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NUTRITIONAL STATUS AND ANEMIA IN ADOLESCENTS: PREPARATION OF A NUTRITIONAL LUNCH PROGRAM AT SMPN 01 KEPULAUAN SERIBU

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ABSTRACT

Adolescence, defined as the critical phase between 10–19 years of age, is characterized by biological, emotional, and social changes that require optimal nutritional intake. However, during this transitional stage, adolescents are vulnerable to the double burden of malnutrition—both undernutrition and overnutrition—as well as iron deficiency anemia. These conditions can negatively impact learning concentration, increase susceptibility to infections, impair cognitive function, and elevate the risk of non-communicable diseases in adulthood, such as type 2 diabetes mellitus and cardiovascular disease. National data indicate that the prevalence of anemia among Indonesian adolescents is 32%, with a higher rate among girls, and this problem is further exacerbated by limited access to healthcare services in island regions such as Pulau Pari, Kepulauan Seribu. To address this issue, Universitas YARSI conducted a community service program at SMPN 01 Pulau Pari to support the implementation of the Free Nutritious Food (MBG) Program. The activities aimed to improve nutrition literacy and facilitate early detection of anemia through educational sessions for teachers and students, accompanied by anthropometric and hemoglobin measurements. Education was delivered via presentations, posters, pocketbook distribution, and interactive discussions, while the health assessments provided baseline data on nutritional and anemia status. A total of 54 students participated, with findings revealing a double burden of malnutrition: 46% underweight, 19% overweight or obese, and 21% of female adolescents with anemia. These results highlight the urgent need for integrated, school-based promotive and preventive interventions. The School Health Unit (UKS) program can serve as a primary platform for sustaining nutrition interventions, iron supplementation, and adolescent health monitoring. With this baseline data, the successful implementation of the MBG program in Pulau Pari is expected to be replicable in other island regions with similar challenges.

Introduction

According to the World Health Organization (WHO), adolescence is the age period from 10 to 19 years. During this period, significant biological, emotional, and social changes occur. Optimal nutritional adequacy is essential to support growth and development. During this transition, adolescents are also vulnerable to nutritional problems such as iron deficiency (anemia) and malnutrition, including underweight and overweight.

The impact of anemia in adolescents can cause decreased concentration in learning (Rahmiwati et al., 2023), malnutrition can increase the risk of infection and impaired cognitive function (Alshwaiyat et al., 2023), while the impact of excess nutrition causes psychosocial and metabolic problems in adulthood (Kamaruddin et al., 2023).

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Based on the WHO's classification of public health problems, the prevalence of anemia in Indonesia is classified as a moderate public health problem with a prevalence of around 32% (WHO, 2011). Anemia is more common in adolescent girls than in boys, with a ratio of 1:3. This is because adolescent girls experience menstruation every month, there is an increased need for iron during adolescence, accompanied by low iron intake (UNICEF, 2021). Research conducted by Mahardika et al. in 2024 in DKI Jakarta showed an increase in the prevalence of anemia in adolescent girls from 23% to 50.6% in 2020 compared to 2022 (Mahardika, P, et al., 2022).

Pari Island is one of the islands in the Seribu Islands administrative region, DKI Jakarta, with a population of approximately 763 adolescents (Pari Island Village, 2024). Its isolated geographic location and limited access to health and education mean that the community in this area faces significant challenges in accessing basic services, including nutrition and adolescent health services. The only secondary school available on the island is SMPN 01 Pari Island, with a total enrollment of approximately 60 students. However, it plays a vital role in providing formal education for the region's youth.

As a government intervention to address adolescent nutrition issues, the Free Nutritious Food Program (MBG) is designed to provide healthy and safe food for students in schools. This initiative aims not only to reduce malnutrition and anemia rates but also as a strategy to improve academic achievement (Maharani et al., 2024). However, the success of MBG implementation depends heavily on teachers' and students' understanding of nutrition, as well as the availability of accurate baseline data on students' nutritional status and anemia. To date, such data is not available for SMPN 01 Pulau Pari.

The goal of this community service activity is to educate teachers and students about the importance of a healthy diet and early detection of anemia as part of a promotive and preventive approach. Data-driven interventions, including measuring nutritional status or Body Mass Index (BMI) and hemoglobin (Hb) levels, are expected to provide baseline data for planning and evaluating the success of the MBG program. This will enable the successful implementation of the MBG program to be replicated in other island regions with similar characteristics.

Febrianti KD, et al., (2023), in a national meta-analysis study, found that nutrition education was effective in increasing knowledge of anemia in adolescent girls, although it did not significantly increase hemoglobin levels directly.

Methodology

This community service (pengmas) was held for three days, from June 15-17, 2025, at SMPN 01 Pulau Pari, Seribu Islands. Approximately 60 students participated, but 54 received parental permission to undergo anthropometric testing and blood sampling, as well as 14 teachers and school staff. This activity, part of a series of community service programs from YARSI University, involved 11 lecturers, 5 staff members, and 4 medical students.

Figure 1. Teacher and staff respondents

At the survey stage, coordination with a staff member was conducted. Preparations were then made by submitting a request for a community service permit from YARSI University to the head of the Jakarta Health Office. Further coordination was then carried out with the school regarding the date and method of the activity, as well as the distribution of the

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materials.*informed consent dan information sheet*given to parents of students a week before the community service. This includes anthropometric measurements and blood sampling to check for anemia.

Implementation method. On the first day, the location was prepared, then on the second day, education was conducted for teachers and school staff. On the third day, education was conducted for students. All educational activities were carried out using PowerPoint presentations, posters, and pamphlets, and concluded with a question and answer session regarding adolescent nutritional health issues. Educational pocketbooks were also provided to all teachers and students. This will facilitate and improve adolescents' understanding of these issues. These teaching materials will later be submitted to the School Health Unit (UKS) at SMPN 01 Pulau Pari so that they can be used as educational media for its UKS health programs. This is expected to ensure continuity of the student nutritional status measurement program.

Figure 2. Teacher and Staff Education

Figure 3. Student Education

Figure 4. Hb Level Measurement

Following the education, anthropometric assessments were conducted on the students, measuring their height and weight to calculate their BMI. Hb levels were measured to detect anemia. Students were given souvenirs in the form of lunch boxes and eating utensils. Faculty, staff, and students were actively involved in all of the community service activities.

Figure 5. Distribution of Souvenirs

Evaluation of this activity was carried out by distributing user satisfaction surveys regarding the entire series of community service events from YARSI University.

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Results and Discussion

Result

This community service activity was attended by seventh, eighth, and ninth grade

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students. The following are the characteristics of the respondents. (Table 1.)

Table 1. Respondent characteristics

Gender	Frequency (%)
Man	25 (46)
Woman	29 (44)
Class	
7	23 (43)
8	14 (26)
9	17 (31)
Total	54

The total number of respondents in this study was 54 students, with the largest number of female respondents at 29 students (54%). Based on educational level, the students who participated most were from grade 7 at 23 (43%), while the fewest participants were from grade 8 at 14 (26%).

The distribution of nutritional status shows that although the majority of students are in the normal category, there are some students who are overweight or underweight, both in the male and female groups.**(Table 2.).**

Table 2. Distribution of nutritional status

gender	amount	normal	underweight	Obese 1	Obese 2	overweight
man	25	10	11	1	2	1
women	29	9	14	1	0	5

The results of the nutritional status analysis showed that out of 25 male students, 10 people (40%) had normal nutritional status, 4 people (16) were overweight, 11 people (44%) were underweight. Meanwhile, out of 29 female students, 9 people (31%) had normal nutritional status, 6 people (20%) were overweight, 14 people (48%) were underweight.

Hemoglobin levels are measured to determine anemia status. Normal Hb levels in males aged 12–18 years are ≥ 13.0 g/dL , while normal Hb in women aged 12-18 years is ≥ 12.0 g/dL (WHO, 2011). The results of Hb levels in respondents can be seen in (Table 3.).

Table 3. Hemoglobin (Hb) Levels

Gender	Amount	Hb normal (%)	Anemia (%)
Man	**25**	**25 (100)**	**0**
Woman	**29**	**23 (79)**	**6 (21)**

The results showed that all male students (100%) were in the normal hemoglobin category. In contrast, of the 29 female students, only 23 (79%) had normal hemoglobin levels, while 6 (21%) were identified as having anemia.

Discussion

The results of this study indicate a dual nutritional problem among adolescents on Pari Island: overweight (obesity) and underweight. This phenomenon, known as the double burden of malnutrition, is common in developing countries, including Indonesia, due to shifts in consumption patterns and lifestyles (World Health Organization, 2020).

An unbalanced nutritional status, whether excess or deficiency, can have serious impacts on adolescent growth and development and increase the risk of non-communicable diseases in adulthood such as type 2 diabetes and heart disease (Popkin et al., 2020).

Data shows that some students are overweight and obese, although most are in normal nutritional status. Obesity in adolescents is at risk of causing psychosocial problems such as low self-confidence, disrupted peer relationships and the emergence of dissatisfaction with their bodies (Iversen, K. D., et al. 2024; Beltrán-Garrayo, L., et al. (2023) Hughes, A. M., et al. (2024)) as well as being a major risk factor for the emergence of cardiometabolic factors (insulin resistance, dyslipidemia,

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hypertension) and accelerating the development of metabolic diseases in adults (Valerio, G., et al., 2024) Xiong, Y., et al. (2024). On the other hand, underweight which is also found in some students, especially girls, can indicate low socioeconomic status, low food intake, infectious diseases, high physical workload or physical activity, and lack of dietary diversity (Ali, et al., 2024; Mustafa, A et al., 2023). Yallew, W.W., et al 2022; Rahmalina, R., et al. 2019

In addition to nutritional status, another important finding is the prevalence of anemia of 21% in female adolescents, while all male students had normal hemoglobin levels. This is consistent with previous research which states that female adolescents have a higher risk of anemia because the need for iron increases during puberty, coupled with blood loss during menstruation Kulsum, U. (2020). Telisa, I., & Eliza, E. (2020).. Anemia can reduce learning capacity, concentration, and school participation, which are part of overall learning productivity. (Samson, K. L. I et al., 2022).

This condition emphasizes the need for integrated school-based interventions, such as iron supplementation programs (TTD), nutrition education, and improving adolescent health literacy. E. Y. Fatmasari, et al. 2024; Support from teachers, parents, and health workers is crucial to ensure the effectiveness of the program Tambunan, K. A. H. et al., 2025. The UKS (School Health Effort) program can be used as the main platform in implementing these interventions. Fatimah, O. Z. S., et al. 2025.

Conclusion

Community service activities at SMPN 01 Pulau Pari identified multiple nutritional challenges in adolescents, including underweight, overweight/obesity, and anemia, with a relatively high prevalence. These results indicate that adolescents in the island region still face serious challenges related to nutritional status and health, which can impact growth and development and the risk of future disease.

Interventions such as nutrition education, anthropometric assessments, and hemoglobin tests provided tangible benefits in increasing knowledge and providing essential baseline data for planning future health programs. The UKS program has proven to have significant potential as a sustainable platform for promotive and preventive interventions in schools, including the distribution of iron tablets and adolescent health monitoring.

With the baseline data from this activity, the implementation of the Free Nutritious Food Program (MBG) on Pari Island is expected to become a model that can be replicated in other island regions with similar conditions, thereby supporting efforts to improve the nutritional status and health of adolescents more broadly and sustainably.

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