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CORRELATION OF NUTRITION EDUCATION ON KNOWLEDGE OF ANEMIA AND CONSUMPTION PATTERNS OF TANNIN IN ANEMIC ADOLESCENT GIRLS AT SMPN 29 SAMARINDA

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Abstract

Data from Basic Health Research (Riskesdas) in 2018 showed that the prevalence of anemia in 2018 increased to 48.9%, where the prevalence of SMP/MTS grade VII female students in Samarinda who were at risk of anemia was 7%. Based on the results of interviews with 10 female students, it is known that students have sufficient knowledge of anemia (60%), consume less tannin sources (100%) and do not often consume tannin sources (70%). Anemia can be prevented by providing education that will affect attitudes and food consumption behavior. One of the media that can be used is animated video. This study aims to determine the correlation of nutrition education on knowledge of anemia and consumption patterns of tannin in anemic adolescent girls at SMPN 29 Samarinda. The research design used was pre experimental with a one group pretest posttest design with a sample of 30 female students. The variables studied were nutrition education, knowledge of anemia and consumption patterns of tannin. The instruments used were pretest and posttest questionnaires and SQ-FFQ. The statistical test used is paired T-test if the data is normally distributed and wilcoxon test if the data is not normally distributed or ordinal scale. The results of the wilcoxon test showed that there is an correlation of nutrition education on knowledge of anemia (p=0.000). There is no correlation of nutrition education on the source of tannins consumed (p=0.102)and the frequency of consuming tannins (p=0.808).

Keywords: Anemia, Knowledge, Nutrition Education, Tannin

1. Introduction

Anemia is a global health problem found in both developing and developed countries (Sari et al., 2022). Anemia is a low level of hemoglobin or red blood cells in the body that has an impact on health, human resources, social and economic (Panyuluh et al., 2018). Adolescent girls aged 10-19 years are among the high-risk groups for anemia (Martini, 2015).

Anemia is said to be a health problem if the prevalence of anemia sufferers is as high as 5% (World Health Organization, 2008). Based on data World Health Organization (WHO) in 2019, the prevalence of anemia globally was 29.9% in women of childbearing age aged 15-49 years and 39.8% in children aged 6-59 months (World Health Organization, 2021). Based on data from Riset Kesehatan Dasar (Riskesdas) in 2018, the prevalence of anemia in 2018 increased to 48.9% which was previously in 2013 at 37.1%

(Kemenkes RI, 2018). The prevalence of junior high school students in grade VII in Samarinda City who are at risk of suffering from anemia is 7% (Dinas Kesehatan Kota Samarinda, 2022).

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Iron deficiency anemia is caused by menstruation, improper and irregular diet, chronic blood loss, inadequate iron intake and absorption, as well as an increased need for iron for red blood cell production as a result of increased activity during adolescence (Kalsum & Halim, 2016). Anemia in adolescence can have adverse effects. Anemia in adolescents can lead to emotional and behavioral problems, as well as a halt in physical growth. This can have an impact on the growth and development of brain cells, which can lead to decreased learning achievement, immunity, weakness and easy hunger (Vidayati et al., 2020).

Prevention of anemia in adolescents can be achieved through education about anemia and its impact with the aim of increasing knowledge. The higher a person's nutritional knowledge, the more it will affect the attitude and behavior of food consumption (Elvira & Rizqiya, 2022; Firdaus, 2021). Nutrition education can be carried out using the media so that the message can be conveyed clearly and the target can receive the message clearly and precisely. One of the media that can be used is animation videos. Animated videos provide a stimulus to hearing and vision that can improve memory, attract attention and the concept of imagination, objects and their relationships may be visualized (Amelia & Kurniasari, 2021; Silalahi et al., 2018). Research conducted by Hutasoit et al. (2022) shows that there is an effect of providing animation education on adolescent girls' knowledge about anemia (p value=0.000).

Adolescence is the time when a person begins to acquire and apply new information. The current era of globalization has a significant impact on adolescents' knowledge, including eating habits, study habits and lifestyle. Currently, drinking coffee is one of the lifestyles that teenagers love and more and more coffee shops are popping up (Paramita et al., 2023). In addition to coffee, tea has become a tradition for the world's population, tea is the most widely enjoyed beverage by humans, especially among young women. The habit of adolescent girls consuming coffee and tea can cause anemia because these drinks contain tannins that can prevent the body from absorbing iron when consumed at the wrong time, such as during meals or an hour after meals (Marina et al., 2015; Rifai, 2020; Sariyanto, 2019). Research conducted by Royani et al. (2019) suggests that there is an influence between tea drinking habits after meals (p value=0.000) to the incidence of anemia in adolescent girls at Sekolah Putri Darul Istiqamah, Kabupaten Maros.

The results of a preliminary study conducted at the Dinas Kesehatan Kota Samarinda found that the highest prevalence of anemia was found in Puskesmas Bengkuring as much as 24% (Dinas Kesehatan Kota Samarinda, 2022). Based on data obtained at the Puskesmas Bengkuring, it was found that SMPN 29 Samarinda is a junior high school with the highest risk of anemia, which is 42.3% (Puskesmas Bengkuring, 2022).

Based on this background, the researcher is interested in conducting research related to the influence of nutrition education on knowledge and consumption patterns of tannins in anemia adolescent girls at SMPN 29 Samarinda.

2. Method

The type of research used in this study is quantitative using experimental research methods. More specifically, the research design used in this study is pre-experiment with one group pretest posttest design. The population limitation in this study was 30 female students of SMP Negeri 29 Samarinda class VIII who were classified as anemic with hemoglobin levels <12 g/dL. Sampling in this study used total sampling so that the sample size used was the same as the population. The variables in this study were nutrition education, knowledge of anemia and consumption patterns of tannin. The instruments used were pretest and posttest questionnaires using multiple choice closed questions with a Guttman Scale and Semi Quantitative - Food Frequency Questionnaire (SQ-FFQ) to determine consumption patterns of tannin over the past month.. The validity test of the pretest and posttest questionnaires was carried out at a significance level of a 5% and the number of respondents was 30 female students. The reliability test of the pretest and posttest questionnaires obtained a Cronbach's Alpha value of 0.729. Semi Quantitative - Food Frequency Questionnaire (SQ-FFQ) was not tested for validity and reliability because the questionnaire was in a standard form.

The implementation of this study included filling out the pretest by respondents, initial and final interviews on consumption patterns of tannin and nutrition education. The pretest, initial interview on consumption patterns of tannin and nutrition education were conducted in one meeting. Nutrition education was conducted 3 times with a duration of 30 minutes. Nutrition education used animated videos

2 times and nutrition education combined with lectures 1 time. Nutrition education materials included anemia, consumption patterns of iron, tannin and hemoglobin levels. The posttest was conducted by respondents 7 days after the provision of nutrition education. The final interview on consumption patterns of tannin was conducted 30 days after the provision of nutrition education.

Statistical tests were conducted by looking at the normality of the data. The data normality test used was the Shapiro-Wilk test (<50 data). If the data is normally distributed (Sig.>0.05), the statistical test performed is the Paired T-Test, while if the data is not normally distributed (Sig.<0.05) or is ordinal, the statistical test performed is the Wilcoxon test. This study has obtained ethical permission from the Health Research Ethics Commission (KEPK) of the East Kalimantan Ministry of Health Polytechnic with an ethical certificate number DP.04.03/F.XLII.25/0139/2024.

3. Result and Discussion

Characteristics of Respondents

The respondents were class VIII students of SMP Negeri 29 Samarinda who were classified as anemic with hemoglobin levels <12 g/dL. Characteristics in this study include age, parents' latest education and parents' occupation. Based on the research that has been conducted, the characteristics of respondents can be seen in table 1, it can be seen that the age of respondents in this study is in the range of 13-14 years, where most are 14 years old (63.3%). In addition, the last education of the father and mother showed that most of the respondents' fathers had the last education of Senior high school/ Equivalent (53.3%) and most of the respondents' mothers had the last education of Senior high school/ Equivalent (73.3%). In terms of employment characteristics, respondents' parents had quite diverse occupations. The occupations of the respondents' fathers and mothers showed that half of the respondents' fathers worked as private employees (50.0%) and almost all of the respondents' mothers worked as housewives (90.0%).

Characteristics p %					
	11	/0			
Age	11	36.7			
14 years old	10	62.2			
Ta years old	15	63:3			
Flamentary school (Equivalent	2	10.0			
	5	10.0			
	5	16.7			
Senior high school/ Equivalent	16	53.3			
Associate's degree	3	10.0			
Bachelor's degree	3	10.0			
Mother's Last Education					
SD/Sederajat	5	16.7			
SMP/Sederajat	2	6.7			
SMA/Sederajat	22	73.3			
Bachelor's degree	1	3.3			
Father's Occupation					
Labor/Driver/Household Assistant	6	20.0			
Self-Employed	6	20.0			
Civil Servant/Soldier/Police	1	3.3			
Private Employee	15	50.0			
Farmer	1	3.3			
Other	1	3.3			
Mother's Occupation					
Labor/Driver/Household Assistant	1	3.3			
Civil Servant/Soldier/Police	1	3.3			
Private Employee	1	3.3			
Housewife	27	90			

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Knowledge of Anemia

Table 2. Knowledge of Anemia					
Knowledge of Anomia	Before		After		
Kilowledge of Allenna	n	%	n	%	
Less	8	26.7	0	0.0	
Sufficient	22	73.3	20	66.7	
Good	0	0.0	10	33.3	
Total	30	100.0	30	100.0	

Based on table 2, it can be seen that nutrition education provided can improve respondents' knowledge of anemia, where before nutrition education most respondents had sufficient knowledge (73.3%) and almost half of the respondents had insufficient knowledge (26.7%). After nutrition education, there was an increase in respondents' knowledge to most respondents having sufficient knowledge (66.7%), almost half of the respondents had good knowledge (33.3%) and there were no more respondents with less knowledge (0.0%).

Table 3. Average Knowledge Score of Anemia

Knowledge Score of Anemia	n	Mean	Standard Deviation	Min	Max
Before	30	49.67	7.184	40	50
After	30	69.33	9.803	60	90

Based on table 3, it can be seen that before nutrition education, the average knowledge score of anemia of respondents was 49,67 and after nutrition education, the average knowledge score of anemia of respondents was 69.33. This shows that the average knowledge score of anemia of respondents has increased by 19.66.

The results of this study are in line with research conducted by Haya & Wahyu (2021) which showed that there was a significant increase in knowledge in adolescent girls after education with animated video media. This can be seen from the average value before education, which was 4.80 and after education it became 8.75. The results of this study are also in line with research conducted by Fitriani et al. (2019) which showed that there was a significant increase in adolescent girls after education with motion video media. This can be seen from the average value before education, which was 5.1 and after education it became 8.71.

Nutrition education can improve a person's knowledge, attitude and behavior about the habit of choosing a healthy and balanced diet, understanding the benefits of a food and the nutritional content of the food (Tsania et al., 2023). Nutrition education using media is a tool that can be used to convey information to be understood by the intended target (Adventus et al., 2019).

Educational media that can be used are animated videos that have images and make sounds. The advantages of education using animated videos are that they provide a more real picture and increase memory retention because they are more interesting and easy to remember. Watching videos can be done quickly and can incorporate more information in a short span of time. The human brain likes to visualize things and videos present images that are easy to understand and learning very complex things is much faster and easier than reading a book (Mahmud et al., 2017).

Table 4. Consumption Patterns of Tannins					
Consumption Patterns of Tanning	Before			After	
Consumption ratterns of ratinitis	n	%	n	%	
Source					
Less	19	63.3	23	76.7	
Sufficient	11	36.7	7	23.3	
Frequency					
Not Often	19	63.3	18	60.0	
Often	11	36.7	12	40.0	
Total	30	100.0	30	100.0	

Consumption Patterns of Tannins

Based on the results of the analysis of tannin sources consumed in table 4, before nutrition education showed that most respondents consumed less tannin sources (63.3%), almost half of the respondents consumed sufficient tannin sources (36.7%) and after nutrition education there was an increase in tannin sources consumed to almost all respondents continued to consume less tannin sources (76.7%), a small proportion of respondents still consumed sufficient tannin sources (23.3%).

Based on the results of the analysis of the frequency of consuming tannin sources in table 4, before nutrition education showed that most respondents did not often consume tannin sources (63.3%), almost half of the respondents often consumed tannin sources (36.7%) and after nutrition education there was no increase in the frequency of consuming tannin sources, most respondents still did not often consume tannin sources (60.0%), almost half of the respondents still often consumed tannin sources (40.0%).

The results of this study are in line with research conducted by Raihani et al. (2024) which showed that almost all respondents rarely consumed iron inhibitors (80.0%) and a small number of respondents often consumed iron inhibitors (20.0%). The results of this study are in line with research conducted by Fitripancari et al. (2023) which showed that most respondents rarely consumed tea (75.6%) and almost all respondents rarely consumed coffee (87.0%).

The habit that is often done by teenagers today is more often consuming drinks containing tannins rather than plain water. Tannins are substances that can reduce the ability of iron availability before absorption through the formation of insoluble mineral complexes. Tannins inhibit the absorption of iron by binding it, because it continues to be bound, the iron contained in food will be difficult to absorb by the body, causing a decrease in iron, despite consuming foods that contain high iron (Andiani, 2020; Kurniati, 2020; Lisisina & Rachmiyani, 2021).

A person's level of knowledge about nutrition can affect their eating habits, such as being able to choose good food, being able to understand the benefits of a food ingredient and the nutritional content that is in the food. Eating habits are an important factor that can affect a person's nutritional status and health, especially among adolescents who need adequate nutritional intake, to support the growth and development process. Eating habits that are influenced by the environment, especially culture, are very influential and arguably difficult to (Indraswari, 2019; Pradiningtyas & Ismawati, 2023; Putri et al., 2021).

The	Correlation	of Nutritio	n Education	on Knowledge	of Anemia
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Table 5. Wilcoxon Test of Knowledge of Anemia					
Knowledge of Anemia	n	Mean±SD	p value		
Before	30	49.67±7.184	0.000		
After	30	69.33±9.803	0.000		

Based on table 5, it can be seen that the results of the analysis on the knowledge of anemia of respondents show a p value of 0.000 which indicates that there is an correlation of nutrition education on knowledge of anemia. The results of this study are in line with the research conducted by Hutasoit et al.

(2022) which shows that there is an influence of education using animated video media about anemia on changes in knowledge of adolescent girls with a p value of 0.000. The results of this study are also in line with the research conducted by Safitri et al. (2024) which shows that the influence of education using animated video media about anemia on adolescent girls with a p value of 0.000. The results of this study are not in line with the research conducted by Nadiawati & Susanti (2022) which shows that there is no relationship between knowledge about adolescent anemia and the incidence of anemia in female students at SMA Negeri 1 Godean with a p value of 0.779.

Nutrition education will be easier to do with the use of appropriate learning media and can increase the ease of receiving. Animated video media is media that presents information in the form of writing, sound and images that are designed in such a way as to be interesting. The existence of animated videos in learning can help students understand abstract material to be more concrete, so that students do not just imagine and imagine (Alifa, 2021; Andrasari et al., 2022; Elihami & Saharuddin, 2017).

Students can easily receive the information provided and make students interested in learning that is different from usual, so students will be more interested in seeing the video than reading textbooks. Animated videos make students more quickly understand the material presented because of the video system that can be repeated and also make students not bored quickly when learning. Animated videos are also considered more effective for retaining memories than just using pictures and words. Therefore, animated videos can overcome boredom, increase learning interest and student motivation in learning (Kusumaningrum et al., 2022; Mahadewi, 2021).

Table 6. Wilcoxon Test of Consumption Patterns of Tannin					
Consumption Patterns of Tannin —	Before		After		a salua
	n	%	n	%	p oaiue
Source					
Less	19	63.3	23	76.7	0.102
Sufficient	11	36.7	7	23.3	
Frequency					
Not Often	19	63.3	18	60.0	0.808
Often	11	36.7	12	40.0	

The Correlation of Nutrition Education on Consumption Patterns of Tannin

Based on table 6, it can be seen that the results of the analysis on the source of tannins consumed by respondents show a p value of 0.102 which indicates that there is no correlation of nutrition education on the source of tannins consumed. In the analysis of the frequency of tannin sources consumed by respondents, the p value is 0.808, indicating that there is no correlation of nutrition education on the frequency of consuming tannin sources.

The results of this study are in line with the study conducted by Raihani et al. (2024) which showed that there was no effect of nutritional education on the consumption pattern of iron inhibitors with a p value of 0.317. The results of this study are also in line with the study conducted by Salma et al. (2023) which showed that there was no significant relationship between the frequency of consumption of iron inhibitor foods and anemia with a p value of 0.212. The results of this study are not in line with the study conducted by Susantini & Bening (2023) which showed that there was a relationship between the consumption of iron inhibitors and anemia with a p value of 0.004.

A person's knowledge influences attitudes and behaviors in food choices which will ultimately affect the nutritional state of the individual. However, a person's nutritional knowledge does not necessarily change their eating habits, where they have an understanding of the nutritional intake needed to meet the needs of the body but do not apply this knowledge (Runkat et al., 2019).

Tea consumption in reasonable amounts and at appropriate times does not necessarily cause anemia, especially if nutritional needs are met. Although excessive consumption of tea can inhibit the absorption of iron in the body, under normal conditions with adequate nutritional intake, the human body is able to absorb iron from food and beverages consumed optimally. In addition, tea consumed after meals up to 1

hour will reduce the absorption of red blood cells to iron by 64%, therefore it is recommended to consume tea 2 hours after meals (Herawati et al., 2023; Masthalina et al., 2015).

4. Conclusion and Suggestion

There is an correlation of nutrition education on knowledge of anemia. There is no correlation of nutrition education on the source of tannins consumed and the frequency of consuming tannins.

It is hoped that future researchers can examine other factors that affect the increase in hemoglobin levels of adolescent girls with anemia such as iron absorption aids (enhancers) and consumption of blood supplement tablets.

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