



Empowerment of Young Women Through Nutrition Education and Reproductive Health in Stunting Prevention at Mega Islamic Boarding School, Semarang City

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Abstract: This community service program aims to improve adolescent girls' knowledge of balanced nutrition, anemia prevention, reproductive health, and stunting prevention. The program was conducted at Mega Islamic Boarding High School in Semarang City and involved 47 female students. The intervention was implemented through socialization sessions and interactive educational methods. Program evaluation employed a pre-test and post-test design, with data analyzed using a paired-sample t-test. The results indicate an average increase in knowledge scores of 11.21%, with a statistically significant difference between pre-intervention and post-intervention scores ($p < 0.05$). Educational activities focusing on nutrition, reproductive health, and stunting prevention for adolescent girls have important implications for strengthening the role of schools in promoting adolescent health. The structured boarding school environment positions schools as strategic settings for fostering sustainable health behaviors. Therefore, it is recommended that health education activities be integrated into extracurricular programs or dormitory guidance and supported by the establishment of adolescent health teams or student health cadres as agents of change through a peer education approach. Furthermore, sustained partnerships with community health centers and universities should be strengthened to support mentoring, evaluation, and program sustainability, ensuring that initiatives to improve adolescent girls' health literacy contribute meaningfully to the long-term prevention of stunting.

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Introduction

Stunting is one of the public health issues that remains a major challenge in Indonesia because it has a long-term impact on the quality of human resources (World Health Organization, 2015), (Black *et al.*, 2013). Stunting not only affects physical growth, but is also closely related to cognitive development, productivity, and the risk of non-communicable diseases in adulthood. Preventing stunting requires a life-course approach, where interventions are not only focused on pregnant women and toddlers, but also begin during adolescence (Wardanis, 2021).

Adolescent girls play a strategic role in preventing stunting because they are future mothers who will determine the quality of the next generation (World Health Organization, 2011). However, various studies show that adolescent girls are still vulnerable to nutritional and reproductive health problems, such as iron deficiency anemia, unbalanced diets, poor nutritional status, and limited understanding of reproductive health and the importance of the



first 1000 days of life (HPK)(UNICEF, 2023). This condition has the potential to increase the risk of unhealthy pregnancies in the future, leading to the birth of stunted babies(Sylvia, Erna Yovi Kurniawati, 2025)(Kementerian Kesehatan Republik Indonesia, 2018).

The city of Semarang, as an urban area with high social dynamics, still faces problems of adolescent nutrition and stunting(Kementerian Kesehatan RI, 2024). Factors such as lifestyle, unhealthy consumption patterns, lack of physical activity, and exposure to unverified health information also influence adolescent health behavior(Galuh Purwaningsih, 2022). Therefore, targeted, sustainable, and education-based promotive and preventive interventions are needed(Erni Rukmana, Muhammad Edwin Fransiari, Kanaya Yori Damananik, 2023).

Mega Islamic Boarding School in Semarang is a high school located on Jl. Mr. Wuryanto, Pagersalam, Mangunsari, Kec. Gunung Pati, Semarang City. It is a boarding school with a large number of female students. Mega Islamic Boarding Schools are a more urgent intervention setting because they combine high exposure, centralized nutrition systems, concentrated adolescent risk, strong institutional authority, and program sustainability, making them a pivotal environment for adolescent health promotion and stunting prevention. The boarding school system means that students spend most of their daily activities, including eating, studying, and resting, in the school environment (World Health Organization, 2017). This condition makes the school a strategic partner in implementing nutrition and reproductive health education programs because interventions can be carried out in a structured, controlled, and sustainable manner(Hambra *et al.*, 2025).

Based on the results of the situation analysis and initial discussions with partners, several major problems were identified at Mega Islamic Boarding School in Semarang. First, female students' knowledge of balanced nutrition, anemia prevention, and reproductive health varies and has not been systematically integrated into learning activities or boarding school guidance. Second, the use of health education media that is attractive and easy for adolescents to understand, both in print and digital forms, is not yet optimal. Third, there is a limitation in the capacity of female students as agents of change (peer educators) who are able to disseminate accurate health information to their peers. Fourth, there is no structured evaluation mechanism to measure the improvement in knowledge and changes in the health behavior of adolescent girls on an ongoing basis(World Health Organization, 2017)(Sumartini and Maretha, 2020)(Mandar, *et al.*, 2025).

These problems indicate a gap between the need to improve the health capacity of adolescent girls and the educational programs available in schools. If this condition is not addressed systematically, the risk of anemia, nutritional disorders, and low reproductive health preparedness among adolescent girls will continue and potentially contribute to a high risk of stunting in the future. This community service activity aims to improve adolescent girls' knowledge regarding balanced nutrition, anemia prevention, reproductive health, and stunting prevention.

Method

The method used in this community service program is to provide education in three main integrated sessions, namely socialization and interactive education methods on balanced nutrition and anemia prevention, adolescent reproductive health, and stunting prevention, and the importance of the first 1000 days of life (HPK). Each session was delivered through interactive lectures, discussions, and question-and-answer sessions tailored to the characteristics of adolescent girls and the boarding school environment. The aim of this



education was to improve the conceptual understanding and awareness of female students regarding their important role in maintaining their health and preventing stunting in the future. The activity was conducted for female students in grades 10 to 12 at Mega Islamic Boarding School in Semarang, which were held on Friday, November 7, 2025, at the auditorium of Mega Islamic Boarding School in Semarang, with 100 minutes allocated for training and 30 minutes for a question-and-answer session. Evaluation was performed using a pre-test and post-test design, and analyzed using the Paired Sample T-Test.

Result and Discussion

This community service activity was implemented at SMA Mega Islamic Boarding School, Semarang City, and targeted female students in grades X to XII as the primary participants. The selection of adolescent girls was based on their strategic role in the life-course approach to stunting prevention, as they represent future mothers whose nutritional and reproductive health status will influence intergenerational health outcomes. A total of 47 students participated in the activity, which was conducted in a structured and participatory manner within the school's boarding system environment.

The educational intervention consisted of three core materials delivered in sequential sessions. The first session focused on balanced nutrition and anemia prevention, emphasizing daily nutritional needs of adolescent girls, iron-rich food sources, and healthy eating patterns within the boarding school context. The second session addressed adolescent reproductive health, including puberty, menstrual health, and reproductive readiness, presented in an age-appropriate and culturally sensitive manner. The third session discussed stunting prevention and the importance of the first 1,000 days of life (1,000 HPK), linking current adolescent health behaviors with future maternal and child health outcomes. The materials were delivered using interactive lectures, visual aids, and guided discussions to enhance comprehension and engagement.

Participants responded positively and actively throughout the implementation. Students showed high levels of attention and participation, particularly during interactive discussions related to anemia, menstruation, and daily dietary practices.



Figure 1. Implementation Documentation

The education program was conducted in three main sessions, namely training on balanced nutrition and anemia prevention, adolescent reproductive health, and stunting



prevention and the importance of the first 1000 days of life (HPK). To measure the success of the education and training activities, pre-tests and post-tests were conducted with the following results:

Table 1. Pre-test dan Post-test Results

Test	N	Mean	Min	Max	Sig. Shapiro
Pre-Test	47	16.15	11	20	0.057 Normal
Post-Test	47	17.96	9	20	0.001 Abnormal
% Increase		11.21%			

In general, the average score of female students' knowledge about reproductive health and stunting before and after education showed an increase of 11.21%, from 16.15 to 17.96. The results of the mean difference test conducted using the Wilcoxon test showed Sig = 0.001 < 0.05, so Ho was rejected, meaning that there was a difference in the mean scores of students before and after education on reproductive health and stunting. In addition, based on the related-samples Wilcoxon Signed Rank test graph, it also shows that most of the 47 students, 36 students' scores increased, 2 students' scores decreased, and 9 students' scores remained the same from pre to post.

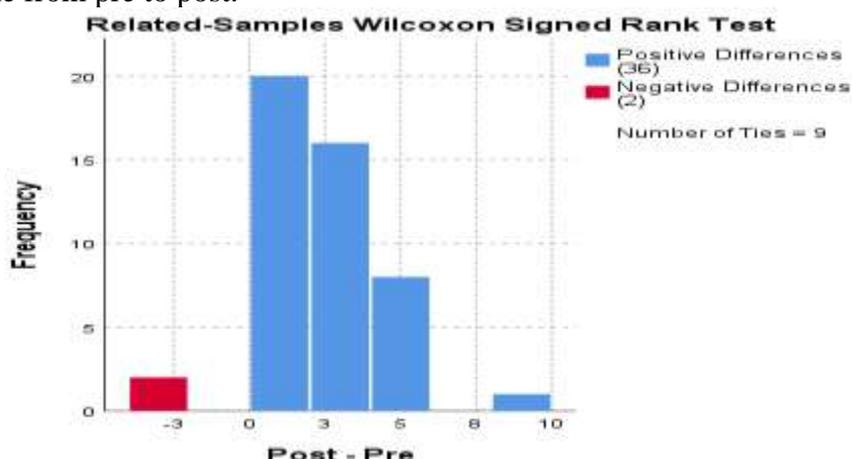


Figure 2. Results of the analysis of differences in pre-test and post-test knowledge scores

The results of community service activities show that nutrition education, adolescent reproductive health, and stunting prevention provided to female high school students at Mega Islamic Boarding School in Semarang City had a positive impact on increasing participants' knowledge. An average increase in knowledge scores of 11.21% from an initial score of 16.15 to 17.96 shows that the educational material presented was well understood by most of the students. This finding is in line with various studies that state that school-based health education interventions are effective in improving adolescent health literacy, particularly in the areas of nutrition and reproductive health (Langford *et al.*, 2015).

The normality test results show that the pre-test data is normally distributed, while the post-test data is not normally distributed. Therefore, the analysis of the difference in means was performed using the Wilcoxon Signed Rank Test. The Wilcoxon test results showed a significance value of 0.001 ($p < 0.05$), indicating a significant difference between knowledge scores before and after education. This indicates that the educational activities carried out had a significant effect on increasing adolescent girls' knowledge about reproductive health and stunting prevention. These results are consistent with the research by Salam *et al.*, which



states that a structured and participatory educational approach for adolescents can significantly improve their understanding and awareness of health issues (Sumartini and Maretha, 2020).

In addition, the results of the Wilcoxon Signed Rank Test related-samples graph show that most of the female students (36 people) experienced an increase in knowledge scores after participating in the education program. This finding reinforces that the intervention had not only a statistical impact, but also a practical impact on the majority of participants. The education delivered in three main sessions—balanced nutrition and anemia prevention, adolescent reproductive health, and stunting prevention and the importance of the First 1000 Days of Life (HPK)—was deemed relevant to the needs of adolescent girls as future mothers. WHO and UNICEF emphasize that improving nutrition and reproductive health knowledge among adolescent girls is an important strategy in breaking the intergenerational chain of stunting (Ahmed *et al.*, 2023), (UNICEF, 2010).

The context of activities in a boarding school environment is also a factor supporting the success of the program. The boarding system allows for more controlled, intensive, and sustainable education because adolescents spend most of their daily activities in the school environment. The boarding school environment is considered strategic for shaping adolescent health behaviors through an integrated promotive and preventive approach (Langford *et al.*, 2015). With increased knowledge, it is hoped that adolescent girls will be better prepared to maintain their nutritional status, prevent anemia, and understand the importance of reproductive health before entering reproductive age.

Overall, the results of this activity support the concept of a life-course approach to stunting prevention, in which interventions starting in adolescence play a strategic role in improving the health quality of future generations (World Health Organization, 2018). However, increased knowledge does not necessarily lead directly to behavioral change (Pantiawati, *et al.*, 2023), (Pantiawati, *et al.*, 2024). Therefore, follow-up in the form of continuous education, mentoring, and strengthening the role of adolescents as agents of change (peer educators) is needed so that the impact of the program can be sustainable and contribute significantly to stunting prevention efforts.

Conclusion

Community service activities in the form of nutrition education, adolescent reproductive health, and stunting prevention carried out among female high school students at Mega Islamic Boarding School in Semarang City proved effective in increasing participants' knowledge. The evaluation results showed an average increase in knowledge scores of 11.21% after the education was provided, as well as a significant difference between the pre-test and post-test scores based on the Wilcoxon test ($p < 0.05$). These findings indicate that structured health education tailored to the needs of adolescent girls can improve health literacy related to nutrition, reproductive health, and stunting prevention.

Conducting activities in a boarding school environment offers unique advantages as it allows for controlled and continuous intervention. The increase in knowledge among adolescent girls is expected to be an important asset in shaping health readiness before entering reproductive age, thereby contributing to stunting prevention efforts through a life cycle approach. Therefore, similar education programs are recommended to be implemented routinely and developed with continued assistance and strengthening of the role of adolescents as agents of change so that the impact is more sustainable.



Recommendation

For teenage girls are expected to adopt healthy lifestyles by consuming a balanced diet, especially foods rich in iron, protein, fruits, and vegetables, to prevent anemia and support optimal growth. In addition, teenage girls need to maintain reproductive health through a good understanding of menstrual hygiene, bodily changes during puberty, and the importance of health preparedness before entering reproductive age. Teenage girls are also encouraged to play an active role as agents of change through peer education activities to disseminate accurate health information and build awareness that health during adolescence affects the quality of health of mothers and children in the future, especially in the prevention of stunting.

For schools, it is recommended that educational materials on nutrition, reproductive health, and stunting prevention be continuously integrated into student guidance activities and school health programs. The use of educational media such as posters and videos is expected to continue to be used as a means of strengthening health literacy among adolescent girls.

For future research and community service, it is recommended to add long-term evaluation indicators, such as monitoring balanced nutrition behavior or anemia status, so that the impact of the program can be measured more comprehensively and sustainably.

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