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The Relationship between Nutritional Knowledge with Nutrient Intake and Adherence to the Consumption of Blood-Added Tablets in Adolescent Girls at SMA Islam SHAFTA Surabaya

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ABSTRACT

Anemia is a nutritional problem of adolescents in Indonesia that occurs due to iron deficiency. The purpose of the study was to analyze the relationship of nutritional knowledge with nutrient intake and adherence to the consumption of blood-added tablets in adolescent girls at SMA Islam SHAFTA Surabaya. This type of research is analytical descriptive research with a cross sectional design. Large sample of 45 respondents. Data collection with interviews and SQ-FFQ. Furthermore, it was analyzed with the spearman correlation test. The results of the analysis indicate that the majority of respondents' characteristics are aged 16-18 years (68.9%). Good nutrition knowledge 35 respondents (77.8%). Protein intake 32 respondents (71.1%) severe deficit, iron intake 36 respondents (80%) deficient and 41 respondents (91.1%) non-compliant. There was no relationship between nutritional knowledge with protein intake (p value = 0.428), nutritional knowledge with iron intake (p value = 0.685), and nutritional knowledge with adherence to blood added tablet consumption (p value = 0.231). There is no relationship between variables and it is necessary to collaborate on independent blood added tablets and health counseling at school.

INTRODUCTION

Anemia, which is estimated to suffer 30% of the world's population, is a problem caused by micronutrient deficiencies, especially in developing countries in the adolescent age group. One of the nutritional problems in Indonesia that occurs in adolescents is anemia, which is more likely to occur in adolescent girls when they lack micronutrients. Lack of iron intake is the main cause of anemia.[1]

Referring to 2018 Basic Health Research data, there are 48.9 percent of teenagers in Indonesia experiencing anemia, respectively 25-34 percent and 15-24 percent experiencing anemia.[2] The 2021 Indonesian Health Profile indicates that iron supplement coverage for adolescent girls in East Java Province is 23.5%, lower than Indonesia's target of 31.3% for 2021.[3] The results of blood added tablets coverage at SHAFTA Surabaya Islamic High School in 2022 show that the number of young women who received blood added tablets was 135 female students through activities providing and monitoring blood added tablets consumption.

Referring to Fatma and Novera's research from 2022, it indicates that knowledge and compliance with iron tablet consumption are related. Adolescent girls who lack knowledge are at risk

of not consuming one blood added tablets tablet per week, which is around 4.9x higher than adolescent girls who have sufficient or good knowledge.[4]

From the results of a preliminary study that was conducted on 20 female students at SHAFTA Islamic High School Surabaya it is known that for compliance with blood added tablets consumption among young women in the non-compliant category there are 16 female students (80%) And in the obedient category, there are 4 female students (20%). Meanwhile, for the knowledge of young women in the poor category, there are 16 female students (80%) and in the good category there are 4 female students (20%). Considering the above, the author is interested in the research "The Relationship between Nutritional Knowledge and Nutrient Intake and Compliance with the Consumption of Blood Supplement Tablets in Young Women at SHAFTA Islamic High School Surabaya".

MATERIALS AND METHODS

This type of research is descriptive-analytical research with a cross-sectional design. The research was conducted at SHAFTA Islamic High School Surabaya from October 2022 to June 2023. The research population was 135 students. The sample size was 45 respondents. The sampling technique uses a simple random sampling method. Data were collected using questionnaire interviews for knowledge and compliance data, the SQ-FFQ form was used to obtain nutritional intake data. Data analysis using the Spearman statistical test.

RESULTS

Respondent Characteristics

1. Respondent's Age

   From the results of data collection, the following table describes the characteristics of respondents based on the age of the respondents:

Table 1. Age Frequency Distribution of Respondents at SHAFTA Surabaya Islamic High School in 2023

Age	Amount	
	n	%
13-15 Years	14	31.1
16-18 Years	31	68.9
Total	**45**	**100.0**

Source: Primary Data 2023

   In Table 1 it can be seen that of the total respondents, namely 45, the majority were respondents with an age range of 16-18 years, namely 31 respondents (68.9%).

2. Respondent Class

   From the results of data collection, the characteristics of respondents in the respondent class can be seen in the following table:

Table 2. Frequency Distribution of Respondent Classes at SHAFTA Surabaya Islamic High School in 2023

Class	Amount	
	N	%
Class X	28	62.2
Class XI	17	37.8
Total	**45**	**100.0**

Source: Primary Data 2023

In Table 2 it is clear that of the total respondents, namely 45, the majority were respondents in Class X, namely 28 respondents (62.2%).

Level of Nutrition Knowledge

The following table indicates the level of nutritional knowledge of respondents determined from the data collected:

Table 3. Frequency Distribution of Respondents Level of Nutritional Knowledge at SHAFTA Surabaya Islamic High School in 2023

Level of Nutrition Knowledge	Amount	
	N	%
Deficient	0	0
Enough	10	22.2
Good	35	77.8
Total	**45**	**100.0**

Source: Primary Data 2023

The total number of respondents was 45 people, which can be seen in Table 3. Of this number, 35 people (77.8%) had a good level of nutritional knowledge.

Nutrient Consumption Levels

1. Protein Consumption Levels

From the results of the data collection, the results of the respondents' levels of protein consumption can be seen in the following table:

Table 4. Frequency Distribution of Respondents Protein Consumption Levels at SHAFTA Islamic High School Surabaya in 2023

Protein Consumption Levels	Amount	
	n	%
Severe Deficit	32	71.1
Moderate Deficit	5	11.1
Mild Deficit	2	4.4
Normal	3	6,7
Over	3	6,7
Total	**45**	**100.0**

Source: Primary Data 2023

In Table 4, the results show that the highest category of protein consumption level is the severe deficit category, with 32 respondents (71.1%).

2. Iron Consumption Levels

From the results of data collection, the respondent's level of iron consumption can be observed in the following column:

Table 5. Frequency Distribution of Respondents Iron Consumption Levels at SHAFTA Islamic High School Surabaya in 2023

Iron Consumption Levels	Amount	
	n	%
Deficient	36	80
Enough	9	20
Total	**45**	**100.0**

Source: Primary Data 2023

In Table 5, the results show that the highest category of iron consumption level is the deficient category, there are 36 respondents (80%).

Blood Added Tablets Consumption Compliance

From the results of data collection, the table of blood added tablets consumption compliance results looks as follows:

Table 6. Frequency Distribution of Respondents' Blood Added Tablets Consumption Compliance at SHAFTA Islamic High School Surabaya in 2023

Blood Added Tablets Consumption Compliance	Amount	
	N	%
Compliant	4	8.9
Non-Compliant	41	91.1
Total	**45**	**100.0**

Source: Primary Data 2023

The total number of respondents as shown in table 6 was 45 people, with 41 non-compliant respondents (91.1%).

Protein Consumption Levels Are Based on Level of Nutritional Knowledge

From the results of data collection, the results of the cross-tabulation of respondents' nutritional knowledge and protein intake are presented in the following table:

Table 7. Cross Tabulation of Levels of Nutritional Knowledge and Levels of Protein Consumption at SHAFTA Islamic High School Surabaya in 2023

Level of Nutrition Knowledge	Protein Consumption Levels											
	Severe Deficit		Moderate Deficit		Mild Deficit		Normal		Over		Total	
	n	%	n	%	n	%	n	%	n	%	n	%
Deficient	0	0	0	0	0	0	0	0	0	0	0	0
Enough	8	80	0	0	1	10	0	0	1	10	10	100
Good	24	68.6	5	14.3	1	2.9	3	8.6	2	5.7	35	100
Total	**32**	**71.1**	**5**	**11.1**	**2**	**4.4**	**3**	**6.7**	**3**	**6.7**	**45**	**100**

Source: Primary Data 2023

In Table 7, there are 24 respondents (68.6%) with a high level of nutritional knowledge but severe protein deficiency. In contrast, only three respondents (8.6%) had a good level of nutritional knowledge and normal levels of protein consumption, while five respondents (14.3%) experienced a moderate protein deficit.

Iron Consumption Levels Are Based on Level of Nutritional Knowledge

From the results of data collection, the following table displays a cross-tabulation of respondents' nutritional knowledge and protein intake:

Table 8. Cross Tabulation of Levels of Nutrition Knowledge and Levels of Iron Consumption at SHAFTA Islamic High School Surabaya in 2023

Level of Nutrition Knowledge	Iron Consumption Levels					
	Deficient		Enough		Total	
	n	%	n	%	n	%
Deficient	0	0	0	0	0	0
Enough	9	90	1	10	10	100
Good	27	77.1	8	22.9	35	100
Total	**36**	**80**	**9**	**20**	**45**	**100**

Source: Primary Data 2023

Table 8, if you look at the trend, the majority of respondents have a good level of nutritional knowledge with 27 respondents (77.1%). Meanwhile, there were only 8 respondents who had good nutritional knowledge and enough levels of iron consumption (22.9%).

Compliance with Blood Added Tablets consumption is based on the level of nutritional knowledge

From the results of data collection, cross-tabulation of respondent's nutritional knowledge and compliance with iron supplement consumption resulted in the following table:

Table 9. Cross Tabulation of Levels of Nutritional Knowledge and Compliance with Blood Added Tablets Consumption at SHAFTA Surabaya Islamic High School in 2023

Level of Nutrition Knowledge	Blood Added Tablets Consumption Compliance					
	Compliant		Non-Compliant		Total	
	n	%	n	%	n	%
Deficient	0	0	0	0	0	0
Enough	1	10	9	90	10	100
Good	3	8.6	32	91.4	35	100
Total	**4**	**8.9**	**41**	**91.1**	**45**	**100**

Source: Primary Data 2023

Table 9, if you look at the trend, the majority of respondents have good nutritional knowledge and Blood Added Tablets consumption is non-compliant, there are 32 respondents (91.4%). On the

other hand, there were only 3 respondents who had a good level of nutritional knowledge and compliant to Blood Added Tablets consumption (8.6%).

DISCUSSION

Respondent Characteristics

The characteristics of the research respondents included young women aged between 13 and 15 years, there were 14 respondents (31.1%) and 31 respondents (68.9%) at the age of 16-18 years, with class X as many as 28 respondents (62.2%) and class XI there were 17 respondents (37.8%).

Level of Nutrition Knowledge

Indirect causal factors consist of education, nutritional knowledge, lifestyle, age, social status, and distance to health facilities. Health services and iron intake are influenced by distance to health facilities through mechanisms related to travel distance and reach of health facilities and food. Nutritional knowledge is the main causal factor that influences intake and compliance with blood added tablets consumption. If a teenager's diet is unbalanced, it will disrupt the process of iron and protein absorption, which is a cause of anemia in teenage girls. So nutritional knowledge is the independent variable in this research.

The level of respondents' nutritional knowledge was measured using a questionnaire, the majority of respondents had good nutritional knowledge, 35 respondents (77.8%). The knowledge of respondents in this study was good because it was influenced by information and learning related to health and biology both inside and outside school. In general, health information can be obtained from various media, namely the internet and other electronic media such as cellphones, television and radio.[5] Apart from that, respondents also said that they had received education about health at school from the community health center. So, the knowledge they have is more than just knowing.

Nutrient Consumption Levels

1. Protein Consumption Levels

   Based on the research results, it is known that the majority of protein consumption levels are in the severe deficit classification of 32 respondents (71.1%). From the research results, it was found that the average protein intake was 39.7 g. If we look at the average, referring to the Ministry of Health (2003), the respondents' protein intake is still classified as a severe deficit.

   As a result of interviews with respondents, respondents said they never had breakfast at home because it was their habit that if they had breakfast, they would feel nauseous. This reason led respondents to go to the canteen and buy snacks there. Therefore, based on the results of the SQ-FFQ interview, respondents consumed more snacks than main meals as a

result of which respondents felt full. This is by Arisnawati's statement that children prefer foods containing carbohydrates and salt because these foods help children feel full quickly.[6]

2. Iron Consumption Levels

Referring to the research results, the majority of 36 respondents (80%) had deficient iron consumption. From the research results, it was found that the average iron intake was 7.8 mg. If we look at the average, referring to Gibson (2005), the respondents' iron intake is still relatively low. The SQ-FFQ results showed that the majority of respondents consumed tea along with snacks purchased from school or consumed at home. In 150 milliliters of tea, there are 25-80 mg of tannin.[7]

Tannin is a plant-derived polyphenolic compound that can inhibit iron absorption. Consuming tea after meals is not recommended if the body is deficient in fe.[8] This is in line with research conducted by Riswanda (2017) that the risk of anemia can be seen from tannin intake. Tannin consumption >10.5 g/day carries a 2.21 times greater risk of anemia than tannin consumption <10.5 g/day.[9] Referring to Ari Istiany, protein also functions to help absorb iron in the body, so if a person's level of protein consumption is low it will cause iron deficiency.[10]

Blood Added Tablets Consumption Compliance

Referring to the results of observations, it is known that compliance with blood added tablets consumption is highest in the non-compliant classification, numbering 41 respondents (91.1%). The reason respondents did not want to drink blood added tablets regularly according to the recommended rules was that they were lazy and did not like the fishy aroma of blood added tablets. So, what respondents consumed was only vitamin C supplements. However, some respondents also chose to consume blood added tablets regularly because they were used to consuming it and already understood the consequences of not consuming blood added tablets.[11]

Relationship between level of nutritional knowledge and level of protein intake

From the correlation test, significance or Sig is obtained. (2-tailed) has a value of 0.428 > 0.05, meaning that there is no relationship between the level of nutritional knowledge and the level of protein consumption at SHAFTA Surabaya Islamic High School. This shows that even though the respondents have a good level of knowledge, it turns out that the respondents have not been able to meet their protein intake according to their daily needs. But basically the better the level of knowledge, the more adequate protein consumption will be.[12] However, this is inversely proportional to this research because the nutritional knowledge they have is more than limited to what they know but is not put into practice in daily life so this influences the level of protein consumption to become a severe deficit.

However, this research is in line with the findings of Adawiyah and Nieken (2017), this study indicates that there is no relationship between the level of nutritional knowledge and protein intake

because even if you have good nutrition knowledge but still make the wrong choice of food, it will result in health problems.[13] One of the factors that influences eating habits is knowledge. Teenagers can develop a clear understanding of how to behave with knowledge. During adolescence, a person assumes responsibility for his or her health, behavior, and eating habits. Teenagers rely heavily on their knowledge when making decisions.[14]

Relationship between level of nutritional knowledge and level of iron intake

From the correlation test, it was found that the significance was 0.685 > 0.05, meaning there was no correlation between the level of nutritional knowledge and iron intake at SHAFTA Surabaya Islamic High School. This shows that even though the respondents have a good level of knowledge, it turns out that the respondents have not been able to meet their iron intake according to their daily needs. But basically the better the level of knowledge, the better the iron consumption will be.[15] However, this is inversely proportional to this research because the nutritional knowledge they have is more than just what they know but is not put into practice in daily life, as a result, this has an effect on the level of iron consumption being low. Another thing that influences the majority of female students is not consuming vegetables, where vegetables are a food source of iron, especially green vegetables, and consuming tea along with snacks. Therefore, this is not recommended because these foods contain tannins which can inhibit fe absorption.[16]

This research is in line with the study carried out by Indah, M (2018) targeting students, indicating that there is no correlation between the level of knowledge and iron intake because even if you have good nutrition knowledge but still make the wrong choice of food, it will result in nutritional problems.[17] One way to balance good nutritional knowledge is to practice it directly in daily life by maintaining eating habits, namely a diet based on the principles of balanced nutrition.[18]

Relationship between level of nutritional knowledge and compliance with Blood Added Tablets consumption

From the correlation test, Sig is produced. (2-tailed) was 0.231 > 0.05, meaning there was no relationship between nutritional knowledge and compliance with blood added tablets consumption at SHAFTA Surabaya Islamic High School. This shows that even though respondents have a good level of knowledge, it will not necessarily result in better compliance with blood added tablets consumption. But basically the better the level of knowledge, the more compliant the consumption of blood added tablets will be.[19] According to Fatma Ryalda's research from 2022, compliance with iron supplement consumption is related to knowledge and family support. This shows that knowledge and compliance with the consumption of iron tablets are related. Adolescent girls who lack knowledge are at risk of not consuming one blood added tablets tablet per week, which is around 4.9x higher than adolescent girls who have sufficient or good knowledge. However, this is inversely proportional to this research because the nutritional knowledge they have is more

than just what they know but is not put into practice in everyday life. Another influence is that you are lazy and don't like the smell of fishy blood supplement tablets. Therefore, this has an impact on the number of female students who do not comply with blood added tablets consumption.

If we look at the qualitative results of the SQ-FFQ, it can be seen that the majority of respondents' eating habits regularly consume protein sources but not green vegetables because the average respondent doesn't like vegetables. These two food groups are the greatest sources of fe.[20] The sources of protein are less diverse, only chicken, eggs and tilapia fish with the most frequent consumption frequency being 1x/day for chicken. This may be due to the influence of the students' irregular eating habits. So, eating habits also play an important role in a person's nutritional knowledge. So this is where the role of educators in schools is needed as providers of guidance.[21]

From this research, researchers used 45 samples because these samples were sufficient to represent the research results which showed that there is no relationship between nutritional knowledge and protein intake, iron intake, and compliance with consuming blood supplement tablets in young women at SHAFTA Islamic High School Surabaya. The researcher chose a cross-sectional design as the design for this research because it is observational research which allows the researcher to carry out analysis with the same variables for all subjects in the sample population in the research period. In collecting data using the SQ-FFQ method because its use makes it easier to measure macro and micronutrient intake, provides an overview of portion sizes and frequency of food eaten by a person in years, months, weeks and days, and ranks them. Individual nutritional intake is based on standard portion sizes which can be a reference for each type of food.

CONCLUSION

Level of female students' nutritional knowledge at SHAFTA Islamic High School Surabaya the majority were in a good category, there were 35 respondents (77.8%). The majority of adolescent girls' nutritional intake at SHAFTA Surabaya Islamic High School is in the severe deficit category consisting of protein intake for 32 respondents (71.1%) and iron intake deficient for 36 respondents (80%). The majority of adolescent girls at SHAFTA Islamic High School Surabaya were in the non-compliant category with 41 respondents (91.1%). There is no relationship between nutritional knowledge and protein intake, iron intake, and compliance with the consumption of blood supplement tablets among young women at SHAFTA Islamic High School Surabaya.

This research focuses on protein and iron intake because the research was conducted on anemia in adolescent girls where food sources of protein contain iron which is a micronutrient that the body needs in blood formation for the synthesis of hemoglobin as the main component of blood. If protein intake is low, iron levels in the body will automatically decrease and hemoglobin will decrease, causing anemia.

For follow-up plans for female students, can increase understanding and motivation for female students about the importance of consuming nutritious food and food ingredients that inhibit fe

absorption so that they are applied in everyday life to develop female students' knowledge about nutrition and prevent anemia. For the school, it is necessary to hold an independent collaboration between the school and the nearest health center regarding blood supplement tablets so that the supply of blood supplement tablets at the school can be sufficient for all young female students. For the community health center, it is necessary to maintain an active iron supplementation program and provide outreach activities regarding the importance of consuming blood supplement tablets for students so that they are motivated to regularly consume blood added tablets to prevent anemia in young women.

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