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Research Article

The Relationship Between Animal Protein Consumption Patterns and the Incidence of Anemia in Adolescent Girls at MTS Darul Hidayah Sriminosari, East Lampung

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Abstract:
MTs Darul Hidayah is one of 7 schools whose teenage girls experience anemia at the highest rate of 70% in the Labuhan Maringgai Community Health Center Nutrition Program. The condition of iron nutritional anemia is caused by several interrelated factors, including the insufficient amount of iron in food due to low consumption of animal protein sources. Therefore, research was conducted which aimed to analyze the relationship between animal protein consumption patterns and the incidence of anemia in young women at MTs Darul Hidayah. The type of research is quantitative with an analytical survey method using a cross sectional design approach. The research was carried out in December 2022 at MTs Darul Hidayah. Sampling was carried out by purposive sampling. The population in this study were all 101 young women at MTs Darul Hidayah classes VII, VIII and IX. The total sample after screening was 69 young women who had anemia, where each class had a sample to represent and meet the inclusion criteria. Data on animal consumption patterns was obtained using the FFQ (Food Frequency Questionnaire) Form. Hemoglobin levels were measured using a Family Dr. The statistical test used for analysis is the Fisher Exact Test. The research results show that 69.6% of young women never consume animal protein, 53.6% have chronic energy deficiency and 55.1% have moderate anemia. The results of the statistical test analysis show that there is a relationship between animal protein consumption patterns and the incidence of anemia in young women at MTs Darul Hidayah Sriminosari East Lampung with a p-value = 0.007 (p-value <0.05). So, it is concluded that there is a relationship between animal protein consumption patterns and the incidence of anemia in young women at MTs Darul Hidayah.
Keywords: Anemia, Animal Protein Consumption Patterns, Teenagers

1. INTRODUCTION

A common condition that affects many people, particularly women of childbearing age is anemia, which is defined by a low blood hemoglobin concentration. Iron and protein combine to form hemoglobin. According to data from the World Health Organization (WHO), between 25 and 40 percent of teenage girls in Southeast Asia suffer from mild to severe anemia (Novelia et al., 2022). According to the 2018 Riskesdas data, anemia cases among teenage females climbed to 48.9% from around 37.1% in 2013, with the biggest proportion of anemia occurring in the 15–24 and 25–34 year age groups (Ekasanti et al., 2020; Munira & Viwattanakulvanid, 2021; Noer et al., 2022).

Meanwhile, the prevalence of anemia in Lampung Province is 63% with the age group 10-19 years being 24.3%. The achievement of the Labuhan Maringgai Health Center Nutrition program for checking hemoglobin levels in adolescent girls with a total of 127 samples from 7 schools was 60.6% and adolescent girls experienced the highest anemia at MTs Darul Hidayah Sriminosari East Lampung, namely 70%.

Anemia in adolescents has a negative impact on reducing immunity, concentration, learning achievement, adolescent fitness and productivity (Djogo & Letor, 2022; Yuliani et al., 2020; Yunanci et al., 2023). In addition, the effects of anemia on young women in particular will be more severe since they are future mothers who will get pregnant and give birth to a child, raising the risk of maternal death, early birth, and low birth weight newborns.

Anemia is caused by several factors, including direct causes, namely nutritional deficiencies such as low intake of animal protein which is a source of iron for making hemoglobin as a component of red blood cells (TF Putri & Fauzia, 2022; Riawan et al., 2023; Rizal et al., 2023). Apart from that, young women experience bleeding due to long and excessive

menstruation every month. Indirect causes are low family attention, high activity levels, and inaccurate food distribution patterns within the family. Hemolytic disorders can also induce anemia because they cause red blood cells to be destroyed more quickly than they can be produced. Examples of these disorders include thalassemia, a genetic blood disorder, and chronic malaria patients, who accumulate iron in their liver and spleen (Guidelines for the Prevention and Management of Anemia in Adolescent Girls and Women of Childbearing Age, 2018).

Protein intake is very important for young women because protein has an important role in transporting iron in the body. Lack of protein intake will result in iron transportation being hampered, resulting in iron deficiency which will cause anemia. Based on the research of Masthalina et al. (2015), from the results of the analysis of respondents' consumption amounts, it was found that respondents who were anemic had a protein intake in the bad category of 81%, respondents who were not anemic had a protein intake in the good category of 65.2%. In line with the research of Lewa (2016) which shows that female students who have less protein intake have a 1.7 times risk of experiencing anemia compared to those who do not experience anemia.

As stated in the Guidelines for the Prevention and Management of Anemia in Adolescent Girls and Women of Childbearing Age (2018), a laboratory test measuring the blood's hemoglobin/Hb levels is used to diagnose anemia. In the event that the hemoglobin/Hb level is less than 12 g/dL, this is in compliance with Minister of Health Regulation Number 14 of 2019 regarding Guidelines for Technical Implementation of Nutritional Surveillance for teenage females experiencing anemia. Lethargy, weakness, weariness, and weakness are common symptoms of anemia; headaches, dizziness, and blurred vision are common side effects, along with feelings of sleepiness and difficulty concentrating. Clinically, pallor in the hands, nails, skin, and eyes is indicative of the condition. Food high in iron, such as meat, fish, poultry, eggs, and plant foods like dark green vegetables, nuts, and tempeh, can be consumed in greater quantities to prevent and treat anemia. Consuming fruits and vegetables high in vitamin C, such as guava, tomatoes, oranges, and pineapple, can also help the body absorb iron more readily from the intestines. Finally, drinking Blood Supplement Tablets can increase the body's intake of iron.

Diet is the most important behavior that can influence nutritional conditions. This is because the quantity and quality of food and drinks consumed will affect nutritional intake so that it will affect the health of individuals and society which reflects the amount and type of food consumed every day and is an important habit. One of them is consuming protein, which is an important macronutrient for humans. Based on the source of protein, it can be divided into two, namely animal food ingredients which are a good source of protein, in quantity and quality, such as eggs, milk, poultry, fish and shellfish, sources of vegetable protein are soybeans and their products, such as tempeh and tofu, and peanuts. - another nut.

Based on Nutrition and Public Health 2011, one method used to assess food consumption status is by using the food frequency method. The Food Frequency Method is a qualitative method to determine the frequency of eating, types of food and eating habits during a certain period such as days, weeks, months or years. Apart from that, the food frequency method is used to measure past eating habits that are still ongoing today.

The results of a preliminary survey of 20 female students at MTs Darul Hidayah Sriminosari, East Lampung, found that 65% (13 female students) had anemia and 35% (7 female students did not experience anemia). Furthermore, as many as 40% (8 young women) never consume protein, as many as 60% (12 young women) occasionally consume animal protein. Based on the problem description above, researchers are interested in conducting research with the title "The relationship between animal protein consumption patterns and the incidence of anemia in adolescent girls at MTs Darul Hidayah Sriminosari, East Lampung." This study aims to determine the frequency distribution of anemia in adolescent girls, the frequency distribution of animal protein consumption patterns, and analyze the relationship between animal protein consumption patterns and the incidence of anemia in adolescent girls at MTs Darul Hidayah Sriminosari, East Lampung.

2. MATERIAL AND METHOD

The type of research used is quantitative research using analytical survey methods, using a cross-sectional design approach. This research aims to analyze the relationship between animal protein consumption patterns and the incidence of adolescent anemia daughter of MTs Darul Hidayah Sriminosari East Lampung. This research was carried out after obtaining approval from the Tanjung Karang Ministry of Health Polytechnic Ethics Commission with No. 322/KEPK-TJK/XI/2022. The research was carried out on 10 - 17 December 2022. The population in this study were all teenagers at MTs Darul Hidayah Sriminosari East Lampung, totaling 101 female students, while the sample in this study

was 69 female students who experienced anemia at MTs Darul Hidayah Sriminosari East Lampung. The sampling technique in this research uses purposive sampling, where each class has a sample to represent and meet the inclusion criteria. The distribution of the number of samples was taken from each class with details of class VII as many as 20 samples, class VIII as many as 27 samples, and class IX as many as 22 samples. The inclusion criteria for the population in this study were adolescent girls aged 12 – 15 years, physically healthy, anemic adolescent girls but not with comorbidities such as Leukemia, Thalassemia, and Tuberculosis, as well as young women who are not anemic. Meanwhile, the exclusion criteria in this study were students who moved schools during the research, withdrew from being research respondents, and young women who did not attend. Primary data in this study includes characteristics of respondents, examination of hemoglobin levels, and data on animal protein consumption patterns.

The procedure for this research is that after the ethical clearance is issued, the researcher then explains the aims and objectives of the research to potential respondents. Researchers distributed informed consent sheets to respondents to sign a letter of agreement to become respondents before the interview was conducted. Anemia status is obtained byexamination of hemoglobin levels assisted by the Midwife or Nurse from the UKS (School Health Business) Program Team and the PKPR (Youth Care Health Services) program at the Labuhan Maringgai Community Health Center with the procedure 1) Make sure the code card is installed on the Family Dr tool, 2) Place the strip on the end of the tool 3) Clean the fingertip of the sample from which blood will be taken with an alcohol swab, 4) After the blood comes out, bring it close to the mouth of the tool's tip, and 5) Wait for the results to come out and read the results on the screen of the Family Dr tool.

The research instruments used include: Consent sheet (Informed Consent) which is filled in directly by the respondent and carried out before the interview, FFQ (Food Frequency Questionnaire) Form to determine animal protein consumption patterns, Hemoglobin level check tool (Family Dr) and alcohol swab as well SPSS version 26 software to analyze research data. Hemoglobin examination results are further categorized into severe anemia, if the Hb level is <8.0 gr/dl, moderate anemia, if the Hb level is 8.0-10.9 gr/dl, and mild anemia, if the Hb level is 11-11.9 gr /dl (RI Ministry of Health, 2018).

Researchers conducted interviews regarding animal protein consumption patterns using the Food Frequency Questionnaire form. Based on Nutrition and Public Health 2011, one method used to assess food consumption status is by using the food frequency method. The Food Frequency Method is a qualitative method to determine the frequency of eating, types of food and eating habits during a certain period such as days, weeks, months or years. Apart from that, the food frequency method is used to measure past eating habits that are still ongoing today. Based on Widajanti (2009) in Sembiring (2017), there are 3 categories for Frequency of Consumption Patterns, namely Usually consumed if the score is ≥ 15–50, Sometimes if the score is ≥ 10–14.9, and Never if the score is ≥ 1–9.9. Steps for the Food Frequency Method: 1) Introduce first before starting the interview, 2) Ask about the frequency of eating each food item listed on the food frequency form list 3) The interviewer puts a mark (√) on the list of foods listed on the questionnaire according to frequency. , 4) Give a score to each food ingredient chosen by the sample with a score: 4) >3 times/day score 50; 1 time/day score 25; 3-6 times/week score 15; 1-2 times/week score 10; 2 times/month score 1; Never score 0 ; 5) Add up the scores for each food ingredient based on the food group, 6) The total score for each food group is divided based on the number of foods in that food group, 7) The quotient is then categorized into never if the score >1-9.9, sometimes if the score is ≥ 10 - 14.9, and usually consumed if the score is ≥ 15 – 50. The food ingredients asked for are food sources of animal protein, including beef meatballs, crab, crab, clams, squid, chicken liver, beef, chicken, freshwater fish, eggs, dried anchovies, sea fish, salted fish and shrimp. The advantages of the Food Frequency method are that it is carried out using direct interviews, represents the subject's eating habits, does not force respondents to remember all the food and drinks consumed, does not require complicated procedures, and can identify risk factors for chronic malnutrition in the subject. Furthermore, data on Animal Protein Consumption Patterns was obtained All forms are complete, the researcher continues with data processing for statistical analysis. The characteristic data obtained is presented in the form of a frequency distribution table in the form of percentages on an ordinal scale and then the data is analyzed to determine the relationship between animal protein consumption patterns and the incidence of anemia in adolescent girls at MTs Darul Hidayah Sriminosari East Lampung using SPSS Fisher Exact Test statistics. The Fisher Exact test was used because the conditions of the Chi-square test were not met.

3. RESULT AND DISCUSSION

MTs Darul Hidayah Sriminosari is one of the educational units at the MTs level in Sriminosari, Labuhan Maringgai District, East Lampung Regency, Lampung. In carrying out its activities, MTs Darul

Hidayah is under the auspices of the Ministry of Religion. Darul Hidayah is a foundation consisting of the Darul Hidayah Islamic Boarding School, Darul Hidayah Vocational School and Darul Hidayah MTs which is located at Jalan Silem Jaya, Sriminosari. The location of Sriminosari Village is on the East Coast bordering the Java Sea. Most of them earn their living as fishermen, processing fish, squid and others.

MTs Darul Hidayah has a canteen which provides light food (snacks), heavy food (rice) and drinks. MTs Darul Hidayah is close to a minimarket. This close proximity means that female students can easily access food. MTs Darul Hidayah has a UKS room and a teacher in charge of the UKS. With the person in charge of the UKS, it can facilitate coordination in every cross-sectoral activity to improve health services, health education, foster a healthy school environment and increase optimal growth and development of students.

1. Respondent Characteristics

The characteristics of the respondents in this study were reviewed in terms of the respondent's age, anemia classification, and animal protein consumption patterns.

Table 1. Frequency Distribution of Respondent Characteristics Based on Age

Age	Number (n)	Percentage (%)
12 years old	4	5.8
13 years old	32	46.4
14 years	23	33.3
15 years	10	14.5
Amount	69	100

Table 1 shows that of the 69 teenage girls who experienced anemia, most of the respondents were 13 years old (46.4%). During this period, teenagers experience very rapid physical changes and very intensive intellectual development so that children's interest in the outside world is very great and at this time teenagers no longer want to be considered children but cannot leave behind their childish patterns. Apart from that, during this period teenagers often feel lonely, doubtful, unstable, dissatisfied and disappointed. This sudden increase in growth is accompanied by hormonal, cognitive, and emotional changes. All of these changes require special nutrients.

Adolescent girls are more at risk of developing anemia compared to adolescent boys because adolescent girls menstruate every month. Menstruation with bleeding of 50-80 cc every month and iron loss of 30-40 mg so that young women need three times more iron than men. Anemia in teenage girls causes a decrease in work productivity or academic abilities at school and reduces the body's resistance so that they are susceptible to disease (Tarini et al., 2020). For a variety of reasons, adolescence (10–18 years old) is a critical time for nutrition (Mitkari et al., 2020). First, due to their rapid physical growth and development, teenagers need greater nutritional intake. Second, adolescent dietary demands and consumption are impacted by changes in their eating and lifestyle patterns. Third, adolescents with unique dietary requirements, such as those who participate in sports, have long-term illnesses, are expecting, overeat, are alcoholics or drug addicts, or are pregnant

2. Frequency Distribution of Anemia Classification

Classification of anemia according to age 12 – 14 years is divided into 3, namely mild anemia (11-11.9 g/dL), moderate anemia (8-10.9 g/dL), severe anemia (<8 g/g/dL).

Table 2. Frequency Distribution of Anemia Classification

Anemia Classification	Number (n)	Percentage (%)
Moderate Anemia	38	55.1
Mild Anemia	31	44.9
Severe Anemia	0	0
Amount	69	100

Table 2 shows that of the 69 female adolescents, there were 38 (55.1%) respondents with moderate anemia, 31 (44.9%) with mild anemia, while there were no female adolescents with severe anemia.The results of

this research are in line with the results of research conducted by Novayanti & Sundari (2020) which stated that of the 43 female teenage students at Tasikmalaya City High School who experienced anemia the most were in the category of moderate anemia as many as 28 people (65.1%), 14 students who experienced mild anemia (32.5%) and only 1 person experienced severe anemia (2.4%).

3. Frequency Distribution of Animal Protein Consumption Patterns

The most significant habit that can affect nutritional status is diet. This is due to the fact that the quantity and quality of food and beverages consumed will have an impact on nutritional intake, which will have an impact on people's health as well as the health of society, as daily food consumption is a significant habit.

Table 3. Frequency Distribution of Animal Protein Consumption Patterns

Animal Protein Consumption Patterns	Number (n)	Percentage (%)
Never (score >1-9.9)	48	69.6
Sometimes (score ≥ 10 - 14.9)	18	26.1
Commonly Consumed (score ≥ 15 – 50)	3	4.3
Amount	69	100

Table 3 shows that of the 69 female teenagers, the highest number of respondents in the animal protein consumption pattern was the never category, 48 (69.6%).

This research is in line with the results of research conducted by Laksmi (2019) which shows that the level of protein consumption of female students at SMA Negeri 1 Kediri Tabanan is 85.72% of students in the less category and based on the type of food ingredients, it is 64.29% in the not diverse category, while the frequency of use of food ingredients is 35.71% in the rare category. In order for hemoglobin synthesis to run well, protein consumption must be in sufficient quantities considering that protein has an important role in the absorption and transportation of iron in the body. If the protein in the blood that transports iron throughout the body is insufficient, the hemoglobin level will decrease.

Based on the source of protein, it can be divided into two, namely animal food ingredients which are a good source of protein, in quantity and quality, such as eggs, milk, poultry, fish and shellfish, sources of vegetable protein are soybeans and their products, such as tempeh and tofu, and another nuts.

Animal protein intake increases iron absorption in the body by 20-30%. The iron in animal protein is in ferrous form so it is more easily absorbed by the body, while vegetable protein is 1-10%. This is because the iron in vegetable protein is in the form of ferric bonds, which the stomach juice must first break down into ferrous before the body can absorb it. Lack of protein intake results in hampered iron transport, causing a decrease in hemoglobin levels, causing anemia.

The body cannot store excess protein, excess protein intake will be stored by the body in the form of triglycerides which results in an increase in fat tissue which causes poor nutritional status (MP Putri et al., 2022). Meanwhile, a lack of protein and energy intake for a long time can cause Chronic Energy Deficiency (CED) which usually occurs at the age of 15-45 years.

4. Relationship between Animal Protein Consumption Patterns and the Incidence of Anemia in Adolescent Girls

Results of analysis of animal protein consumption patterns and the incidence of anemia in adolescent girls at MTs Darul Hidayah Sriminosari can be seen in the table below:

Table 4. Relationship between Animal Protein Consumption Patterns and the Incidence of Anemia in Adolescent Girls at MTs Darul Hidayah Sriminosari, East Lampung

Animal Protein Consumption Patterns	Occurrence of anemia						*p-value**
	Moderate anemia		Mild anemia		Total		
	n	%	n	%	n	%	
Never	32	46.4	16	23.2	48	69.6	0.007
Sometimes	5	7.2	13	18.8	18	26.1	

Animal Protein Consumption Patterns	Occurrence of anemia						*p-value**
	Moderate anemia		Mild anemia		Total		
	n	%	n	%	n	%	
Usually consumed	1	1.4	2	2.9	3	4.3	
Total	**38**	**55.1**	**31**	**44.9**	**69**	**100.0**	

Description:*Fisher Exact Test

Based on the table above it is known that the results of the analysis of the relationship between animal protein consumption patterns and the incidence of anemia, namely that of the 48 respondents with the never animal protein consumption pattern category, 32 (46.4%) respondents had moderate anemia, of the 18 respondents with the animal protein consumption pattern category, sometimes there were as many as 13 (18.8%) respondents had mild anemia and 3 respondents with animal protein consumption patterns in the usual category, there were 2 (2.9%) respondents with mild anemia. The results of statistical tests using the Fisher Exact test obtained a p-value of 0.007<0.05, indicating that there is a relationship between animal protein consumption patterns and the incidence of anemia in young women at MTs Darul Hidayah.

This research is in line with Indartanti & Kartini (2014), the results obtained were p=0.023<0.05, meaning there was a significant relationship between protein consumption and anemia status in women of childbearing age in Paluh Kemiri. Other research conducted by Sholihah et al. (2019) stated that there was a significant relationship between protein intake and the incidence of anemia (p<0.001).

Protein nutrients play a crucial and helpful role in the synthesis and regulation of various substances. In addition, protein controls human health, acts as a component of body cells, provides the molecular building blocks for amino acids, and transports iron to the spinal cord for synthesis. blood clots. Low protein intake can lower Hb levels, which can lead to anemia. Protein intake, especially animal protein, helps enhance iron absorption. Almatsier stated that if the amount of protein in the body is less, its ability to transport iron in red blood cells will be less than optimal, resulting in disturbances in the absorption and transportation of iron which will cause anemia. Anemia is a clinical syndrome characterized by a decrease in hematocrit, hemoglobin and the number of erythrocytes in the blood (Volchkova & Subkhankulova, 2022). Anemia is also caused by menstruation every month which causes iron loss of around 1.4 mg per day (Welan et al., 2021). The source of iron comes from animal protein. To maintain iron balance in the body, a woman needs a higher protein intake. If the body's iron needs are not met through protein intake or iron supplements, it can cause depletion and lead to anemia.

Anemia can cause health problems ranging from mild to severe. Moderate and mild anemia can cause symptoms of lethargy, weakness, dizziness, paleness and frequent dizziness. In teenagers it has a very broad impact because it is related to productivity and concentration in learning. In addition, anemic teenagers are easily attacked by infectious diseases, which can hamper the quality of human resources.

MTs Darul Hidayah Sriminosari students eat more food in the canteen, according to observations made by researchers. Other than fried foods, which are frequently purchased as snacks, MTs Darul Hidayah Sriminosari students eat very little animal protein. Most only eat eggs once a day, which have a Fe content of 3 mg; they also eat crab as snacks or snacks with a Fe content of 2.2 mg; they eat meatballs every break; they eat chicken in processed form, such as nuggets, 3-6 times a week, which has a Fe content of 1.5 mg; they eat dried anchovies, sea fish, salted fish, and shrimp 1-2 times a week, and 2 times a month.

The students at MTs Darul Hidayah are students at Pondok Darul Hidayah, to fulfill the daily nutritional needs of the students who are also students receive food rations from the boarding school administrator twice a day and there is no menu cycle for daily meals apart from that the students often miss breakfast time. Based on these conditions, students fulfill their nutritional needs by having snacks outside the boarding school. According to the Balanced Nutrition Guidelines (2014), the recommended frequency for adolescents aged 10-19 years is 3 main meals and one snack as well as consuming a variety of foods to meet protein energy needs which are used for rapid growth, increasing blood volume and increasing hemoglobin.The limitation of the food frequency method in this research is that it first conducts a survey with respondents regarding food items that are frequently consumed and cannot measure daily nutritional intake. It is intended that future studies on the prevalence of anemia in teenage females would examine nutritional status based on BMI and that health professionals will raise awareness of patterns of animal protein consumption.

4. CONCLUSION

Based on the results of the research that has been carried out, it can be concluded that the percentage of young women in the moderate anemia category is 38 (55.1%) respondents and mild anemia is 31 (44.9%) respondents, whereas for severe anemia there were no young women with severe anemia. Animal protein consumption patterns of adolescent girls at MTs Darul Hidayah Sriminosari, East Lampung, most of them were in the never category, namely 48 (69.6%) respondents, sometimes 18 (26.1%) respondents, and usually consumed by 3 (4.3%) respondents. Data analysis shows that there is a relationship between animal protein consumption patterns and the incidence of anemia in young women at MTs Darul Hidayah Sriminosari East Lampung with p-value=0.007 (p-value<0.05). With the results of this research, it is hoped that young women will be able to prevent and treat anemia early by adopting a healthy diet and increasing their consumption of animal protein. Health officers at community health centers are expected to coordinate with schools to provide education regarding appropriate ways to prevent and treat anemia through the UKS program in an effort to treat anemia early. Apart from that, the school is also expected to provide food in accordance with balanced nutrition guidelines in the school canteen.

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