TEENAGE ASSISTANCE IN INCREASING HEMOGLOBIN LEVELS IN THE ADOLESCENT WOMEN OF JUNIOR HIGH SCHOOL IN BANDUNG REGENCY

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Abstract, Background: Adolescent girls are a high risk group for anemia due to blood cell loss red through menstruation every month. This causes anemia in adolescent girls to be a problem health with prevalence > 15%. This community service activity aims to increase knowledge and skills of young women in the provision of Crispy glutinous riceblack tapai snacks for anemic adolescent girls. Snacks are made using local ingredients of Glutinous riceblack tapai fortake advantage of local potential.

Method: The target of the activity is young women in junior high school in Bandung Regency. Series of activities includes 3 main stages, namely the preparation stage, the basic data collection stage which includes data collection data on nutritional knowledge, skills, food intake and Hb levels of adolescent girls. The third stage is done training activities for making Crispy Glutinous riceblack tapai Interludes, mentoring for young women in the practice of making snacks and ending with data collection knowledge of nutrition, food intake and Hb levels of adolescent girls. This activity can improve the knowledge of nutrition, skills of young women in practice making snacks Crispy Tape Black Glutinous.

Results: There is an increase in nutritional knowledge, fiber intakeand Fe and an increase in the Hb level of adolescent girls. The activity was carried out by lecturers of the Department of Nutrition, Poltekkes Bandung is assisted by students from the Department of Nutrition.

Keywords : Glutinous riceblack tapai, adolescent girls, Hb levels

Background

The nutritional problem that is often experienced in adolescence is iron deficiency anemia. Anemia is a decrease in the quantity of red blood cells in circulation or the amount of hemoglobin is below the normal limit with symptoms that are often experienced, including lethargy, weakness, dizziness, dizzy eyes, and pale face. Anemia can cause various impacts on adolescents, including lowering the immune system so that they are susceptible to disease, decreased activity and learning achievement due to lack of concentration.[1]

Adolescence is a period that is vulnerable to nutritional problems. This is because adolescence is a period of transition from. childhood to adulthood accompanied by the development of all aspects or functions in entering adulthood.[2] Adolescence experiences a growth rate so it is necessary to monitor nutritional status. The fulfillment of nutritional needs at this time needs to be considered because there is an increase in nutritional needs to support growth and development. Changes in lifestyle and eating habits in adolescents will greatly affect their intake . [2]

Adolescent girls are a high risk group for anemia due to loss of red blood cells through menstruation every month. This causes anemia in adolescent girls to become a health problem with a prevalence of >15%.[3] This is reinforced by the results of the 2013 Basic Health Research, which is known that the prevalence of anemia at the age of 15-24 years has increased to 18.4% when compared to the results of Riskesdas in 2007 the prevalence of anemia in Indonesian adolescents

was 11.9% and 12.6%. in adolescents in West Java.

Iron intake and the incidence of iron deficiency anemia based on the results of research by Dea Indartanti, et al in 2014 targeting adolescent girls at SMP Negeri 9 Semarang. This study showed that the prevalence of anemia in the sample with insufficient iron intake was 95.8% and the prevalence of anemia with sufficient iron intake was 4.2%. From these results, it can be concluded that samples with iron intake were more or less anemic than samples with sufficient iron intake.[1]

The intake of protein and vitamin C and the incidence of anemia were found in the results of a study by Sri Syatriani, et al in 2009 with the target of young women in public junior high schools in Makassar City. The results showed that the prevalence of anemia in the sample with insufficient protein intake was 82.8%, and the prevalence of anemia in sufficient protein intake was 17.2%. The same results were obtained for the prevalence of anemia with insufficient vitamin C intake, which was 82.8% and the prevalence of adequate vitamin C intake at 17.2%. From these results, it can be concluded that samples with protein and vitamin C intake were more or less anemic than samples with adequate protein and vitamin C intake.[4]

Adolescent girls generally have the characteristics of unhealthy eating habits. These include the habit of not eating breakfast, lazy to drink water, unhealthy diet because they want to slim down (ignoring sources of protein, carbohydrates, vitamins and minerals), the habit of consuming snacks that are low in nutrition and eating fast food, so that teenagers are not able to meet the diversity of substances. food needed by the body for the synthesis of hemoglobin (Hb) formation. If this happens for a long time, it will cause Hb levels to continue to decrease and cause anemia .[5]

The results of Aminah's research minah research results, Mimi et al, 2019 to get the results that mentoring young people with the use of local food provision Crispy Black Tape Ketan effective to increase hemoglobin levels in adolescent anemia with $p < 0.000$ ($p \leq 0,05$).[6]

Black sticky tape products can be processed and presented into processed products so that they can be more attractive, easy to carry and more durable. One of the processed products ofglutinous riceblack tapai is Crispy glutinous riceblack tapai. Crispy glutinous riceblack tapai is made from basic ingredients of glutinous riceblack tapai and additional ingredients of eggs and margarine. Provision of snacks in the form of Crispy glutinous riceblack tapai is expected to increase iron and antioxidant intake so that it can reduce the incidence of anemia in adolescent girls.

This community service activity was carried out by a lecturer in the Department of Nutrition, Poltekkes, Ministry of Health, Bandung and assisted by female students in Bandung Regency because symptoms of anemia such as lightheadedness and fatigue often occurred in the second junior high school students.

Methods

The implementation method for this community service activity includes several stages of activity, namely:

Preparation

The initial stage of this activity is to coordinate with partner schools 1 and partner 2. Next, make a proposal for the implementation of the activity. Preparation continued to prepare the necessary equipment for the implementation of the activity, including preparation for the initial data collection in the form of questionnaires, measuring instruments for Hb levels as well as coordination with team members and young women.

Measurement of the level of knowledge of student nutrition, nutritional intake and hemoglobin levels of adolescent girls.

At the beginning of the activity, basic data measurements were carried out which included:

1. To determine the level of nutritional knowledge for young women, prior to the training, interviews were conducted with the provided questionnaire.
2. Followed by measuring nutritional intake, nutritional status BMI/U and Hb levels of adolescent girls, by measuring food intake before carrying out activities using the Semi Quantitative Food Frequency (SQFF) method. SQFF data is processed to determine the average food intake before the implementation of the activity. This measurement activity was carried out by a team of lecturers assisted by 3 students from the Department of Nutrition. Measurement of anemia using the Quik check tool is carried out by competent personnel.

Implementation

1. Training on making Crispy glutinous rice black tapai snacks for the two partners
2. Material on how to make Crispy glutinous riceblack tapai snacks.
3. The practice of making snacks for Crispy glutinous riceblack tapai
4. Assistance to young women in the practice of making Crispy glutinous riceblack tapai
5. Evaluation of Hb levels, nutritional knowledge and nutritional status of adolescent girls.
6. This activity is carried out in both partners according to the schedule for 5-6 months.

Evaluation

1. After the practice of making the Crispy Tape Black Sticky Rice snack, the knowledge level of the young women and the nutritional status of BMI/U were re-measured. To find out the change in the anemia status of adolescent girls in both partners, it was measured again by measuring Hb levels.
2. An evaluation of the skills of young women in making Crispy Tape Sticky Black snacks was carried out.

Results & Discussion

Characteristics of Young Women There are 10 young women in Mitra 1, 10 in Mitra 2. The characteristics of young women according to age, father's education, father's occupation, mother's education and mother's There are 10 young women in Mitra 1, 10 in Mitra 2. The characteristics of young women according to age, father's education, father's occupation, mother's education and mother's occupation in Partner 1 and Partner 2 are presented in the following table

Table 1. Characteristics of young women according to age, father's education, father's occupation, mother's education and mother's occupation at Partner 1 and Partner 2 Year 2020

Variable	Partner 1		Partner 2	
	n (10)	%	N (10)	%
Age				
10-12 years	3	30,0	5	50,0
13-15 years	7	70,0	5	50,0
Father's education				
Junior school	0	0,0	1	10,0
High senior school	9	90,0	5	50,0
D1-D3	1	10,0	2	20,0
DIV/S1	0	0,0	2	20,0
Father's occupation				
Private employee	2	20,0	1	10,0
Self employee	5	50,0	5	50,0
Laborer	3	30,0	4	40,0
Mother's education				
Junior school	1	10.0	10.0	10.0
High senior school	4	40.0	4	40.0
D1-D3	5	50.0	5	50.0
Mother's occupational				
Private employee	0	0.0	1	10.0
Entepreneur	0	0.0	1	10.0
Housewife	9	90.0	7	70,0
Labor	1	10,0	1	10,0

Table 1 shows the proportion of ages ranging from 12 to 15 years. The father's education level in both partners is mostly high school, the type of work father is mostly self-employed. The mother's education level in both partners is mostly high school and the mother's type of work is mostly housewives.

During adolescence, there will be changes in biological development, growth of limbs and sexual development so that adolescents look like adults but do not think like adults. Selalin change not only the growth and development during adolescence only, but also can cause some health problems one of which anemia.[7]

In Ekarini's research, Hikmat Diani yusias stated that every human being has various needs to fulfill their life, so to fulfill these needs, humans must work to earn income. Parent's family income is not a direct cause of anemia, but it can affect the family's purchasing power and ability to choose food for nutritional fulfillment in adolescents. Apart from the work of parents, education of parents can affect knowledge, attitudes and skills in determining family food. The higher the education, the better knowledge about nutrition will be compared to the lower education. If the knowledge of nutrition is getting better, it will cause a person to be able to arrange a good menu by taking into account the type and amount of food that will be consumed .[7]

Food Intake

The young women's food intake at the beginning of the activity was carried out using the Semi Quantitative Food Frequency Queationare (SQFF) method and at the end of The young women's food intake at the beginning of the activity was carried out using the Semi Quantitative Food Frequency Queationare (SQFF) method and at the end of the activity, food intake was measured using the 1 x 24 hour recall method. Interviews were conducted online. The results of female adolescent food intake in Partners 1 and Partners 2 are presented in the following table

Table 2. Young Women Food Intake at the Beginning and End of Community Service Activities for Partners 1 and Partners 2 Year 2020

Variable	Partner 1			Partner 2		
	Mean	SD	P *value*	Mean	SD	P *value*
Before energy	1583,10	59,72	0,001	1477,72	109,27	0,001
After energy	1606,51	67,64		1649,48	50,89	
Before protein	47,50	1,82	0,070	45,99	3,24	0,114
After protein	47,58	1,74		48,81	2,34	
Before fat	54,23	1,67	0,163	53,36	4,37	0,042
After fat	54,36	1,71		56,37	2,67	
Before Carbohydrate	246,16	6.64	0,026	231,86	14,53	0,028
After Carbohydrate	242,77	5,14		258,16	19,68	
Before fiber	21,23	0,82	0,001	20,12	2,39	0,010
After fiber	23,14	0,61		22,61	0,15	
Before fiber	6,64	0,16	0,035	5,74	0,52	0,001
After fiber	6,81	0,18		7,13	0,50	

Table 2 shows that the food intake of the Mitra 1 adolescent girls at the end of the activity there was an increase in the intake of energy, carbohydrates, fiber and Fe, while in Mitra 2 there is an increase in the intake of energy, fat, carbohydrates, fiber and Fe. One possibility that can cause an increase in food intake is education about the importance of a balanced nutritional diet for young women and the intake of snacks such as Crispy Tape which contains iron and fiber given to young women for 30 days. Based on the results of the dependent t statistical test in Partner 1, it showed that there was a significant difference in initial and final intake for energy p = 0.001, carbohydrates p = 0.026, fiber p = 0.001 and Fe p = 0.035, while in Partner 2 there was a significant difference for energy intake p. =0.001, fat p=0.042, carbohydrates p=0.026, fiber p=0.010 and Fe p=0.001.

Carbohydrates, fats and proteins are the largest energy supply nutrients for the body. Energy intake is less than the need for a certain period of time will cause a decrease in nutritional status, if balanced energy intake will help maintain normal nutritional status and if energy intake is excessive or reduced energy expenditure has the potential to cause obesity. Micronutrient intake does not affect nutritional status based on BMI/U because it has little energy content, and if there is a deficiency it may last a long time. The nutritional status of adolescents in Indonesia includes lack of macronutrients (carbohydrates, protein, fat) and micronutrient deficiencies (vitamins and minerals). If the nutritional status is not normal it is feared the iron status is not good, so it can cause anemia .[8]

In the Physical Research (2009) in a study of Revelation Mahar, said that the level of consumption of protein and iron have been associated with anemia status in adolescent.[9] Asupan protein on each subject have increased but it is still relatively low. According to nutritional adequacy Figures 2019, for women ages 10-12 years in need of as much as 55 grams of protein, while that for women aged 13-15 years need as much as 65 grams protein.[10]

Iron is an important component of hemoglobin. Hemoglobin contains iron called haem and protein globulins. Each hemoglobin molecule binds oxygen to be circulated throughout the body. In adolescent girls, the high need for iron is mainly due to iron loss during menstruation.Some of the factors causing the lack of iron consumption in adolescents are food availability, lack of knowledge and wrong eating habits .[9]

According to research Masrizal mention that iron deficiency disorder is often due to the arrangement of the wrong food quantity and quality caused by a lack of food supply, food distribution is not good, wrong eating habits, poverty and ignorance .[11]

Young Women

Training Young women training was conducted for 1 day at Mitra 1 on 26 September 2020 online and at Partner 2 on 17 October 2020 offline in the Yabipa Middle School canteen room. The number of female youth training participants for Partner 1 is 10 people and Partner 2 is 10 people.

Nutritional

Status The nutritional status of the adolescent girls of Mitra 1 and Mitra 2 is measured based on the Body Mass Index by Age (BMI/U) which is presented in the following table.

Table 3. Frequency Distribution of Young Women based on Nutritional Status Indicator Body Mass Index by Age (BMI/U) in Partner 1 and Partner 2 Year 2020

Nutritional Status BMI/U	Partner 1	
	Early (%)	Late (%)
Very Thin	0 (0,0)	0 (0,0)
Thin	0 (0,0)	0 (0,0)
Normal	7 (70,0)	8 (80,0)
Fat	2 (20,0)	2 (20,0)
Obesity	1 (10,0)	0 (0,0)
Total	10 (100,0)	10 (100,0)

Table 3. Based on the data above shows that the nutritional status with BMI/U indicators in Partner 1 has improved after education and provision of glutinous riceblack tapai, namely the number of female adolescents who are obese is reduced from 1 person (10.0%) to no obesity. In Mitra 2, the nutritional status of adolescent girls did not change.

Adequacy of nutrients is needed by every individual since in the womb, babies, children, adolescence, to old age. Adequate nutrition can be influenced by age, gender, activity, weight and height. Nutritional state someone is a picture of what is consumed in a period of long yangcukup and reflected the value of nutritional status .[12]

According to Thompson 2007 in Handayani Putri Wahyu's research, nutritional status has a positive correlation with hemoglobin concentration, meaning that the worse a person's nutritional status, the lower his Hb level. Based on Permaesih's research (2005), found a significant relationship between BMI anemia, in which young women with BMI classified as thin have a risk of 1.4 times suffering from anemia compared to 48 teenage girls with normal BMI .[9]

From the research results of Cahya Daris Tri Wibowo,showed that the relationship between nutritional status and anemia was significant. The conclusion from these results, there is a significant relationship between nutritional status and anemia. And the results of this study support previous research conducted by students at the State University of Semarang which stated that there was a relationship between nutritional status and menstruation with the incidence of anemia in female students of the Al-Hidayah Islamic Boarding School. In his research, it was stated that 95.7% of female female students had poor nutritional status and suffered from anemia, and 54.5% of female female students who had good nutritional status and suffered from anemia.[13]

Hemoglobin levels (Hb)

Hemogblobin levels of adolescent girls Mitra 1 and Mitra 2 are presented in the following table.

Table 4. Hb Levels for Young Women in the Beginning and End of Community Service Activities at Partners 1 and Partners 2 in 2020

Variable	Partner 1 (n=10)			Partner 2 (n=10)		
	Mean	SD	P *value*	Mean	SD	P *value*
Initial Hb level	11,481	0,490	0,000	11,39	0,46	0,000
Final Hb level	2,53	0,36		12,20	0,34	

Table 4. shows that the average Hb level of Mitra 1 adolescent girls in the initial measurement is 11.48 gr% by standard deviation 0.49 gr%. In the final measurement, the average Hb level of Mitra 1 was 12.53 g% with a standard deviation of 0.36 g%. The results of statistical tests obtained p value = 0.000, so it can be concluded that there is a significant difference between the Hb levels of Mitra 1 adolescent girls in the initial and final measurements. In Mitra 2 the mean of the initial measurement was 11.39 g% with a standard deviation of 0.46 g%. In the final measurement, the average Hb level of Mitra 2 was 12.20 g% with a standard deviation of 0.34 g%. The results of statistical tests obtained p value = 0.000, so it can be concluded that there is a significant difference between the Hb levels of Mitra 2 young women in the initial and final measurements.

In Mitra 2 the mean of the initial measurement was 11.39 gr% with a standard deviation of 0.46 gr%. In the final measurement, the average Hb level of Mitra 2 was 12.20 g% with a standard deviation of 0.34 g%. The results of statistical tests obtained p value = 0.000, so it can be concluded that there is a significant difference between the Hb levels of Mitra 2 adolescent girls in the initial and final measurements. These results are in line with the theory in Nisa Amalia's research that knowledge of nutrition and anemia is a person's understanding of nutrition and anemia needed by the body so that it can maintain optimal health. If someone has a good knowledge of anemia, it is expected also have nutrition and good hemoglobin levels.[14]

Nutritional knowledge

Nutritional knowledge of Mitra 1 and Mitra 2 young women is measured through pre and post tests, presented in the following table.

Table 5. Pre and Post Test Results of Young Women Nutrition Knowledge Beginning and End of Community Service Activities at Partners 1 and Partners 2 in 2020

Variable	Partner 1 n (10)			Partner 2 n (10)		
	Mean	SD	P *value*	Mean	SD	P *value*
Pre test	48,00	14,33	0,000	60,00	8,89	0,000
Post test	88,00	8,88		87,30	7,24	

Data above shows that the average result of the pre-test of nutritional knowledge of young women in Mitra 1 is 48.00 gr. % with a standard deviation of 14.33. In the post test, the mean nutritional knowledge of Mitra 1 was 88.70 with a standard deviation of 8.88. The results of statistical tests obtained p value = 0.000, so it can be concluded that there is a significant difference between the nutritional knowledge of Mitra 1 adolescent girls in the initial and final measurements. In Mitra 2 the average pre-test of nutritional knowledge was 60.00 with a standard deviation of 8.89. In the post test, the average nutritional knowledge of Mitra 2 was 87.30 with a standard deviation of 7.24. The results of statistical tests obtained p value = 0.000, so it can be concluded that there is a significant difference between the nutritional knowledge of Mitra 2 young women in the initial and final measurements.

According to Permaesih (2005) in Ila Fadila's research (2018), it is stated that educational factors can affect a person's anemia status in connection with the choice of food consumed. Higher levels of education will affect knowledge and information about nutrition. This condition shows the need for further intervention regarding the provision of more intensive information about the importance of nutritional knowledge, especially those related to balanced nutrition guidelines for adolescent girls .[15]

Assistance in the Practice of Making Snacks

After training and education for young women was carried out, then there was assistance in the practice of making Crispy glutinous riceblack tapaisnacks which was held on October 21, 2020 for Partners 1 and Partners 2 online. Assistance is more directed at how to manufacture and use local food ingredients.

Conclusion

1. From the results of community service activities that have been carried out by Partners 1 and Partners 2, it can be concluded that: 1. The number of young women in Mitra 1 is 10 people and in Partners 2 4 as many as 10 people, mostly aged 12 to 15 years.
2. All young women have never attended training on the practice of making Crispy glutinous riceblack tapai.
3. The training for young women has been able to increase the nutritional knowledge and skills of young women in making Crispy glutinous riceblack tapai.
4. The results of the application after the young women received training on the practice of making Crispy glutinous riceblack tapai snacks were:
   a. Increased knowledge of young women's nutrition in both partners.
   b. There was an improvement in food intake, especially fiber and Fe
   c. There was an improvement in the nutritional status of BMI/U in Partner 1
   d. There was an increase in Hb levels in both Partners

Sugestion

1. It is necessary to increase the practice of food making training activities through training of young women for daily consumption.
2. It is necessary to integrate the practice of making Crispy glutinous riceblack tapai snacks with life skill activities in Islamic boarding schools.
3. It is necessary to provide supporting facilities and equipment for the continuation of the practice of making snacks for teenagers

References

1. Dea Indartanti, A Poina Krtini. Relationship between nutritional status and incidence of anemia in adolescent girls. Journal of Nutrition College; 2014: Vol 3 No.2
2. Bitty, Frensy et al. *Stress with Nutritional Status of Adolescents at State Junior High School 2 Manado*. Journal of Public Health.7(5) : 1-6.2018
3. Research and Development Ministry of Health RI. *Basic Health Research ; RISKESDAS*. Jakarta: Research and Development Ministry of Health RI.
4. 2013 Syatriani Sri, Aryani Astrina. *Food Consumption and the Incidence of Anemia in a Junior High School Student in Makassar City.*
5. Zubir. *Relationship between diet and the incidence of anemia in young women at AsSyifa School Health Vocational School*

Banda Aceh.2018. Saintia's Porch. Vol 6, No 2

6. Aminah, M, Syarief, O, Hastuti, W, Sudartini, S, Tuyet. Specific Nutrition Intervention Model and Adolescent Assistance with Utilization of Local Food to Increase Hb Levels in Anemic Adolescent Girls. Research Report on Domestic Cooperation of Poltekkes, Ministry of Health, Bandung. *2019*
7. Ekarini, Wisdom Diani Yusias et al. An Overview of Nutritional Status in the Incident of Anelia Adolescent Girls at SMPN 1 Sukasari, Sukasari Sumedang District in 2019. 2020. Widya Scientific Journal of Health and the Environment. Vol 1, No. 3
8. Indartanti, Dea and Kartini, Apoina. *The Relationship between Nutritional Status and the Incidence of Anemia in Adolescent Girls*. Journal of Nutrition College. 2014 : 3(2) : 33-39.
9. Permatasari, Wahyu Mahar. Thesis at the Faculty of Medicine, Airlangga University, Surabaya. 2016
10. PERMENKES RI. *Nutritional Adequacy Rate*. 2019
11. Masrizal. *Iron Deficiency Anemia*. Journal of Public Health; 2007: 2(1). 140-145.
12. Handayani, Wahyu Putri et al. *The Relationship between Nutritional Status and the Incidence of Anemia in Adolescent Girls*. JOM ; 2015 : 2(1) : 742-749.
13. Wibowo, Cahya Daris Tri et al. *The Relationship Between Nutritional Status and Anemia in Adolescent Girls at Muhammadiyah 3 Junior High School Semarang*. Muhammadiyah Medical Journal; 2013 : 1(2) : 1-5.
14. Amalia Nisa. *Relationship of Knowledge, Nutritional Status, Energy and Nutrient Intake with Hemoglobin Levels in Students of the Undergraduate Program in Applied Nutrition. Essay. 2020.*
15. Fadila, Ila and Kurniawati, Heny. *Efforts to Prevent Anemia in Young Women as Pillars Towards Improving Maternal Health*; 2018 : 78-89