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ANEMIA RISK FACTORS AT CHILDRENS AGE OF ELEMENTARY SCHOOL IN GOVERNMENT ELEMENTARY SCHOOL 2 ABEPURA AND GOVERNMENT ELEMENTARY SCHOOL INPRES SKOUW SAE CITY OF JAYAPURA PAPUA

MAXSI IRMANTO

Lecturer Of Nutritions,Faculty Public Health Cenderawasih University-Papua,Indonesia:
Email: maxiirmanto@gmail.com

ABSTRACT

Preliminary. Anemia occurs because the intake of food consumed is not sufficient. Based on Riskesdas 2007 the prevalence of anemia in Papua Province is 13.1% and according to World Health Organization/ WHO 2008 anemia in Papua Province is classified as moderate.

Objective. This research is aimed to know the risk factors of anemia in elementary school children in Government Elementary School 2 Abepura and Government Elementary School Inpres Skouw Sae.

Methods. The type of this research is descriptive analytic using cross sectional research design with the total sample of 126 children from 2 primary schools and sampling using stratified random sampling technique. The study was conducted on elementary school students of class V and VI in July - August 2015 at Government Elementary School 2 Abepura and Government Elementary School INPRES Skouw Sae. The variables studied were anemia, determined on the basis of hemoglobin concentration by *cyanmethemoglobin* method, while breakfast habits, vitamin C intake, intake of Fe, and protein intake were measured by food recall method. The analysis used is univariate and bivariate analysis.

Results. The results showed that 43 (34.1%) samples had anemia and 83 (65,9%) samples that did not have anemia, breakfast habit category was less 57 (45,2%) sample, vitamin C intake category less 82 (65 , 1%) of the sample, the intake of Fe less 76 (60.3%), and the protein intake category was less than 36 (28.6%). The results of the statistical test showed a relationship of breakfast habits ($p = 0,000$), intake of vitamin C ($p = 0,000$), intake of Fe ($p = 0,000$), and protein intake ($p = 0.007$) with anemia incidence in elementary school children in Government Elementary School 2 Abepura And Government Elementary School Inpres Skouw Sae.

Keywords: *anemia, hemoglobin, elementary school children*

PRELIMINARY

Anemia is the most widespread health problem, especially in developing countries among school-aged children. At this time the child is still in its infancy and has a high activity. Therefore, schoolchildren should have optimal potential in terms of both physical and mental and intelligence. If the body lacks food intake, then the body will experience lack of certain nutrients (Gutema et al, 2014). In developing countries, the prevalence of anemia in school-aged children is 12-60% (Gutema et al, 2014). Anemia is an indicator of the lack of nutrient intake and poor health of a person. Children who have anemia can cause a decrease in cognitive development, disrupt physical growth, decrease learning achievement so as to affect the formation of human resource quality in the productive period. In adults experiencing anemia can lead to fatigue, low work productivity (Assefa et al, 2014 and Sudhagandhi et al., 2011).

Based on Sudhagandhi (2011) study in India, the prevalence of anemia in primary school children is 52.88%. Research Gomber et al (2003) also in India, said that the prevalence of anemia in primary school children in urban areas is 51.5% and in rural areas by 41.8%. Based on data from the WHO in the *Worldwide Prevalence of Anemia* (2008) note that the total population of the world who suffer from anemia was 1.62 billion people with a prevalence of 48.8% and the prevalence of anemia in Southeast Asia was 14.9%. In school children the prevalence of anemia is 25.4% and this prevalence states that 305 million school children worldwide suffer from anemia (Benoist, 2008). Data from the Ministry of Health of Indonesia (2011) revealed that the prevalence of anemia in children in Indonesia reached 17.6% (Ministry Of Health RI, 2012). Nationally the prevalence of school anemia is 27.5% in urban areas, and 31.0% for rural areas (Regional Health Research, 2013). In the report of the result of Basic Health Research in 2007 stated that the

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province of Papua has anemia prevalence in children 14 years = 13.1% (Regional Health Research, 2007).

Arisman (2004) states that school-aged children are one of the groups who are prone to anemia. The main factor of the onset of anemia is due to unbalanced and less diverse food factors. The consequences of anemia for school-aged children are decreased capacity and learning ability.

Ministry Of Health set *Cut of Point* prevalence of anemia in school children as a public health problem limit in Indonesia that is > 20%. According to WHO (2008), the prevalence of anemia reaches 40% is classified as severe, 10-39% prevalence is moderate and less than 10% is classified as mild. Government Elementary School 2 Abepura is a school located in areas classified as urban and the location of the school is located in the city center where these places readily available snacks and *fast food* outlets easily visited and the numbers vary greatly. Meanwhile, Government Elementary School INPRES Skouw Sae is located in a relatively rural area.

In the area of Abepura (urban areas) access to food is the indirect access or by buying, whereas in Kampung Skouw Sae (rural areas) which largely livelihoods as farmers obtain their food by means of direct access and then treated himself to be consumed. Food consumption in urban areas tends to be fast food type, whereas in rural areas tend to use their own food that people get around the environment.

METHOD

This research is descriptive research with studicross sectional approach, that is research to study correlation dynamics between risk factor by observation or data collection approach at one time (Notoatmodjo, 2012). The design chosen according to the purpose of research is to know the risk factors of anemia in elementary school children in Jayapura City. The population in this study were all children of school grades V and VI at Government Elementary School 2 Abepura and Government Elementary School INPRES Skouw Sae with the number of 184 children. Population selection in Abepura and Kampong Skouw Sae is to represent urban and rural areas, due to differences in food consumption. In the city access to food is by indirect access or by buying, while in rural areas where most of their livelihoods as farmers get their food by direct access or by obtaining from the garden. The number of samples involved in this study amounted to 126 primary school children, calculated on the basis of the sample formula. After the sample was obtained, the researcher calculated the sample proportion for each school, so that the number of 84 children for Government Elementary School 2 Abepura and 42 children in Government Elementary School Inpres Skouw Sae was obtained.

Primary data collected are data which is dependent variable and independent research. The data for the dependent variable is anemia and independent variables of the study, namely: breakfast habits, intake of vitamin C , intake of Fe, Protein intake. To determine the status of anemia performed by examination of hemoglobin in the blood at the Laboratory of Regional Health Jayapura. While the data of breakfast habits and nutrient intake were collected by 24 hour recall method. The data have been obtained is then processed and analyzed using the chi-square test to determine the relationship of the variables in ti incidence of 95% (α = 5%).

RESULTS AND DISCUSSION

Anemia is a condition in which blood hemoglobin levels are below normal limits. Anemia standards used in this study were Hb <11.5 g / dl for those aged 5-11 yrs and Hb <12.0 g / dl ts aged 12-14 yrs. Measurement of hemoglobin concentration in the study done by taking blood which is then in a laboratory test by officers Papua Provincial Health Laboratory using *cyanmethemoglobin.* The prevalence of school-aged anemia in Government Elementary School 2 Abepura and Government Elementary School INPRES Skouw Sae was found to be 34.1% of 126 primary school children examined, so based on the WHO 2008 reference, that figure belongs to a moderate level of Public Health Problems.

Table 1. Distribution Frequency of Variables Research

Variable	Govern. El.School2		Govern El. Inpres. Skouw Sae		Total	
	N (84)	%	N (42)	%	N (126)	%
1. Anemia status						
a. Anemia	24	28.6	19	45.2	43	34.1
b. Normal	60	71.4	23	54.8	83	65.9
2. Breakfast Habits	41	48.8	16	38.1	57	45.2

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http://www.ijsk.org/ijrmhs.html

a. Less	43	51.2	28	61.9	69	54.8
b. Good						
3. Vitamin C intake	53	63.1	29	69	82	65.1
a. Less	31	36.9	13	31	44	34.9
b. Good	48	57.1	28	66.7	76	60.3
4. Intake of Fe (iron)	36	41.9	14	33.3	50	39.7
a. Less	23	27.4	13	31	36	28.6
b. Good	61	72.6	29	69	90	71.4
5. Protein intake						
a. Less						
b. Good						

Source: Primer data Year 2015

Table 2. Analysis Research Bivariate

Variable	Nutritional status		*P value*	RP	CI = 95%
	Less	Good			
1. Breakfast Habits					
a. Less	31	26	0.0001	2,301	1.59 - 3.28
b. Good	12	57			
2. Vitamin C intake					
a. Less	39	43	0.0001	1,751	1.39 - 2.20
b. Good	4	40			
3. Intake of Fe (iron)					
a. Less	41	35	0.0001	2,261	1.74 - 2.93
b. Good	2	48			
4. Protein intake					
a. Less	20	16	0.003	2,413	1.40 - 4.15
b. Good	23	67			

Source: Primer data Year 2015

1. Relationship of breakfast habits with the anemia status.

This study showed that samples with anemia status were higher in the group with less than 30 (71.4%) breakfast habits. The results of *chi-square* test showed (p value = 0.000), which means that there is a relationship with the breakfast habits of anemia in children. The results of this study are in line with research conducted by Utami (2013), that there is a relationship with the eating habit of anemia in primary school children.

Breakfast is said to be good if the type and amount of food consumed in accordance with the required child. Breakfast habits are judged on 24-hour recall in 3 days. In this study it was found that school children in Government Elementary School 2 Abepura who had breakfast habits were less than 41 (48.8%) samples, while school children in Government Elementary School INPRES Skouw Sae who had breakfast habits less than 16 (38.1%) samples and Which was anemic at 31 (72,1%) sample.

Based on a 3x24 hour recall, the most widely consumed sample breakfast type in both elementary schools is bread, cakes, tea, and fried noodles. Good breakfast menu consisting of rice with side dishes, vegetables, fruit and more complete with milk. This indicates that the type of food consumed at breakfast does not meet the recommended needs. It can also occur due to lack of parental attention to child's breakfast, lack of mother role in controlling intake for children like breakfast before school.

Breakfast is an activity to eat in the morning that someone did before the move. Breakfast habits are a good activity and a source of energy. School children who do not have breakfast and breakfast less will lack energy to move. The impact will be felt on the learning process where the child will be less concentrated, tired, easily drowsy, which can lead to anemia. Lack of breakfast habits can be influenced by the behavior of parents in familiarizing their children breakfast in the morning. Breakfast is very important so that children can concentrate more and not sleepy while studying. But many children who do not want breakfast with a

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variety of reasons, including no time, hurry, not hungry, and not as good as food provided. Research shows that children who have breakfast attitudes and learning achievements are better than children who do not breakfast (Almatsier et al, 2011). Directly the state of nutrients is influenced by the adequacy of food intake and individual circumstances. Both factors are influenced by economic problems are also influenced by an inadequate parenting pattern.

2. Relationship of Vitamin C Intake with Anemia Status

The results in this study showed that samples with anemia status were higher in samples consuming vitamin C in less amounts, than samples consuming vitamin C in good quantities. *Chi square* test results showed that the p value = 0.000 (p <0.05), which means that there is a relationship of vitamin C intake with the incidence of anemia in primary school children.

This research is in line with Syatriani (2010) and Mahameru (2015) which states that there is an association of vitamin C intake with anemia status. However, this study is not in line with the research found by Utami (2013), that vitamin C intake has nothing to do with the incidence of anemia in primary school children. Based on the results of interviews using the method of food recall 24 hours for 3 days, it was found that school children in Government Elementary School 2 Abepura who consumed vitamin C in category less than 53 (63.1%) sample, while school children in Government Elementary School INPRES Skouw Sae who consume vitamins C in the category of less than 29 (69.0) samples and among those affected Anemia that is equal to 38 (90,5%) sample. This means that the amount of intake of sufficient levels of vitamin C and primary school children are under the recommended dietary allowance figures. Therefore it is necessary for a concern to increase vitamin C intake in school children.

This happens because Government Elementary School 2 Abepura and Government Elementary School INPRES Skouw Sae rarely consume fruits and other foods containing vitamin C. Based on the value of RP = 1.727 (RP> 1) which means that samples consuming less amount of vitamin C 1.727 times greater for anemia than those taking a good amount of vitamin C. Vitamin C is a group of water-soluble vitamins that are commonly found only in plant foods, vegetables and fruits, especially acids, such as oranges, pineapples, rambutan, papaya, and tomatoes and in leafy vegetables and cabbage (Almatsier 2009) .

3. Intake of Fe Feel With Anemia Status

The results in this study showed that samples of anemia were higher in the group who consumed Fe in less amounts, than samples that consumed Fe in a good amount. *Chi square* test results showed that the p value = 0.000 (p <0.05), which means that there is a relationship Fe intake with the incidence of anemia in children, meaning that the higher the intake of Fe, the levels of hemoglobin, the better. This research is in line with Syatriani (2010), Mahameru (2015) and Utami (2013) studies, which states that iron intake is associated with anemia. The lack of intake of Fe can be due to a lack of knowledge about foods containing iron as well as the role of the mother in controlling the intake for her child. Knowledge of food intake can change the diet of children and family so that the intake of food, especially iron intake of children will be better and can increase the hemoglobin level of children.

Based on interview result using 24 hour food recall method for 3 days, found that school children in Government Elementary School 2 Abepura who consumed Fe in category less than 48 (57,1%) sample and, while school children in Government Elementary School INPRES Skouw Sae who consumed Fe In the category of less than 28 (66,7) samples and among which affected anemia that is equal to 41 (95,3%) sample.

This means that the amount of iron intake and iron sufficiency levels of primary school children is below the recommended Nutritional Numbers (AKG). School children experience Fe deficiency because at this age children are very active play at school and at home, in this group of children sometimes decrease appetite so that consumption of food and intake of Fe become unbalanced with intake of Fe required by child. Although schoolchildren in both sites consumed fish that were high sources of Fe, but the results showed that the amount of school intake of Fe did not meet the recommended amount of adequacy. This can be caused by the low intake of nutrients that can help the absorption of Fe like vitamin C, because based on Wirakusuma (1998) the higher intake of vitamin C in food, the higher the absorption and use of iron in the body.

This can also be due to school children also often consume coffee, tea, and milk. These three drinks can inhibit the process of absorption of iron in the body. Milk is a food that has high bioavailability, but the high calcium contained in milk can inhibit the absorption of iron (Wahyuningsih, 2014).

Iron is a major component that plays an important role in the formation of blood is the formation of hemoglobin molecules. Fe deposits in the body (ferritin and hemosiderin) are present in the liver, spleen, and bone marrow. If the amount of Fe in the form of sufficient savings, then the need for the formation of red blood cells in the bone marrow will always be met. However, if the deposits of Fe are reduced and the amount of Fe obtained from food is less than the need, then there will be iron imbalance in the body, which will eventually cause iron nutritional anemia (Soekirman, 2000).

4. Relationship of Protein Intake with Anemia Status.

The results in this study showed that samples with anemia status were higher in samples consuming protein in good quantities, than samples consuming less protein. While samples that have less normal status in samples consuming less protein, than samples that consume a good amount of protein. The results of this study are in line with Utami (2013) study indicating that protein intake has a relationship with the incidence of anemia in primary school children. This study is also in line with Syatriani (2010) research, but unlike Fajrin's (2012) study which says that there is no relationship between protein intake and the incidence of anemia in children.

Based on the results of interviews using the 24-hour food recall method for 3 days, it was found that schoolchildren who consumed protein in the category were less than 36 (28.6%) of the samples and 19 (45.2%) of the samples were affected by anemia. This means that the amount of protein intake and sufficiency levels of primary school children includes the recommended nutritional adequacy rate. This is because primary school children in both research sites most often consume animal protein food sources such as eggs and fish, because their purchasing power is affordable and easy to obtain. In addition to eggs and fish, schoolchildren also consume sausages because these types of foods are sold in the school environment, and also consume milk in the morning and evening. Schoolchildren in addition to consuming foods derived from animal protein, also consume foods derived from vegetable proteins such as tofu and tempeh. This type of food is also often consumed because of the affordable price, and easy in can at any time.

Chi square test results showed that the p value = 0.007 (p <0.05), which means that there is a relationship of protein intake with the incidence of anemia in children. Based on the value of RP = 2,235 (RP> 1) which means that samples with less protein intake have an odds of 2.235 times greater for anemia than samples that consume a good amount of protein. This can be caused by the lack of fulfillment of the need for protein consumption, if the protein consumption in the body is less, then the hemoglobin level in the blood will also be reduced. Anemia occurs when the production of hemoglobin is lacking, so the levels in the blood are low.

Protein is part of all living cells and is the largest part of the body after water. Protein is one of the nutrients needed by the body, especially to build cells and tissues, maintain and maintain endurance, help enzymes, hormones, and various other biochemical materials (Almatsier, 2009). Thus, the lack of protein intake will greatly affect the various conditions of the body needed to stay healthy. Proteins are associated with anemia because the measured hemoglobin to determine an anemia status of a person is a red blood pigment, which functions as an oxygen transporter and carbon dioxide is a protein bond. Animal protein sources from beef, goat, chicken, liver, and fish play a role in increasing the absorption of iron in the intestine, whereas plant proteins such as nuts can inhibit iron absorption, especially if the protein is used instead of meat (Almatsier 2009).

CONCLUSION

Based on the results obtained in this study can be summarized as follows:

1. Most of the samples had normal Hb concentrations and only 34.1% had anemia, and the majority of the samples also had good breakfast habits (54.8%). In the variable intake, it is known that most of the samples have vitamin C and iron intake were low at 65.1% and 60.3%, while the proportion sebaanyak protein intake showed 71.4% of samples had good protein intake.

2. Bivariate test results using chi square test showed that all independent variables (breakfast habits, protein intake, vitamin C intake and intake of Fe) had a significant relationship with the incidence of anemia in primary school children in Jayapura City.

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