

Analysis of Factors Associated with Anemia Among Adolescent Girls

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ABSTRACT

In Southeast Asia, 25-40% of adolescent girls have mild and severe anemia. Based on the results of the Indonesian Demographic and Health Survey (SDKI) in 2017, the prevalence of anemia in children aged 5-12 years in Indonesia is 23%. The purpose of this study is to find out the Factors Associated with Anemia in Adolescent Girls in the Kampung Sawah South Tangerang. This research method uses a type of quantitative research with cross sectional design studies. The sample technique in the study was purposive sampling, with a sample of 75 adolescents. The instruments used are questionnaires and GCHb Easy Touch, data analyzed using the chi-Square Test. The results showed that 58.7% of adolescents had anemia and 41.3% of adolescents did not have anemia. There was a relationship between family income ($p=0.000$), knowledge ($p=0.000$), food boosting iron absorption ($p=0.000$), nutritional status ($p=0.005$) and physical activity ($p=0.000$) with anemia among adolescent girls. There was no association between iron absorption-inhibiting foods ($p=0.603$), and menstruation ($p=0.397$) and anemia in adolescent girls. Conclusions and suggestions that can be given are anemia caused by low family income, low knowledge, not consuming foods that encourage iron absorption, abnormal nutritional status, and adolescents who carry out strenuous activities, it is expected that the school will coordinate with the Public Health Centre to hold health counseling activities, especially regarding adolescent anemia periodically, conducting early detection to find out the signs and symptoms of anemia.

Keywords: adolescent girls; hemoglobin level; anemia

INTRODUCTION

Based on 2018 Riskesdas data, the prevalence of anemia in adolescents was 32%, meaning that 3-4 out of 10 adolescents suffer from anemia. This is influenced by the habits of nutritional intake that is not optimal and lack of physical activity. Based on data from the Banten Provincial Health Office (2017) it was found that 37.1% of young women in Tangerang had anemia. The 2019 Government Institute Performance Report (LKIP) by the South Tangerang City Health Office, obtained 411 patients who were referred from all health centers in the South Tangerang region during 2019. Out of the 411 referral patients, anemia is the most referral case ranked 2 out of 10 types of referral cases and in the Government Institution Performance Report (LKIP) of the South Tangerang City Health Office in 2020 the number of anemia referral cases is still contained in the table top 10 most cases referred.

In 2019, based on the results of the Hb status networking carried out by the Kampung Sawah Health Center officer in the 3rd grade girls in the working area of the Kampung Sawah Health Center, it was known that the incidence of anemia at the junior high school / MTS level was 47.87%. The largest prevalence of anemia is found in PGRI 2 Junior High School, which was 59.3%. Based on who's criteria (2008) in Indah (2018) the high incidence of anemia in the school is a problem of severe health ($\geq 40\%$).

Anemia is a condition in which hemoglobin (Hb) levels in the blood are lower than normal levels for groups of people based on age and gender, in adolescents normal Hb levels are 12-15 gr/dl and in adolescent boys by 13-17 gr/dl (Adriani, 2017). According to WHO in 2017 Anemia is a condition of the body where the number of red blood cells and oxygen removal capacity is insufficient to meet the physiological needs of the body, this is a condition when the number of red blood cells is normal (< 4.2 million/ μ l) or Hb levels < 12 g/l in women and < 13 in men. This is because adolescent girls entering puberty experience rapid growth so that the need for iron also increases to increase its growth. Adolescent girls also often do the wrong diet with the aim of losing weight, including by reducing the intake of animal protein which is very much needed for the formation of blood hemoglobin. Adolescents also experience menstruation which will cause a lot of blood loss every month so that iron needs double during menstruation and sometimes young women also

experience disorders such as menstruation that is longer than usual or menstrual blood comes out more than usual (Ministry of Health Indonesia, 2016).

The incidence of anemia in adolescent girls can cause fatigue, learning concentration becomes decreased so that it will affect learning achievement and can reduce work productivity, besides anemia can cause endurance to decrease so that it is easy to get sick or infectious (Nurman et al., 2015 in Desak, et al., 2019). The high prevalence of anemia among adolescents if not handled properly, then continues into adulthood and will contribute greatly to the mortality rate of mothers, premature birth babies and babies with low birth weight (Desak et al., 2019). There is a need to determine factors related to Anemia among adolescent girls. Based on the background above, the author is interested in conducting research on "Analysis of Factors Related to Anemia in Adolescent Girls in Pamulang Tangerang region south".

METHOD

This research design uses a type of quantitative research with cross sectional or cut latitude design studies, i.e., data that transports dependent and independent variables collected and observed in time. The population in this study was all class XI girls in SMP PGRI 2 Kampung Sawah in 2022. In this study, the sample used by the researchers was 75 adolescent girls with certain inclusion and exclusion criteria. Sampling technique is using purposive sampling or can be interpreted to choose samples among the population that is as desired by the researcher (in accordance with the purpose or problem in the study). Research location was at PGRI Junior High School 2 on January 20, 2022. The GCHb Easy Touch was used to measure Hb levels. A questionnaire was used to measure knowledge and has been passed the validity and reliability analysis. A form was used to measure income, iron boosting foods, iron inhibiting food, nutritional status, physical activity, and menstrual period. A questionnaire which had been tested for validity and reliability. Data were analyzed by univariate and bivariate statistic.

RESULT

Table 1. Distribution of Frequency of Anemia Events among Adolescent Girls

Characteristics	Frequency (n)	Percentage (%)
Anemia		
Anemic	44	58,7
Not anaemic	31	41,3
Income		
High	44	58,7
Low	31	41,3
Knowledge		
Good	12	16,0
Enough	19	25,3
Less	44	58,7
Iron boosting foods		
Yes	37	49,3
No	38	50,7
Iron inhibiting food		
Yes	28	37,3
No	47	62,7
Nutritional status		
Underweight	50	66,7
Normal	11	14,7
Overweight	14	18,7
Physical activity		
Low	50	66,7
High	25	33,3
Menstrual period		
Yes	5	6,7
No	70	93,3
Total	75	100%

Table 1 shows that majority of the respondents were anemic (58.7%), had high income (58.7%), had less knowledge (58.7%), did not consume iron boosting foods (50.7%), did not consume iron inhibiting foods (62.7%), had underweight nutritional status (66.7%), had a low physical activity (66.7%), and were not in their period (93.3%).

Table 2. The Relationship Between Family Income, Knowledge, Iron Inhibitor Foods, Iron Boosting Foods, Physical Activity, Menstrual Status, and Anemia among Adolescent Girls

Variables	Anemia Status				Total		p-value
	Anemia		Not anemia				
	n	%	n	%	n	%	
Family income							0.000
High	16	36.4	28	63.3	44	100	
Low	28	90.3	3	9.7	31	100	
Knowledge							0.000
Low	43	97.7	1	2.3	44	100	
High	1	3.2	30	96.8	31	100	
Iron Inhibitor Foods							0.603
Consumed	18	64.3	10	35.7	28	100	
Did not consume	26	55.3	21	44.7	47	100	
Iron Boosting Foods							0,000
Did not consume	35	94.6	2	5.4	37	100	
Consumed	9	23.7	29	76.3	38	100	
Nutritional Status							0.005
Not Normal	27	77.1	8	22.9	35	100	
Normal	17	42.5	23	57.5	40	100	
Physical Activity							0.000
Light	19	38.0	31	62.0	50	100	
Heavy	25	100.0	0	0.0	25	100	
Menstruation status							0.397
In period	4	80.0	1	20.0	5	100	
Not in period	40	57.1	30	42.9	70	100	
Total	44	58.7	31	41.3	75	100	

Based on Table 2. It can be concluded that out of 44 respondents with high income, majority of them were not anemic (63.3%). Then, out of 31 respondents with low income, majority of them were anemic (90.3%). The results of the calculation using the Chi-Square test were obtained a value of $p=0.000$, where the value of $p<0.05$ which means there was a relationship between family income and anemia among adolescent girls. It can be concluded that out of 44 respondents with low knowledge, majority of them were anemic (97.7%). Out of 31 respondents with high level of knowledge, majority of them were not anemic (96.8%). The results of calculations using the Chi-Square test were obtained a value of $p=0.000$, where the value of $p<0.05$ which means there was a relationship between knowledge and anemia among adolescent girls. It can be concluded that out of 47 respondents who did not consume iron inhibitor foods, majority of them were anemic (55.3%). Then, out of 28 respondents who consumed iron inhibitor foods were anemic (64.3%). The results of the Chi-Square test obtained a value of $p=0.603$, where the value of $p>0.05$ which means there was no relationship between habit of consuming iron absorption-inhibiting foods with anemia among adolescent girls. It can be concluded that out of 38 respondent who consumed iron boosting foods, majority of them were not anemic (76.3%). Out of 37 respondents who did not consume iron boosting foods, majority of them were anemic (94.6%). The results of calculations using the Chi-Square test obtained a value of $p=0.000$, where the value of $p<0.05$ which means there was a meaningful relationship between the consumption of iron absorption-boosting foods and anemia among adolescent girls. It can be concluded that out of 40 respondents with normal nutritional status, majority of them were not anemic (57.5%) while out of 35 respondents with not normal nutritional status, majority of them (77.1%) were anemic. The results of calculations using the Chi-Square test were obtained a value of $p=0.005$, which means that there was a relationship between nutritional status and anemia among adolescent girls. It can be concluded that out of 50 respondents with light physical activity, majority of them were not anemic (62%) and out of 25 respondents with heavy physical activity all of them were anemic. The results of calculations using the Chi-Square test were obtained a value of $p=0.000$, where the value of $p<0.05$ which means there was a meaningful relationship between physical activity and anemia among adolescent girls. It is showed that out of 70 respondents who were not in their period, majority of them were not anemic while out of 5 respondents who were in their period, majority of them were anemic. Chi-Square test

results obtained a value of $p=0.397$, where the value of $p>0.05$ which means there was no relationship between menstruation and anemia among adolescent girls.

DISCUSSION

Based on the results of the analysis of data in this study showed that respondents who had anemia amounted to (58.7%) and respondents who were not anemic (41.3%). The incidence of anemia among adolescent girls can cause fatigue, learning concentration becomes decreased so that it will affect learning achievement and can reduce work productivity, besides that anemia can cause endurance to decrease so that it is easily exposed to disease or infection (Nurman et al., 2015 in Desak, et al., 2019). The high prevalence of anemia among adolescents if not handled properly, then continues into adulthood and will contribute greatly to the mortality rate of mothers, premature birth babies and babies with low birth weight (Desak et al., 2019). In this study showed that more than half of the respondents were in the anemia group. A fairly high prevalence rate in adolescent girls needs attention, because adolescent girls are in a period of growth and development.

Based on the results of the analysis of data in this study showed that respondents of the high-income group amounted to (58.7%) and respondents of the low-income group (41.3%). According to Yayuk (2004) in Nursari (2012) which states that changes in income can directly record changes in family food consumption. Rising incomes mean increasing opportunities to buy food of better quality and quantity. Conversely, a decrease in income will cause a decrease in the quality and quantity of food purchased, which can result in the unmet needs of the body for nutrients, one of which is not meeting the body's need for iron, so it can have an impact on the occurrence of anemia. In this study showed that the income frequency of more than half of respondents was in the high-income group. Family economy is a fundamental factor that will affect aspects of life. The higher the family income, the more quality the purchasing power of food and purchasing power for better health services.

Based on the results of data analysis in this study shows that the respondents' knowledge is grouped into two, namely the knowledge group is low (58.7%) and high knowledge (enough and good) was (41.3%). According to Notoatmodjo (2012) knowledge is a very important domain in shaping one's Actions. The level of knowledge of behavioral attitudes in choosing food and subsequently will affect the status of health. The selection of less iron intake will affect the iron in the body so that in the body low iron, can cause anemia. In this study showed that the frequency of knowledge more than half of respondents was in the low knowledge group. The importance of adolescent knowledge level to anemia in order to maintain and improve self-health so as to prevent anemia. Good knowledge will help adolescents to prevent anemia. The more knowledgeable about anemia eating adolescents will know how to behave towards efforts in the prevention of anemia. Adolescents is hoped to increase their knowledge regarding anemia.

Based on the results of the analysis of data in this study showed that more than half of respondents did not consume iron absorption inhibition foods by (62.7%) and respondents who often consumed iron-inhibiting foods (37.3%). According to Aritonang (2015) substances that can inhibit iron absorption include tannins and phytic acid. Tannin is a substance that is widely found in coffee, tea and some types of vegetables and fruits. Tannins can inhibit the process of iron absorption by binding to it. If foods / drinks containing tannins are consumed simultaneously, it can cause the amount of iron absorbed in the body to be lower. In addition to tannins, phytic acid can also inhibit the process of absorption of iron in the body by binding iron so that it cannot be absorbed and will be excreted with feces. Phytic acid is found in nuts, sereal, and black tea. In addition, the addition of soy protein in food can inhibit iron absorption because there is a high content of phytic acid in soy protein (Aritonang, 2015). In this study showed that more than half of the respondents did not consume iron absorption-inhibiting foods. The cause of anemia is a lack of nutrients in the food consumed daily, this causes iron deficiency in the body, so the body cannot make healthy red blood cells. Absorption of iron in the intestines that is not good (disturbed) is also the cause of anemia.

Based on the results of the analysis of data in this study showed that half of the respondents consumed enough iron absorption-boosting foods (50.7%) and respondents who consumed less iron absorption-boosting foods (49.3%). According to Proverawati (2011) in Elma (2018) which states that the cause of anemia is a lack of nutrients in the food consumed daily, this causes iron deficiency in the body, so the body cannot make healthy red blood cells. If you have red blood cells that are not healthy properly, the organs and tissues in the body do not get enough oxygen to carry out their functions, so anemia occurs. Salman's (2013) research anemia can occur due to lack of consumption of food sources containing iron. Low iron food intake often occurs in people who consume less diverse foodstuffs. In this study showed that half of the respondents consumed iron absorption-boosting foods. Consumption of animal protein can increase the absorption of iron in the body because animal protein is one of the nutrients needed for iron absorption. Less protein intake in the respondents was most likely due to snacks in school canteens where most carbohydrates were

available and very little contained protein and iron. With the low consumption of animal protein, it can cause low absorption of iron by the body, this state can result in the body lack of iron and can cause adolescent anemia.

Based on the results of the analysis of data in this study showed that the nutritional status of respondents in the group became two, namely normal nutritional status (53.3%) and respondents of abnormal nutritional status (thin and fat) (46.7%). Nutritional status is the embodiment of nutrients in the form of certain variables. Good nutritional status will lead a person to be healthy and productive. The indicator used to measure nutritional status is body mass index (BMI). To get an BMI value, anthropometric measurements consisting of weight and height (Salsabila, 2019). In this study showed that more than half of the respondents were in the category of normal nutritional status. Nutritional status is a picture of nutrients of a person's body, including one of them is iron. If the nutritional status is not normal, it is feared that the status of iron in the body is also not good. So, it can be said that nutritional status is one of the risk factors for anemia. Research conducted by Mulliawati et al., (2022) consuming ambon banan juice could increase Hb levels among pregnant women.

Based on the results of data analysis in this study showed that the respondents' Physical Activity was grouped into two, namely light activity (66.7%) and strenuous activity (moderate and heavy activity) by (33.4%). High energy needs are mostly necessary for vigorous and physical activity compared to those necessary for growth. Energy needs depend on physical activity, underactive adolescents may become overweight or possibly obese, although energy intake is lower than recommended energy needs. Conversely, in adolescents who are very active will need more energy than the recommended energy needs (Wijayanti, 2011). In this study showed that more than half of the respondents were in the category of light activity. Energetic nature in adolescence causes the body's activity to increase so that its nutritional needs also increase. This is suspected because school children usually have a lot of time and activities outside the home, so often forget about eating time.

Based on the results of data analysis in this study showed that respondents who were not in the period (93.3%) and respondents who were in the period was (6.7%). Iron is a component that forms hemoglobin that is wasted during menstrual periods. The longer menstruation lasts, the more blood released from the body will also be more. Heavy blood loss during menstruation accompanied by irregular menstrual cycles can lead to more iron loss from the body compared to regular menstrual cycles. Hemoglobin levels in adolescent girls differ before and after menstruation. Before menstruation, the average hemoglobin level is 11.8 gr/dl and the average hemoglobin level after menstruation is 10.61 gr/dl (Nugrahani, 2013). In this study showed that more than half of the respondents were not in period during hemoglobin examination. Young women are very susceptible to anemia where every month menstruating. Anemia in the period of growth or development for adolescent girls will have a less good impact in carrying out daily activities and for growth itself. To deal with the problem of anemia in adolescent girls needs to be solved with safe and effective efforts to overcome the problem of anemia in adolescents needed iron supplementation.

The results showed that respondents who had anemia between low incomes (37.3%) more than high incomes (21.3%). In this study, there was a meaningful relationship between family income and anemia in adolescent girls. A person's eating behavior in this case adolescent is influenced by many things, including family habitation. Family income plays a very important role. What food teenagers eat depends largely on what foods are served by the family. In this case the type of food depends largely on how much funds are available for the purchase of family food (Notoatmodjo, 2012). This is in accordance with the theory put forward by Nursari (2012) which states that changes in income can directly affect changes in family food consumption. Increased income means increasing the opportunity to buy food with better quality and quantity, on the contrary, a decrease in income will cause a decrease in the quality and quantity of food purchased, which can result in the unmet need of the body for nutrients, one of which is not met the body's need for iron, thus impacting the occurrence of anemia.

The results of this study are reinforced by the results of research of Wijayanti (2011) found that there was a relationship between family income and the incidence of anemia in adolescent girls of SMK An Nuroniyah Kemadu, Sulang District, Rembang Regency in 2011. Meanwhile, according to research conducted by Siti, et al (2017) there was a relationship between family income levels and the incidence of anemia in adolescent girls. So that the results of the study are in accordance with the theory and previous research that states there is a relationship between family opinions and the incidence of anemia in adolescent girls. Income is an influencing factor in determining food choices. The higher the income, the more amount and type of nutritious food obtained, and the health services obtained the better. Conversely, people who are low incomes have very limited opportunities in choosing food. Adolescents are one of the groups that are susceptible to iron deficiency, can affect all groups of socioeconomic status, especially those with low socioeconomic status.

The results showed that respondents who had anemia between low knowledge (57.3%) more than high knowledge (1.3%). In this study, there was a meaningful relationship between knowledge and anemia in adolescent girls. According to Notoatmodjo (2012) a person's knowledge will affect attitudes and behaviors in food selection and will

further affect the nutritional state of the individual concerned including anemia status. Health behavior is an individual's response to certain objects related to the incidence of disease, health care systems, food and beverages, and the environment. In an effort to change individual behavior for the better, knowledge, facilities, and support are needed. The results of this study were reinforced by Ngatu & Rochmawati's research (2015) found that there was a knowledge relationship with the incidence of anemia in adolescent girls in SMKN 4 Yogyakarta. Knowledge will influence a person's patterns to determine attitudes and behaviors in choosing food. A good adolescent knowledge of anemia is the main thing in maintaining the fulfillment of iron in the diet of the whole day. Low knowledge of anemia in adolescents can lead to a lack of self-awareness to make efforts to prevent anemia. Without knowledge one has no basis for making decisions and determining actions on the problem at hand.

The results showed that respondents who had anemia among respondents who did not often consume iron absorption-inhibiting foods (34.7%) more than respondents who consumed iron absorption inhibitor foods (24.0%). But in this study, there was no meaningful association between consuming iron absorption-inhibiting foods and anemia in adolescent girls. Anemia occurs due to the insufficiency of iron intake in the body one of the consequences of consuming foods that inhibit the absorption of iron or inhibitors such as tannins and oxalate, but iron can also be absorbed properly when consuming foods sources of iron absorption. Animal protein is one of the driving sources of iron absorption, which will eliminate the effects of chelating agents and change the form of Fe^{2+} to Fe^{3+} which is easily absorbed (Almatsier, 2002 as cited in Khan, 2016). This is not in line with Masthalina's research (2015) which stated that there was a relationship between iron absorption inhibitor foods and schoolgirl anemia because most schoolgirls like to consume the chocolate, and which includes iron absorption inhibiting foodstuffs. But this study is in line with Susiloningtyas' research (2012) stating that there is no link between consuming iron absorption-inhibiting foods and childhood anemia. This research was reinforced by Wahyuningsih (2013) found that there was no significant association between iron absorption inhibiting foods and anemia in adolescent girls. This study showed that there was no association between consuming iron absorption inhibition foods and anemia in adolescent girls. This is because anemia occurs due to several factors where there is a possibility of respondents who consume tea, coffee, and milk 1 hour to 2 hours before and after meals allow iron absorption in the body and no inhibition of absorption.

The results showed that respondents who had anemia among respondents who did not consume iron absorption-boosting foods (46.7%) more than respondents who consumed iron absorption-boosting foods (12.0%). In this study, there was a meaningful relationship between consuming iron absorption-boosting foods and anemia in adolescent girls. Iron is one of the important elements in the process of formation of red blood cells. In adolescents, the occurrence of growth velocity causes adolescents to need to get enough nutrients to support their growth (Nursari, 2009 as cited in Salsabila, 2019). Iron absorption occurs in the duodenum and proximal jejunum. However, stomach acid also plays a role in the process of absorption of non-heme iron. Non heme iron absorption is mostly available in oxidized form (Fe^{3+}) or ferries and will turn into ferrous (Fe^{2+}). Meanwhile, heme iron will be directly absorbed into absorptive cells or transported to plasma after the protein is released (Khan, 2016). Protein is found in red meat, poultry, and fish. Iron derived from animal proteins can be more easily absorbed by the body than from vegetable proteins. Protein plays a role in helping transport iron to the blood plasma. If the body lacks protein, then the transport of iron to the blood plasma will be disrupted so that it can affect blood hemoglobin levels (Sha'bani, 2016). The results of this study are not in line with Matayane (2014) and Lestari (2017) which showed that there was no meaningful association between consuming iron absorption-boosting foods and anemia in adolescent girls. But the results of this study are in line with research conducted by Salman (2013) which showed that there is a relationship between consuming iron absorption-boosting foods and anemia in adolescent girls. This study shows that there is a relationship between consuming iron absorption-boosting foods and anemia in adolescent girls. This can be because anemia can occur due to the lack of adolescents consuming diverse foods so that the lack of food encourages iron absorption in the body. Iron deficiency in the blood can cause the process of red blood cell formation to be disrupted which in a certain period can lead to anemia.

The results showed that respondents who had anemia between abnormal nutritional status (36.0%) were more than normal nutritional status (22.7%). According to Muhayati's research (2019) states that nutritional status is a big picture of nutrients in the body, one of the risk factors for anemia. Adolescents who have normal nutritional status can experience anemia if eating habits are not balanced. Young women often do not pay attention to food consumption so often eat less healthy foods such as fried foods and fast-food snacks. Adolescent girls often go on an unhealthy diet and without the supervision of a doctor or nutritionist can interfere with the growth and nutrients needed by the body. The results of this study are in line with research conducted by Muhayati (2019) which stated that there is a relationship between nutritional status and anemia in adolescent girls. Anemia is directly affected by daily consumption and food consumption closely with nutritional status, if the food consumed is good, then the nutritional status is also good, otherwise if the food consumed lacks nutritional value it can cause anemia. This study showed that there was a significant association between nutritional status and anemia in adolescent girls. This is because nutritional status is

associated with anemia because the food consumed daily by adolescents is related to nutritional status. Many teenagers often go on an unhealthy diet because they want to have an ideal body. The food consumed has a good nutritional content in sufficient quantities then the nutritional status is also good and vice versa if the food consumed with a small amount and less iron content, it could cause anemia.

The results showed that respondents who had anemia between strenuous physical activity (33.3%) more than light physical activity (25.3%). In this study, there was a meaningful association between physical activity and anemia in adolescent girls. Physical activity is a physical movement carried out by the body and its supporting system. Physical activity in adolescents can be associated with increased self-confidence, self-concept, anxiety, and low stress. According to Lee (2008) in Nurhayati, et al (2020) physical activity that can affect hemoglobin levels is in physical activity that is heavy because heavy activity can cause hematuria (glomerular trauma) and bleeding in the gastrointestinal tract which can affect iron status. Strenuous activity can cause blood flow in the kidneys to decrease and lead to an increase in the filtration rate of the glomerulus. As a result of blood vessel compression caused by strong contraction of excess muscles will cause iron loss due to the destruction of red blood cell membranes that will affect hb levels in the blood. High energy needs are mostly necessary for vigorous and physical activity compared to those necessary for growth. Energy needs depend on physical activity, underactive adolescents may become overweight or possibly obese, although energy intake is lower than recommended energy needs. Conversely, in adolescents who are very active will need more energy than the recommended energy needs (Wijayanti, 2011). The results of this study are in line with research conducted by Nurhayati, et al (2020) which stated that there is a relationship between physical activity and the incidence of anemia in adolescent girls in MAN 1 Banjarmasin in 2020. The positive relationship is that the lighter the physical activity the less likely it is to develop anemia. This study showed that there is a link between physical activity and anemia in adolescent girls. Physical activity is closely related to the overall health of the body. The heavier the activity carried out by teenagers, the greater the energy needs that must be fulfilled by the body, because the metabolism in the body increases. Good physical activity for adolescents is moderate physical activity.

The results showed that respondents who had anemia among respondents who were not in period by (53.3%) more than respondents who were in period (5.3%). But in this study, there was no meaningful association between menstruation and anemia in adolescent girls. Anemia in adolescent girls is caused by adolescence has been menstruating. Menstruation is a physiological state, the event of periodic discharge of blood, mucus and remnants of cells that originate from the uterine mucosa and occur relatively regularly from menarche to menopause, except during pregnancy and postpartum period (Prawirohardjo, 2011 in Mahar, 2016). Menstruation is a characteristic of biological maturity in women which is characterized by the discharge of blood from the vagina. Menstruation shows one of the changes in the reproductive apparatus as a form of pregnancy preparation (Aramico, 2017). In line with Puspito research (2017) shows that there is no relationship of the menstrual cycle with hemoglobin levels likely to occur because researchers do not ask how many times the sample changed pads during menstruation. The absence of a link between menstruation and anemia in adolescent girls in school is possible because researchers only judge based on menstruation or not menstruating without assessing the amount of blood that comes out when the teenage girl is menstruating so it cannot be known how much iron comes out along with blood during menstruation.

CONCLUSION

Majority of the respondents were anemic (58.7%), had high income (58.7%), had less knowledge (58.7%), did not consume iron boosting foods (50.7%), did not consume iron inhibiting foods (62.7%), had underweight nutritional status (66.7%), had a low physical activity (66.7%), and were not in their period (93.3%). There is a meaningful relationship of family income ($p=0.000$), knowledge ($p=0.000$), iron absorption-boosting foods ($p=0.000$), nutritional status ($p=0.005$) and physical activity ($p=0.000$) with anemia among adolescent girls. While other variables, food inhibiting iron absorption ($p=0.603$), and menstruation ($p=0.397$) proved the absence of a meaningful association with anemia in adolescent girls. So, it is hoped that after this study respondent should improve the prevention of anemia by cultivating healthy living behaviors and making simple changes in diet that effectively increase the absorption of substances iron, the school party. I hope that the school will coordinate with the health Centre to hold health counseling activities, especially regarding adolescent anemia periodically, conduct early detection to find out the signs and symptoms of anemia, especially mothers can provide directions on food consumption patterns in adolescents, in order to further increase the consumption of animal protein and iron, and for the next researcher it is recommended to conduct research with a vulnerable longer time and a larger number of samples in order to get more significant results.

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