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Increasing Knowledge of Anemia in Adolescents Through the Leaflet Media "Anemia and Adolescent Nutrition"

Kety Soraya [1], Husnul Khotimah [2*], Dadang Rochman [3]
[1] Faculty of Teacher Training and Education, Universitas Faletehan
[2,3] Faculty of Health Sciences, Universitas Faletehan
Jl. Raya Cilegon Drangong Serang - Banten No. KM. 06, Pelamunan, Kec. Kramatwatu, Kabupaten Serang, Banten, Indonesia

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ABSTRACT

Adolescent girls are very susceptible to anemia. Health education on anemia in schools is an effective strategy to reduce the number of anemia in adolescent girls, one of which is through educational media such as leaflets. This community service activity uses the Community Development (community empowerment) method. The activity was carried out in February 2024. The location of the activity is Madrsasah Tsanawiyah Negeri 1 Serang with a target of 34 girl teenagers in February 2025. Community service activities include pre-test, education, and post-test. Data analysis using the Wilcoxon test. The results of the pre-test and post-test showed an average increase in knowledge score of 15.8%. The number of participants with good knowledge increased significantly from 50% to 82.4%, while those with sufficient and insufficient knowledge decreased. The Wilcoxon statistical test showed a significant effect of education using leaflets on increasing adolescent knowledge about anemia and nutrition, with a p value <0.001. Education using leaflets in schools and youth communities is highly recommended as an efficient prevention strategy, as well as the development of other educational media such as animated videos or mobile applications to reach more youth.

Corresponding Author:

Husnul Khotimah
Universitas Faletehan
Email: husnulmehu@gmail.com

INTRODUCTION

Anemia is a condition in which the number of red blood cells is less than normal. The important role of hemoglobin is to carry oxygen throughout the body. About 50% of anemia cases are caused by iron deficiency, which is one of the most common causes of anemia. Anemia caused by a lack of iron intake is known as iron deficiency anemia [1]

Anemia can occur at any stage in life. Adolescents (aged 10-19 years) are one of the groups at high risk of anemia, because at that time the body experiences accelerated growth and development, which makes the body need more iron. In addition, adolescent girls need more iron during their menstruation. Early marriage and teenage pregnancy also increase the risk of anemia, especially in adolescent girls [2].

Anemia in adolescents has a negative impact on growth, development, cognitive ability, and concentration in learning, and increases susceptibility to infectious diseases [3]. On the other hand, anemia in adolescent girls who are pregnant is associated with the risk of premature birth, low birth weight, maternal and neonatal mortality [4,5]

There is an increasing trend in the prevalence of anemia in adolescents, according to basic health research data in 2007, 2013, and 2018. In 2018, 32% of adolescents in Indonesia had anemia. This shows that approximately 7.5 million adolescents in Indonesia are susceptible to infectious diseases, growth problems, and cognitive problems [6–8]. Supplementation of iron and folic acid through the provision of iron tablets (TTD) is one way to reduce the prevalence of anemia in adolescents. In 2018, 76.2% of adolescent girls received TTD, but only 2.13% of them consumed TTD according to recommendations (≥52 tablets per year) [8]

In the framework of the National Movement to Accelerate Nutrition Improvement as stated in Presidential Regulation Number 42 of 2013, health and nutrition efforts are prioritized in the First 1000 Days of Life (HPK) to improve children's growth and development. Efforts to Accelerate Nutrition Improvement are carried out through specific and sensitive interventions which, among others, are integrated with anemia control programs for target groups of adolescent girls (rematri) and WUS. Several efforts have been made to increase the coverage of TTD provision in adolescent girls, including the provision of technical instructions for health services in health facilities issued by the Ministry of Health [9]

Educational environments, such as schools, are strategic places to implement anemia prevention programs because they cover the majority of the adolescent population. Therefore, health education about anemia for adolescents in schools is the right target and will have a significant impact on reducing anemia rates in adolescent girls. One of the educational media is through leaflets so that it is easier for teenagers to understand the material presented.

METHOD

Community service activities have been carried out at the Madrasah Tsanawiyah 1 Negeri Serang which is located at Ciptayasan Street km. 1, Ciruas District, Serang Regency, Banten Province, Indonesia. The distance between the target partner and the university, namely Faletehan University, is approximately 13.59 km. Partner locations can be reached in approximately 40 minutes. The target location map can be seen in the image below:

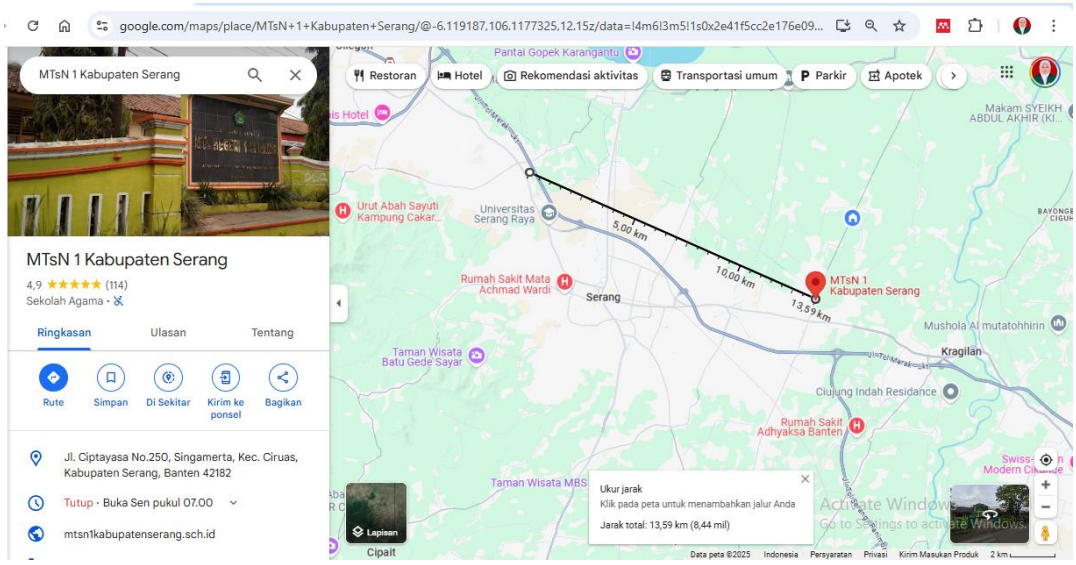

Figure 1. Location of community service activities

The activity method is Community Development, which is an approach oriented towards community empowerment development efforts by making the community the subject and object of development and involving them directly in various community service activities as an effort to increase their participation in development for their own interests. The activity was carried out in February 2025. The location of the activity was at Madrasah Tsanawiyah Negeri 1 Serang, Jalan Ciptayasa Km. 01 Ciruas - Serang, Banten 42182. The number of participants who took part in this activity were 34 young women who were members of the Youth Red Cross (PMR) extracurricular activities. Community service activities are carried out through health examination, nutrition education, and providing mung bean juice. The steps for Community Service activities consist of :

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1. Planning
   a. Preparation of leaflets/leaflets about anemia and adolescent nutrition
   b. Assessment and submission of permit application to MTsN 1 Serang
   c. Scheduling the implementation of community service together with the headmaster of MTsN1 Serang
2. Implementation
   a. Carrying out a pre-test before providing education about anemia and adolescent nutrition
   b. Provide education about anemia and adolescent nutrition
   c. Carrying out a post-test after providing education
3. Evaluation
   a. Anemia and adolescent nutrition education : The increase in adolescent girls' knowledge about anemia and adolescent nutrition increased
4. Reporting
   a. Preparing reports on community service activities, including processing data using the Wilcoxon test to measure the extent to which providing education using leaflet media can increase adolescent knowledge about anemia and adolescent nutrition.
   b. Preparation of publication manuscripts for community service activity journals
   c. Reporting community service activities to research and community service institutions Universitas Faletehan

RESULTS

Fig 2a, 2b, 2c, 2d. Educational activities

Fig 3a, 3b. Closing session of community service activities

Community service activities ran smoothly and according to the schedule that had been determined together by the service team with the school, including the Vice Principal, the Junior Red Cross (PMR) extracurricular mentor teacher and the PMR extracurricular trainer. Participants participated in this activity enthusiastically and orderly. Pre-test and post-test questionnaires were also given online via google form.

Tabel 1. Pre-post test knowledge scores (n=34)

Knowledge scores	Pre-test		Post-test		Score difference
	Frequency	Percentage (%)	Frequency	Percentage (%)	(%)
Poor	5	14.7	2	5.9	**- 8.8**
Sufficient	12	35.3	4	11.8	**- 23.5**
Good	17	50	28	82.4	**32.4**
Means Score		**71.8%**		**87.6%**	**15.8**

Table 1 illustrates that in general there is an increase in the average value of 15.8% from the average pre-test score of 71.8% to 87.6% at the time of the post-test. Then, there was an increase in the number of participants with good knowledge and conversely there was a decrease in the number of participants with poor knowledge. The increase in participants with good knowledge was 32.4% from the pre-test number of 50% to the post-test 82.4%. While participants with sufficient and poor knowledge experienced a decrease, namely a decrease in participants with poor knowledge of 23.5% from the pre-test number of 35.3% to the post-test 11.8%, and participants with poor knowledge experienced a decrease of 8.8% from the pre-test number of 14.7% to the post-test 5.9%.

Tabel 2. The influence of education on increasing adolescent knowledge (n=34)

Variable	Z	p-value
Post-test vs Pre-test	-4.268	<0.001

In the bivariate analysis or relationship test, it was proven that there was an influence of providing education using leaflets on increasing adolescent knowledge about anemia and adolescent nutrition with a p value of <0.001 which assumes that based on the statistical analysis, education using leaflets had a significant influence on increasing adolescent knowledge about anemia and adolescent nutrition as shown in table 2.

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DISCUSSION

Anemia is a public health problem that is still a global challenge, especially in developing countries such as Indonesia. According to WHO, anemia is defined as a condition where the hemoglobin level in the blood is lower than normal, thus disrupting the function of transporting oxygen to body tissues [10]. One of the most common forms of anemia is iron deficiency anemia, which occurs due to a lack of iron in the body [10].

Adolescents, especially adolescent girls, are a group that is very susceptible to anemia. During adolescence, the body experiences a significant growth and development spurt, so the need for iron also increases. In addition, menstruation that occurs regularly also causes iron loss, which if not balanced with adequate intake, will result in anemia [11]. This risk is even higher if adolescent girls experience pregnancy at a young age, where the need for iron increases drastically to support fetal growth and development and maternal health [12].

The impact of anemia on adolescents is very broad, both in terms of physical and psychosocial health. Some of the negative impacts include decreased learning ability, concentration, memory, and increased risk of infection due to a weakened immune system. In pregnant adolescent girls, anemia can cause serious complications such as premature birth, low birth weight, and even maternal and infant death [13].

Counseling or education is a form of nutritional education that aims to increase knowledge and form positive attitudes regarding food consumption patterns. Adolescents are a strategic target group in efforts to overcome anemia through counseling, because at this time they are still in the learning stage, so it is easier to accept and understand the information provided [14].

The source of information is one of the factors that can influence adolescent behavior in preventing anemia. The media chosen must be efficient and effective to enable adolescents to get nutritional education so that they can use the information quickly and ensure they get it. increasing their ideas, attention, and willingness to participate in reading, counseling methods and leaflet media have the power to influence the cognition and attitudes of adolescent girls [15].

In this context, community service activities carried out by the team from Faletehan University at MTsN 1 Serang are a concrete example of promotive and preventive efforts in dealing with anemia in adolescents. This activity targets 34 teenage girls who are members of the Youth Red Cross (PMR) extracurricular activities as subjects of health education intervention.

The method used in this activity is the Community Development approach, namely an effort to empower the community that makes the community both the subject and the object of the activity. The activity process is carried out sequentially starting from planning, implementation, evaluation, to reporting. Educational materials are delivered through leaflets that are designed to be attractive and easy to understand.

The implementation of education is carried out using the pre-test and post-test methods which aim to measure the effectiveness of providing information in increasing adolescent knowledge. The results of the pre-test showed that before education, most adolescents were in the "sufficient" and "good" knowledge categories, but there were still some in the "less" category. After being given education, there was a significant increase in the "good" category, namely from 50% to 82.4%. Conversely, the "sufficient" and "less" categories decreased by 23.5% and 8.8%, respectively.

The increase in the average score from 71.8% to 87.6% also reflects the success of education in increasing adolescent understanding of anemia and adolescent nutrition. To prove the significance of the changes, a statistical test was conducted using the Wilcoxon Signed Rank Test. The test results showed a p value <0.001, which indicated that the difference between the pre-test and post-test was statistically significant. This means that the use of leaflet media has proven effective in increasing adolescent knowledge.

These results are supported by findings in Yogyakarta which showed that providing education through leaflets and other visual media significantly increased the knowledge of adolescent girls about anemia in a short time. This kind of educational media provides visual appeal, ease of repeating information, and time efficiency in delivery [16]. Research by Sadiq (2024) also concluded that health education strategies that include active student participation (active learning) and printed media such as leaflets are more effective than conventional lectures. Leaflets help simplify complex information to make it easier for adolescent age groups to understand [17].

Schools are strategic places for implementing anemia prevention programs because the majority of adolescents are in educational institutions. Health education activities in schools not only increase students' knowledge, but also create a chain effect where students can convey information to their peers and families. In addition, the involvement of teachers and extracurricular instructors in these activities is also an important factor in the sustainability of the program.

The success of this activity has several important implications. First, community service activities based on health education can be an effective strategy in improving adolescent health literacy. Second, educational media such as leaflets have great potential to be used in various other health programs. Third, the importance

of collaboration between universities, schools, and local governments in overcoming adolescent health problems, especially anemia.

As a follow-up, activities like this need to be expanded not only to adolescent girls who are active in organizations such as PMR, but also to all students at the junior and senior high school levels. The development of other educational media such as animated videos, digital infographics, and interactive quizzes can also be an interesting alternative in increasing the effectiveness of education.

CONCLUSION

Anemia in adolescent girls is a serious health problem, but it can be prevented through proper education. The use of leaflet media has been proven effective in increasing adolescent girls' knowledge about anemia, which in turn can encourage behavioral changes towards anemia prevention. Implementation of education using leaflets in schools and adolescent communities is highly recommended as an effective and efficient anemia prevention strategy. The results show that education using leaflet media is effective in increasing adolescent girls' knowledge about anemia.

Therefore, it is recommended that materials on anemia and adolescent nutrition should be included in the health education curriculum in schools, teachers and health workers need to be trained to use leaflet media effectively in education, and the development of other educational media besides leaflets, such as animated videos or mobile applications can be developed to reach more adolescents.

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