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Transforming knowledge about anemia through interactive education for adolescent girls in madrasah

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ABSTRACT

Anemia is one of the common health problems worldwide, where there are around 1.62 billion people in the world suffering from anemia, or around 24.8% of the global population. This activity aims to provide education about anemia to adolescent girls at MTS Madani, Gowa Regency, through an interactive anemia literacy approach and health checks to detect anemia conditions early. This approach includes a series of structured stages, starting from pre-test, initial socialization, counseling, interactive discussion, health screening, to evaluation. The results obtained in the pre-test showed that 56.7% of respondents had sufficient knowledge about anemia, while in the post-test, this figure increased to 60.8%. Although there was a significant increase (P =0.000), a small percentage of respondents still had insufficient knowledge after attending the education, although the percentage was slightly lower in the post-test (39.2%) compared to the pre-test (43.3%). This suggests that the education provided can increase community literacy about anemia, but there is a need to continue to improve the quality and methods of counseling to achieve a more even level of understanding.

ABSTRAK

Anemia merupakan salah satu masalah kesehatan yang umum terjadi di seluruh dunia, dimana terdapat sekitar 1,62 miliar orang di dunia menderita anemia, atau sekitar 24,8% dari populasi global. Kegiatan yang bertujuan memberikan edukasi mengenai anemia kepada remaja putri di MTS Madani, Kabupaten Gowa, melalui pendekatan literasi anemia yang interaktif serta pemeriksaan kesehatan untuk mendeteksi kondisi anemia secara dini. Pendekatan ini mencakup rangkaian tahapan terstruktur, mulai dari pre-test, sosialisasi awal, penyuluhan, diskusi interaktif, skrining kesehatan, hingga evaluasi. Hasil yang diperoleh pada pre-test, sebanyak 56,7% responden memiliki pengetahuan yang cukup tentang anemia, sementara pada post-test, angka ini meningkat menjadi 60,8%. Meskipun ada peningkatan yang signifikan (P=0,000), sebagian kecil responden masih memiliki pengetahuan yang kurang setelah mengikuti edukasi, meskipun persentasenya sedikit lebih rendah pada post-test (39,2%) dibandingkan pre-test (43,3%). Hal ini menunjukkan bahwa edukasi yang diberikan dapat meningkatkan literasi masyarakat mengenai anemia, namun ada kebutuhan untuk terus memperbaiki kualitas dan metode penyuluhan untuk mencapai tingkat pemahaman yang lebih merata.

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INTRODUCTION

Anemia is a significant global health issue characterized by a deficiency in red blood cells or hemoglobin, affecting approximately 1.62 billion individuals, which equates to about 24.8% of the global population (Munira & Viwattanakulvanid, 2021; M et al., 2019). The condition is particularly prevalent in low- and middle-income countries (LMICs), where socioeconomic factors exacerbate its incidence, especially among vulnerable groups such as women and children (Akbarpour et al., 2022; Teshale et al., 2020; Alem et al., 2023). For instance, the prevalence of anemia among pregnant women can reach as high as 38%, while non-pregnant women may experience rates around 29% (Teshale et al., 2020; Vaira et al., 2022).

The World Health Organization (WHO) highlights that iron deficiency accounts for over 50% of anemia cases globally, with significant implications for health, productivity, and cognitive function (Jha & Chandrakar, 2024; Navya et al., 2024). Furthermore, the burden of anemia is not uniformly distributed; regions like Southeast Asia and Sub-Saharan Africa bear the highest prevalence rates, with estimates suggesting that these areas account for 89% of the global anemia burden (Teshale et al., 2020; Mulianingsih, 2021). Addressing anemia requires multifaceted strategies, including improving nutritional access and health education, particularly in LMICs (Dev et al., 2023; Iglesias-Vázquez et al., 2019).

In South Sulawesi, the prevalence of anemia among adolescent girls is high. Based on data from the South Sulawesi Health Office, the prevalence of anemia in the province is around 33% among adolescent girls, which is in line with national data. (Dinas Kesehatan Provinsi Sulawesi Selatan, 2023). Gowa Regency, as one of the regions in South Sulawesi, also faces similar challenges. The prevalence of anemia in Gowa Regency is recorded at around 30% among adolescent girls. This figure indicates that one in three adolescent girls in this area is potentially anemic, a condition that can affect their health and development. (Dinas Kesehatan Kabupaten Gowa, 2023).

Adolescent girls are particularly vulnerable to anemia due to the dual challenges of rapid growth and menstruation. During adolescence, girls experience a significant increase in iron requirements to support their growth and the physiological demands of menstruation, which can lead to iron deficiency anemia if not adequately addressed Ramadhan et al. (2023)Hess et al., 2023; Li et al., 2022). The monthly blood loss associated with menstruation exacerbates this vulnerability, as it can result in a loss of approximately 28 mg of iron, further increasing the risk of anemia among this demographic (Bahrah et al., 2020; Hamidah & Kurniasari, 2022).

Studies indicate that the prevalence of anemia is notably higher in adolescent girls compared to boys, primarily due to these factors (Chauhan et al., 2022; Padmiari et al., 2023). For instance, research shows that heavy menstrual bleeding is a significant contributor to the higher rates of moderate to severe anemia observed in late adolescent girls (Chauhan et al., 2022; Shrivastava et al., 2021). Moreover, inadequate dietary intake of iron-rich foods, coupled with poor nutritional habits, compounds the risk (Rahmiwati et al., 2023; Ferdian et al., 2024). Addressing these issues through targeted nutritional education and interventions is crucial to mitigate the impact of anemia on the health and development of adolescent girls (Rahmiwati et al., 2023; Permanasari et al., 2022).

Anemia significantly impacts adolescents, particularly adolescent girls, due to the interplay of physiological, nutritional, and social factors. The condition can lead to a range of adverse outcomes, including impaired physical growth, cognitive deficits, and emotional disturbances. For adolescent girls, the onset of menstruation introduces additional challenges, as monthly blood loss increases their iron requirements, making them more susceptible to anemia Yulianingsih et al. (2021)Mas'odah et al., 2021; Hamidah & Kurniasari, 2022). The World Health Organization (WHO) emphasizes that iron deficiency anemia is a major public health concern, especially among this demographic, where the prevalence can reach alarming levels (Sari et al., 2022; Millenia & Rahmadyanti, 2024).

The consequences of anemia during adolescence extend beyond immediate health effects. Studies have shown that anemia can hinder academic performance and cognitive development, leading to decreased concentration and learning capabilities (Rahmah & Puspita, 2023; Mengistu et al., 2019). For instance, adolescents with anemia often experience fatigue and reduced endurance,

which can negatively affect their participation in physical activities and academic pursuits (Hamidah & Kurniasari, 2022; Ernawati et al., 2022). Furthermore, the implications of anemia are particularly severe for pregnant adolescents, as it can lead to complications during pregnancy and childbirth, increasing the risk of maternal and infant morbidity and mortality (Habtegiorgis et al., 2022; Gebreyesus et al., 2019).

Nutritional education and interventions are crucial in addressing anemia among adolescents. Research indicates that improving knowledge about nutrition and anemia can significantly enhance dietary practices, leading to better health outcomes (Kusuma & Kartini, 2021; Agustina et al., 2021; Gillespie et al., 2023). Programs that focus on increasing awareness about iron-rich foods and the importance of maintaining a balanced diet are essential in combating the high rates of anemia in this vulnerable group (Munira & Viwattanakulvanid, 2021; Yanisah & Widati, 2023). Additionally, addressing societal factors, such as socioeconomic status and access to healthcare, is vital for effective anemia prevention and management strategies (Srivastava et al., 2022; Habib et al., 2020; Zeleke et al., 2020).

Anemia literacy is critical for effective prevention and management of this widespread health issue, particularly among vulnerable populations such as adolescents and women of reproductive age. Understanding the causes, symptoms, and consequences of anemia can empower individuals to seek appropriate interventions and adopt healthier dietary practices. Given the importance of understanding anemia and how to prevent it, the anemia literacy program for adolescent girls at MTS Madani, Gowa Regency, is expected to increase their awareness and knowledge of the importance of a healthy diet rich in iron and other nutrients.

METHODS

This study used a quantitative approach with a pre-experimental one-group pretest-posttest design to measure the effectiveness of anemia literacy on adolescent girls at MTS Madani, Gowa Regency. The research sample was selected by purposive sampling with the number of respondents involved as many as 120 students. The research phase began with the implementation of a pre-test to measure the respondents' initial knowledge of anemia. The pre-test was conducted using a structured questionnaire that included questions about the causes, symptoms, prevention, and treatment of anemia (see Figure 1).

After the pre-test, an initial socialization was conducted to introduce the importance of anemia literacy and early detection. Counseling activities were provided through interactive and communicative material presentation, complemented by group discussions to deepen participants' understanding. In addition, health screening was carried out in the form of checking hemoglobin levels to detect indications of anemia in respondents. This process aims to link the theory given with the real health conditions of the participants. After the educational series was completed, a post-test was conducted to measure the increase in participants' knowledge. Data testing was conducted using the Wilcoxon test to determine the significance of the difference between the pre-test and post-test results. All stages of this study were designed to provide continuous education and focus on increasing awareness and understanding of adolescent girls about anemia and how to prevent it.

Figure 1. Pre-Testing Activities and Licensing to the Principal

RESULTS AND DISCUSSION

Figure 2 shows the results of the pre-test and post-test showing a difference in the level of knowledge of respondents regarding anemia. In the post-test, 60.8% of respondents had sufficient knowledge about anemia, while 39.2% still had insufficient knowledge. Although there was a small decrease in the percentage of respondents who had insufficient knowledge, the sufficient rate in the post-test was higher than the pre-test, indicating that the educational intervention had a positive effect on their knowledge.

To determine if the change was significant, the Wilcoxon test was conducted, which is used to measure the difference between two related samples, in this case the difference between the pre-test and post-test. Table 1 shows that the test results indicate a p value of 0.000, which is less than the 0.05 significance threshold. This indicates that there is a significant difference between respondents' knowledge before and after the educational intervention. In other words, the educational intervention on anemia significantly improved respondents' knowledge.

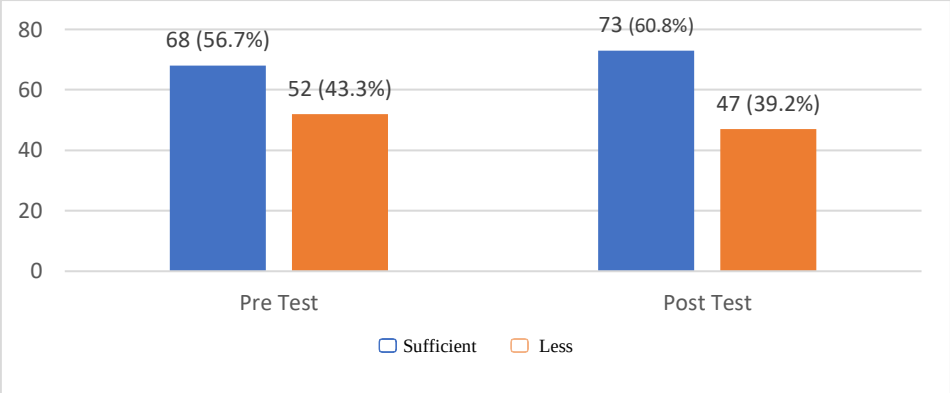

Figure 2. The Level of Knowledge of Female Students about Anemia

These results provide a clear indication that educational interventions on anemia can improve community knowledge, especially in terms of understanding the causes, symptoms, and prevention and treatment of anemia. Although the percentage of respondents who had sufficient knowledge increased, there was still a small percentage of respondents whose knowledge remained deficient. This may be due to various factors, including the level of attention during the education sessions or a lack of in-depth understanding of the material presented.

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In particular, the implication of these results is that although the education program has had a positive impact in improving knowledge about anemia, there are still some respondents who do not fully understand the material presented. The Wilcoxon test result with a p value of 0.000 showed a significant difference between the pre-test and post-test, indicating that the education program succeeded in changing the respondents' knowledge level. However, this data also shows that there are challenges that must be overcome, namely how to maintain the sustainability of the knowledge that has been obtained so that it can be applied in everyday life. Some respondents may still not fully understand the importance of anemia prevention and treatment, which could be due to a lack of understanding in the application of the information obtained. Therefore, education programs need to be designed to be more interactive and sustainable, with an approach that is more suited to the needs and characteristics of the participants.

Table 1. Test Results of the Effect of Literacy on Knowledge Change

Knowledge	Pre-Test		Post-Test		Wilcoxon Test
	n	%	n	%	
Sufficient	68	56.7	73	60.8	0.000
Less	52	43.3	47	39.2	

In addition, although the results showed a significant increase in respondents' knowledge, there were still some participants who had difficulty understanding the material presented. This implies that it is important to evaluate the methods and approaches used in the counseling. One-way or text-based educational methods may not be effective enough for some participants who have different learning styles. More interactive education, for example through group discussions or the use of more engaging visual media, may be a more effective way to convey information about anemia. With a more varied approach and in accordance with different learning styles, it is hoped that people's understanding of health problems such as anemia will be deeper and can be applied in their daily lives.

In addition, the results of this study also provide implications regarding the importance of continuing education programs and sustainable interventions in improving community knowledge about anemia. It is not enough to conduct an education program once, but it must be sustained and conducted periodically to ensure that the knowledge that has been gained can be retained and applied. Repeated and consistent education will be more easily accepted by the community and help them to better understand the importance of anemia prevention, such as consuming foods rich in iron, vitamin B12, and folic acid, and accessing timely health services. It can also increase the level of awareness of regular health check-ups, which can help detect and treat anemia early.

Anemia literacy is critical for effective prevention and management of this widespread health issue, particularly among vulnerable populations such as adolescents and women of reproductive age. Understanding the causes, symptoms, and consequences of anemia can empower individuals to seek appropriate interventions and adopt healthier dietary practices. Research indicates that lower educational levels correlate with higher prevalence rates of anemia, suggesting that gaps in health literacy significantly impact health outcomes Ning et al. (2024; Qadir et al., 2022). This underscores the necessity of educational initiatives aimed at increasing awareness about anemia and its implications.

In the context of adolescents, particularly girls, anemia literacy can lead to improved dietary choices and better management of menstrual health, which are crucial for preventing iron deficiency anemia (Dev et al., 2023; Gillespie et al., 2023). School-based health programs that promote awareness about balanced diets and the importance of iron-rich foods have shown promise in reducing anemia prevalence among students (Dev et al., 2023). Furthermore, studies have highlighted that nutritional education is often underutilized as a preventive strategy, indicating a need for targeted interventions that focus on increasing knowledge and awareness (Sayd et al., 2024).

Moreover, the consequences of anemia extend beyond individual health, affecting overall community well-being and productivity. Anemia is associated with increased morbidity and mortality, decreased work productivity, and impaired cognitive development (Chaparro & Suchdev, 2019; Noreen et al., 2021). Therefore, enhancing anemia literacy not only benefits individual health but also contributes to broader public health goals by reducing the burden of anemia on healthcare systems and improving economic productivity (Chaparro & Suchdev, 2019; Noreen et al., 2021).

Furthermore, another implication of this study is the importance of collaboration between counseling and health services. After gaining knowledge about anemia, people who are more aware of the importance of health will be more encouraged to seek examination and treatment. Therefore, synergy is needed between the education program at Posyandu and health services at Puskesmas or other health facilities, so that the community can utilize these services more optimally. Strengthening this collaboration can ensure that changes in knowledge gained through education not only stop at understanding, but also translate into real actions that improve community health.

Overall, the results of this study show that educational interventions on anemia have a positive impact on improving respondents' knowledge. However, to achieve a better level of understanding

and more effective application in daily life, a more interactive approach, continuation of the education program, and stronger collaboration with health institutions are needed. This effort is expected to reduce the prevalence of anemia in the community by increasing awareness and better behavior change related to the prevention and treatment of anemia.

CONCLUSION

The results showed that educational intervention through anemia literacy can improve the knowledge of adolescent girls at Madrasah Madani, Gowa Regency. This proves that an interactive and structured anemia literacy approach is effective in improving participants' understanding of the causes, symptoms, prevention and treatment of anemia. However, the challenge is to ensure that the understanding gained can be sustainably applied in daily life. Factors such as level of attention during the education session and comprehension of the information provided can affect the results achieved. Therefore, it is recommended that educational programs on anemia be conducted regularly with more interactive methods and tailored to the characteristics of the participants. In addition, collaboration between schools, health workers, and parents is needed to create an environment that supports the implementation of a healthy lifestyle to prevent anemia in adolescent girls.

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