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EFFECTIVENESS OF NUTRITION EDUCATION ON ANEMIA ON THE LEVEL OF KNOWLEDGE IN ADOLESCENTS GIRLS

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ABSTRACT
Anemia is a condition in humans with a decrease in the amount of hemoglobin in red blood cells that is insufficient to meet physiological needs and reduce oxygen levels in the blood. Lack of knowledge about nutrition is one of the most significant reasons for nutritional problems and consequently improper nutrition practices can lead to various complications that occur such as anemia. The purpose of this study was to determine the effect of nutrition education on anemia on the level of knowledge of adolescent girls in Masaran village, Sragen.This study uses a True experimental research design with Pretest and Posttest Control Group Design. The population is all young women in the Masaran Village, Sragen with a sample technique using purposive sampling, totaling 40 respondents. Data analysis using Univariate analysis and Bivariate analysis using t-test. Based on the average value of knowledge in the control group was 63.75 and the average value of knowledge in the intervention group was 85.50. Bivariate analysis with statistical test results using the t-test was carried out, the results obtained p value of 0.000.This study has the effect of differences in knowledge about anemia in adolescent girls before and after being given anemia nutrition education.

Keywords: adolescent; anemia; knowledge; nutrition education

INTRODUCTION
Anemia is a condition in humans with a decrease in the amount of hemoglobin in red blood cells that is insufficient to meet physiological needs and reduce oxygen levels in the blood. Factors that cause anemia include iron deficiency, folic acid and vitamin A, vitamin B12, chronic inflammation, parasitic infections, and congenital conditions. The main cause of anemia worldwide is iron deficiency where iron is needed by the human body to produce red blood cells (World Health Organization, 2020).

According to the World Health Organization, there are cases of anemia worldwide, namely two billion people, about 50% of specific anemia due to iron deficiency. Globally, 47.4% of preschool children (<5 years), 41.8% of pregnant women and 25.4% of school children will be anemic. In the Southeast Asian region, the prevalence of anemia in pre-school children and pregnant women was 65.5% and 48.2%, respectively, while the prevalence among adolescent girls ranged from 17%-90%. In Indonesia, there are 7.5 million cases of iron deficiency anemia with a prevalence of anemia of 22.7% (World Health Organization, 2016).

Impact with cases of iron deficiency anemia (IDA) from low food intake, blood loss resulting in iron loss, problems in iron absorption, and other medical conditions, such as end-stage kidney disease. failure and inflammation. Cases of iron deficiency anemia (IDA) range from mild to severe. Mild to moderate iron deficiency anemia (IDA) may not have any signs or symptoms. However, severe cases of iron deficiency anemia (IDA), if left untreated, can lead to life-

threatening consequences (Miller, 2013). Research conducted by Chaundhary stated that lack of knowledge about nutrition is one of the most significant reasons for nutritional problems and as a result improper nutrition practices can lead to various complications that occur such as anemia (Chaundhary, 2019). Girls are at a much higher risk of malnutrition and related chronic diseases because of their reproductive characteristics and other socio-cultural problems such as neglect of girls in the family, early marriage, and teenage pregnancy. Not consuming breakfast or eating daily which causes malnutrition, and at the same time, consuming junk food and fast food which causes overweight among adolescents (Kotecha, 2013).

Nutrition education will provide individuals with sufficient information and motivation to make wise decisions about choices for good health. Practical nutrition education and adopted according to social and economic conditions, food habits and local food resources, can solve the problem well. Therefore, health and nutrition education to increase and ensure regular consumption of foods rich in iron, folate and vitamin C and to reduce consumption of interfering substances is also important for the prevention and control of anemia (Kamalaja, 2018). Health and nutrition education is defined as educational steps to encourage desired behavior changes for the ultimate result of improving people's nutritional status. It is an inexpensive, highly effective way of making technology and health services available to many people with major illnesses in developing countries. Nutrition education for adolescents about anemia will help in increasing knowledge, attitudes, and appropriate practices and also help in fostering healthy families and communities reducing the prevalence of anemia (Sasmita, 2022). Very little research on anemia has been conducted with a focus on the impact of nutrition education in adolescents so that this study aims to determine the effectiveness of anemia nutrition education on the level of knowledge of adolescent girls.

METHOD

This research was conducted in Masaran Village, Sragen Regency. The time of the study was carried out in October 2021 – March 2022. This type of research is a True Experimental research with a pretest-posttest control group design. In this study, before the experiment and after the experiment, it was divided into an intervention group including nutrition education through counseling, and a control group using leaflet media. The population of this research is all young women in Masaran Village, Sragen Regency. The sample of the study was female respondents using a purposive sampling technique as many as 40 respondents with inclusion criteria. The sample of this study were female adolescents aged 15-16 years, had menstruation, participated and were willing to be respondents. The source of data collection comes from the instrument given to young women using a closed questionnaire to assess the level of knowledge (pretest and posttest). Analysis of the data used is after the data is collected then editing, coding, and entry in computer files are then analyzed statistically using SPSS. The data were then analyzed using the t-test. The significant value in this study was $p < 0.05$.

RESULTS AND DISCUSSION

Table 1.
Distribution Frequency Based on Age Respondent

Age Respondent	f	%
15 years	10	25
16 years	30	75

Table 1 shows that age respondent is 15 years old (25%) and 16 years old (75 %)

Table 2.
Distribution Knowledge Level Frequency Respondent Before Nutrition Education

Knowledge Level	Group Intervention		Group Control	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Good	9	45	3	15
Moderate	9	45	10	50
Less	2	10	7	35
Total	20	100	20	100

The results of this study found that in the intervention group, the percentage level of knowledge prior to being given nutrition education about anemia in the good category was 45%, 9% sufficient and 10% less. Meanwhile, in the control group, the percentage level of knowledge before being given nutrition education about anemia was in the good category of 3%, 50% sufficient, and 35% less.

Table 3.
Distribution Knowledge Level Frequency Respondent After Nutrition Education

Knowledge Level	Group Intervention		Group Control	
	f	%	f	%
Good	15	75	5	25
Moderate	5	15	12	60
Less	0	0	3	15
Total	20	100	20	100

Research results this known to the group intervention that percentage level knowledge after given education nutrition about anemia with good category by 75% and 15% is sufficient . While in the control group the percentage level knowledge after given education nutrition about anemia with good category 25%, 60 % enough , and 15% less

Table 4.
Results of t -Test Knowledge Before and After given Nutrition Education on Anemia

Group	n	mean	SD	Std.Error Mean
Group Control	20	63.75	10,114	2,262
Group Intervention	20	85.50	11,910	2,663

The average value of adolescent knowledge about nutrition on anemia in the control group (leaflet media) was 63.75 and the average value of adolescent knowledge about nutrition on anemia in the intervention group (health education media) was 85.50. Thus, it can be concluded that there is a difference in the average score between the control group (leaflet media) and the intervention group (health education).

Table 5 .
Independent Samples Test

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
Value	F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std.Error Difference	Lower	Upper
Equal Variances assumed	1,794	,188	-6,225	38	,000	-21,750	3,494	-28,823	-14,677
Equal Variances not assumed			-6,225	37,029	,000	-21,750	3,494	-28,829	-14,671

The results of statistical tests using the T-Test test obtained p value of 0.000. Equal variances assumed Sig. (2-tailed) < probability value (0.005), it can be concluded that "Ha is accepted" which means that there is a significant difference between the average scores in the control group (media leaflet) and the intervention group (health education). The Mean Difference value is -21,750. This value indicates the difference between the average scores in the control group (leaflet media) and the intervention group (health education). So it can be concluded that there is an effect of differences in knowledge about anemia in adolescent girls before and after being given nutrition education.

DISCUSSION

This study discusses the effectiveness of anemia nutrition education on the level of knowledge of young women. Based on the univariate analysis, the age category of the respondents was 15-16 years old. According to the World Health Organization, adolescents are between the ages of 10 and 19 years. Adolescence is characterized by a phase of rapid growth and development in which the need for nutrients and micronutrients are relatively high. Malnutrition in this adolescent age group can be caused by various factors such as poor nutritional conditions in childhood, food crises in the household, or wrong eating patterns and food modes (World Health Organization, 2021).

Adolescence is an important point in life's journey, marked by transformative physical, cognitive, and emotional growth, openness to change, and the drive to reshape the social environment. Adolescents have a unique opportunity to adopt changes in diet and physical activity that can last into later life. Pre-existing cases and nutritional problems, including micronutrient deficiencies, food insecurity, and poor diets, persist when adolescents face the emergence of epidemics of obesity, anemia and malnutrition. Adolescent growth and nutrition has been largely neglected in research interventions and policies (Hargreaves, 2021).

According to this study, it was stated that the Medical Council Research in India in the Asian region aimed to investigate appropriate knowledge, attitudes, and practices (KAP) and treatment seeking behavior regarding anemia among adolescent female students. Anemia was defined as hemoglobin [Hb] <120 g/L) was 90.1% in adolescent girls from 16 districts in 11 Indian states, and 7.1% of girls had severe anemia (Hb <70 g/L) (Toteja,2006). according to UNICEF,in families with inadequate resources, girls are more likely to be neglected. Adolescents experience a lack of food and good education. Anemia occurs because menstrual blood loss, normal or abnormal, triggers crises too often. This causes general weakness and a sense of sluggishness which then reduces work efficiency (Gupta,2012). Adolescence is a time to learn and adopt healthy habits to avoid many health and nutritional problems later in life (Alaofe, 2009). Health education in schools plays an important role in increasing students' knowledge (Amani, 2006).

The results of this study are supported by the results of research from Singh that the research was conducted to determine knowledge, attitudes, and practices (KAP) related to anemia in adolescent girls and to determine health-seeking behavior about anemia in adolescent girls. Knowledge about anemia in adolescent girls is distributed. The study questionnaire has several questions with several options to choose from. The study observed that out of 210 girls, only 60 (28.5%) had heard of the term anemia. Knowledge of anemia assessment was carried out on 60 female students only. Of these 60 girls, 50 (83.3%) felt that anemia was a health problem. When assessed for understanding of anemia, 46 (76.7%) girls answered that anemia was caused by decreased blood iron and 12 (20%) did not know the cause of anemia. 38 (63.3%) adolescent girls felt that food intake resulting in decreased iron caused anemia and 18 (30%) girls also said that worm infestations caused anemia (Singh, 2019)

This research is supported from previous research that nutrition education in schools has proven to be effective in increasing the knowledge, attitudes, and practices of adolescents to prevent anemia (Angadi and Ranjitha, 2016). Furthermore, nutrition education is both a method and a long-term strategy because it provides education for good nutritional status (Sharma and Singh, 2017). A community-based intervention study was conducted in India involving 300 girls aged 13-17 years, who were divided equally into the intervention and control groups. The nutrition education program for anemia was carried out only with the intervention group for four months. The results showed a significant positive effect on hemoglobin level status and KAP scores in the intervention group (Kamalaja et al., 2018). In the same way, a randomized control trial (RCT) was conducted in the Gaza Strip, Palestine, involving 89 girls aged 15-19 years, who were divided into control and intervention groups. The intervention group attended nutrition education courses for three months. The results before and after the test showed good knowledge and positive attitude scores, and the adoption of the desired practice increased significantly in the intervention group (Jalambo et al., 2017).

This study is supported by previous studies where the effectiveness of the nutrition education model on iron deficiency anemia in 7th and 8th graders of SMA Fasa. PRECEDE on increasing knowledge and positive attitudes towards eating behavior to prevent anemia. Educational sessions through videos, small group discussions, booklets, and lectures by patients with iron deficiency anemia for the experimental group increased students' knowledge and positive attitudes towards eating behavior to prevent anemia (Khani, 2021)

According to research from Chaudhary states that the high prevalence of iron deficiency anemia in adolescent girls is a very burdensome thing for adolescents for optimal growth and activity. The results of this study were conducted on young women with moderate anemia (Hb=8-10.9 mg/dl). The effectiveness of the diet and nutrition intervention was evaluated for hemoglobin (Hb) levels at the pre and post intervention stages. the average Hb levels of the experimental group I and II subjects increased significantly ($p<0.05$) from 9.31±0.12 and 9.51±0.11 g/dl to 11.44±0.12 and 10 .97±0.16 g/dl, while no significant results were found in the control group. Dietary intervention with nutrition education is an effective method to increase hemoglobin levels and to reduce cases of iron deficiency anemia in adolescent girls (Chaudhary, 2021)

CONCLUSION

Based on the results of research and discussion on the effectiveness of anemia nutrition education on the level of knowledge of adolescent girls, it can be concluded that there is an effect of differences in knowledge about anemia in adolescent girls before and after being given anemia nutrition education.

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