowledge bases for successful adjustment to adult life and acquiring certain skills (Wong, D, 2009). Respondents in this study who were 10-13 years old were cognitively capable of thinking abstractly, reasoning logically and being able to draw conclusions from available information so that they could understand the explanation of the aims and objectives of this study.

3.2.2 Iron intake, vitamins and protein

Based on tables 1 and 2 it is known that most respondents have good iron, vitamin and protein intake, which is equal to 31 respondents (44.3%). Macronutrient intake (energy and protein) is related to brain cognitive function. Energy is needed to support all biological and chemical mechanisms in the body including the maturity of the nervous system. Proteins play a role in building and maintaining body cells and tissues. The quality of protein consumed affects the amount of brain protein and neurotransmitters.

Iron is the most abundant micro mineral in the human and animal bodies. There are two types of iron in food, namely: iron hem and non hem. Iron hem is contained in meat, fish, and poultry. Whereas non hem iron is obtained from all foods originating from all plants. Iron hem consumption is higher than non-hem iron. Iron hem is only about 5-10% of iron consumed but its absorption is better, which is around 25% compared to the absorption of non-hem iron only about 5%. A diverse diet, adequate animal food (meat and fish) coupled with sources of vitamin C to increase iron absorption will increase the availability of iron in food.

Protein is a food substance that is very important for the body. This substance besides functioning as a producer of energy, the body also has a main function as a builder and regulator. Protein also functions as a power in a state of energy needs that are insufficient by carbohydrates and fats, which energy is needed to meet the needs during the activity period, because without this fulfillment, the metabolism in the body does not run smoothly. One important function of protein is the formation of antibodies. The body's ability to fight infection depends on its ability to produce antibodies to organisms that

cause certain infections or to foreign materials entering the body. Protein deficiency is common in low socio-economic communities. While proteins that are consumed in excess are also not beneficial to the body. foods that are high in protein are usually high in fat so they can cause obesity. Protein in food requires 10-15 of total calories.

3.2.3 Thinking Ability

The thinking ability variable is known that there are 28 respondents (40%) have good thinking skills and 26 respondents (37.1%) are not good. Plato in Suryabrata, Sumadi (2013) thinks that thinking is speaking in the heart. Based on the last opinion from Plato, two facts were stated, namely, that thinking was an activity, so subjects who were active thinkers and activities were ideational in nature, so they were not sensory or motoric, even though they could be accompanied by both; thinking uses abstraction or "ideas". Based on the opinion of Plato in Suryabrata, Sumadi (2013) namely that teachers emphasize more on students to do more activities during learning such as practicum. In explaining the material followed by practicum which is applied directly in daily life, it is expected that students or subjects can think actively and better understand the material provided. So that it can be concluded that thinking is a dynamic process that can be described according to the process or path.

3.2.4 Relationship to Iron, Vitamin, and Protein Intake with Thinking Ability

The results showed that there was a correlation between iron intake, vitamins, and protein with the thinking ability of fourth and fifth grade students of 01 Kotayasa Elementary School in Sumbang Subdistrict, Banyumas District, with a p-value of 0.009. From the results of these calculations it can be seen that the ρ-value is <0.05, which means that statistically there is a relationship between iron intake, vitamins, and protein with the thinking ability of fourth and fifth grade students of 01 Kotayasa Elementary School, Sumbang Subdistrict, Banyumas District.

The results of this study are supported by the research of Sorhaindo and Feinstein in London which states that there is a relationship between nutritional status and learning achievement. In their research, they found that poor nutrition experienced by children will affect the immune system so that children more easily suffer from infectious diseases. This situation will affect the presence of children in school so that children tend to be left behind in the learning process so that it affects learning outcomes. Poor nutritional status causes imperfect brain development that causes cognitive and developmental IQ to be inhibited and impaired learning abilities which subsequently affect student achievement. Hodgkin also stated that abilities and learning outcomes apart from being influenced by nutritional status based on the index weight / height, weight / age, height / age and body mass index (BMI), were also influenced by the accuracy in choosing foods that were rich in nutrients and dietary habits. Choosing the right nutrition will optimize brain growth and development (Sa'adah, H.R, Herman, R.B, & Sastri S, 2014)

Many factors influence student learning achievement, namely internal factors and external factors. Internal factors include physiological and psychological aspects. Physiological aspects are related to physical conditions and certain physiological functions (vision, hearing and disease). The psychological aspect consists of attitudes, habits, talents, interests, needs, motivations and emotions. Malnutrition in the past will cause metabolic changes in the brain, especially if this occurs during the golden period (3 years) of the child's brain growth and development. This will lead to the inability of the brain to function normally. In more severe and chronic conditions, malnutrition causes disrupted growth, smaller bodies, reduced number of cells in the brain and immaturity and imperfections in biochemical organizations in the brain. This situation will affect the development of children's intelligence.

4. Conclusions

Based on the results of the research and data analysis, the conclusions can be drawn, as follows: The characteristics of the sex of the respondents who were mostly male were 43 respondents (61.4%). The age characteristics of the respondents were mostly 11 years old, namely 32 respondents (45.7%). Most of the respondents had good iron, vitamin, and protein intake as many as 39 respondents (55.7%). Most respondents have good thinking skills as many as 44 respondents (62.8%). There is a relationship between iron intake, vitamins, and protein with the thinking ability of fourth and fifth grade students at 01 Kotayasa Elementary School in Sumbang Subdistrict, Banyumas District.

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