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Effectiveness of Interpersonal Communication in Nutrition Education on Iron Supplement Knowledge in Adolescent Girls at SMP Muhammadiyah Maros

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ABSTRACT

Anemia among adolescent girls is a critical health issue that requires serious attention, as it can trigger a chain of nutritional problems in future generations. Providing iron supplementation tablets to adolescent girls is expected to reduce the incidence of anemia in this population group. This study aimed to assess the knowledge level of adolescent girls before and after receiving nutrition education on the importance of iron supplementation. A quasi-experimental study design was used, specifically a one-group pre-test and post-test design. Participants' knowledge was initially pre-tested using a validated questionnaire adapted from previous studies. The questionnaire had been reviewed and validated by experts in the field of nutrition education to ensure its reliability in measuring knowledge about iron supplementation. Nutrition education was delivered through interpersonal communication for approximately 40–50 minutes. Following the intervention, participants' knowledge was reassessed through a post-test. The study sample consisted of 13 adolescent girls enrolled at Muhammadiyah Junior High School, Maros Regency. Data was collected through interviews, and knowledge assessment was performed using the same validated questionnaire. The results showed a p-value of 0.003 (<0.05), indicating a statistically significant improvement in the knowledge of adolescent girls after receiving the nutrition education intervention. The interpersonal communication approach likely contributed to this improvement by enabling active interaction, immediate feedback, and better engagement with the participants, all of which are essential factors in enhancing information retention.

Key Messages:

- Targeted nutrition education delivered via interpersonal communication significantly enhances adolescent girls' knowledge regarding the importance of iron supplementation (p=0.003), highlighting an effective strategy to improve adherence and combat anemia within this vulnerable population potentially.

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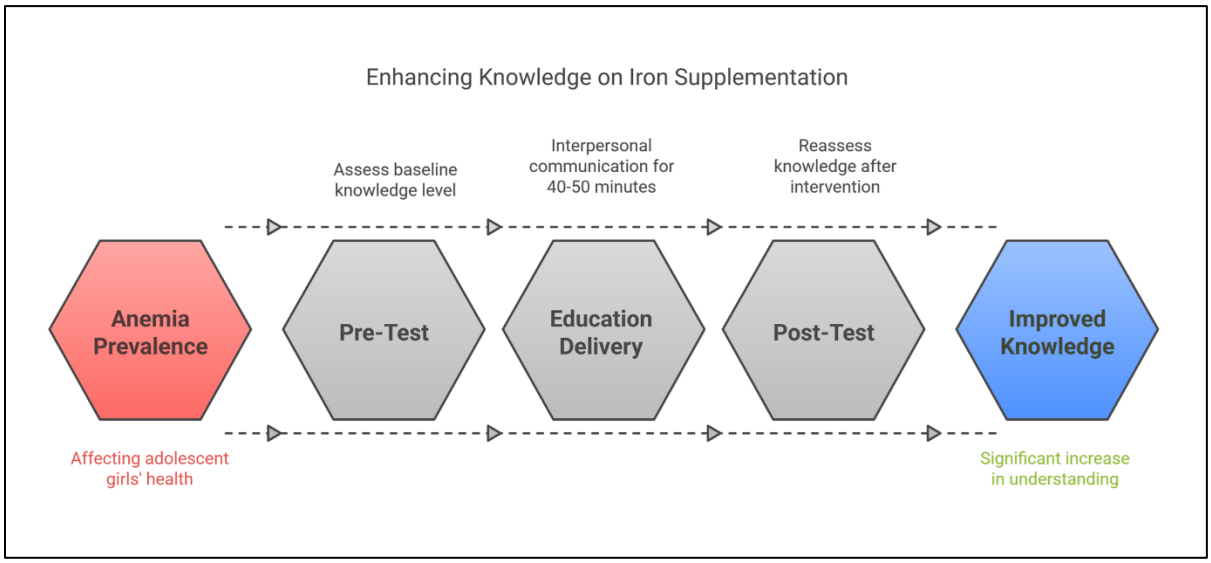
GRAPHICAL ABSTRACT



INTRODUCTION

Adolescence is a transitional phase from childhood to adulthood, marked by significant biological, cognitive, and emotional changes. One of the common nutritional and health issues faced by adolescents is anemia (1). Anemia occurs when blood hemoglobin levels fall below normal due to the inability of red blood cell-producing tissues to maintain adequate hemoglobin levels. Adolescent girls are considered anemic if their hemoglobin level is <12 g/dL (2).

The prevalence of anemia among adolescent girls is categorized as moderate (20–39%) based on WHO standards. Globally, the prevalence of anemia among adolescent girls and women of reproductive age is reported to be 81.5% (3). Based on the 2018 Basic Health Research (Riskesdas) report from the Indonesian Ministry of Health, the prevalence of anemia among adolescent girls in Indonesia is 27.2% in the 15–24 age group (4). Additionally, data from the South Sulawesi Provincial Health Office indicate that the prevalence of anemia among adolescent girls in the province is 33.7%.

Anemia among adolescent girls is primarily caused by iron deficiency. This condition is often linked to poor dietary habits or inappropriate dieting practices, despite adolescence being a period of rapid growth (growth spurt). Furthermore, the lack of preventive measures such as iron supplementation exacerbates the problem (5). The 2018 Basic Health Research (Riskesdas) report also highlights that the risk of anemia among adolescent girls is significantly high, with iron tablet consumption in this group being only 1.4% (4).

Anemia can negatively impact health across all age groups. Even mild iron deficiency, without the presence of anemia, can cause fatigue, weakness, lethargy, lack of concentration, and drowsiness—commonly referred to as the "5Ls" symptoms. These symptoms result from decreased oxygen levels in the blood, which are necessary for body tissues, including muscles and the brain, to function optimally. Since hemoglobin is responsible for carrying oxygen, anemia can weaken the immune system, making individuals more susceptible to infections (6). Additionally, anemia among adolescent girls can affect their academic performance, as it reduces concentration levels. Adolescent girls with anemia are 1.875 times more likely to achieve lower academic performance compared to their non-anemic peers (7).

Anemia prevention can be achieved through the consumption of iron-rich foods, folic acid, vitamin A, vitamin C, and zinc, along with iron supplementation (TTD). The government has implemented routine programs for distributing iron tablets to women of reproductive age, including adolescents and pregnant women. The government's continuous and systematic nutrition interventions include the provision of one iron tablet per week for adolescent girls to minimize the risk of anemia (8).

Awareness of iron tablet consumption during menstruation is strongly influenced by access to information and knowledge. Knowledge is a key factor that shapes individual dietary behavior. Poor

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nutritional knowledge among adolescents is closely related to inadequate dietary intake and lack of awareness regarding nutritional needs. Adolescent girls need to maintain good nutritional status, particularly during menstruation, as nutrient requirements increase during the luteal phase. Neglecting this can lead to discomfort during the menstrual cycle (9).

Adequate knowledge about anemia is essential for increasing awareness and adherence to iron tablet consumption. Therefore, education plays a crucial role in the prevention and management of anemia. Given this context, providing nutrition education through interpersonal communication is necessary to enhance adolescent girls' understanding of anemia (10)(11)(12)(13,14). This study aims to evaluate the knowledge level of adolescent girls regarding iron supplementation by assessing changes before and after a nutrition education intervention. The intervention was delivered using an interpersonal communication approach, to enhance participants' understanding and improve adherence to iron supplementation programs.

METHODS

This study employed a quasi-experimental one-group pre-test and post-test design, conducted in July-September 2024 at SMP Muhammadiyah, Maros Regency. The intervention lasted approximately 45 minutes. Thirteen adolescent girls were recruited through total sampling. Due to the small sample size, findings are intended as preliminary and not for generalization.

Primary data included age, menstrual status, and knowledge scores collected through interviews and a validated questionnaire. The 10-item questionnaire underwent expert review for content validity; however, formal reliability testing was not conducted. The intervention was delivered using Interpersonal Communication (IPC) techniques, structured into three phases: (1) warm-up and rapport building, (2) interactive education using clapping games and educational songs, and (3) commitment reinforcement to promote iron tablet (TTD) adherence.

Data were analyzed using descriptive statistics and the Wilcoxon signed-rank test. The absence of a control group and small sample size are recognized as study limitations. Ethical approval was obtained from the Research Ethics Committee of Poltekkes Kemenkes Makassar, and all participants provided informed consent.

RESULTS

Table 1 shows that the majority of respondents were 13 years old (30.8%). All respondents (100%) had already experienced menstruation.

Table 1. Respondent Characteristics

Respondent Characteristics	n	%
Age (Year)		
12	2	15.4
13	4	30.8
14	2	15.4
15	2	15.4
16	3	23.1
Menstrual Status		
Not yet menstruating	0	0.0
Menstruating	13	100.0
Total	13	100.0

Table 2 indicates a difference in the respondents' knowledge scores before (mean = 5.00) and after (mean = 8.46) the nutrition education. The Wilcoxon test resulted in a p-value of 0.003 (< 0.05), indicating a statistically significant difference in knowledge before and after the intervention. Thus, it can be concluded that nutrition education effectively improved the respondents' knowledge.

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Table 2. Respondents' Knowledge Scores Before and After Nutrition Education

Knowledge scores	n	Mean±SD	p
Before the education session	13	5.00 ± 1.080	0.003
After the education session	13	8.46 ± 1.050	

DISCUSSION

Based on the results of this study, the characteristics of adolescent girls in terms of age and menstrual status indicate that the majority of respondents were 13 years old, with a total of four individuals (15.4%). The study also showed that all respondents had experienced menstruation. In general, adolescents begin menstruation between the ages of 12 and 13. This process is a physiological event that signifies the maturation of the reproductive system. Menstruation is a natural physiological process experienced by every female adolescent, typically occurring between the ages of 12 and 13, during which reproductive organs reach maturity, playing a crucial role in both physical and psychological well-being (15).

The findings of this study suggest that nutrition education using the interpersonal communication (IPC) approach effectively improved the knowledge of adolescent girls regarding iron supplementation. Prior to the intervention, only 30.8% of respondents demonstrated good knowledge, while after the education session, all respondents exhibited good knowledge. The significant improvement, with a mean score increase from 5.00 to 8.46 ($p = 0.003$), aligns with previous research indicating that IPC methods can enhance knowledge retention and behavior change.

This study aligns with the findings of Widianti et al. (2024), which demonstrated a 17% increase in the proportion of participants with good knowledge in the intervention group and a 13% increase in adherence to iron supplement consumption (TTD) in the same group (16). The study concluded that nutrition education significantly influenced knowledge and compliance with iron supplementation, as evidenced by a p-value of <0.05. This finding is further supported by the study of Agustina et al. (2020), which found that after receiving education through an interpersonal communication method, participants' knowledge improved to a good category (>76%) (17). This increase in knowledge is expected to lead to changes in attitudes and behaviors.

The observed effectiveness of the IPC approach can be attributed to its interactive and engaging nature, which encourages active participation. Compared to traditional lectures, IPC facilitates better communication between educators and participants, allowing for a more personalized learning experience. Furthermore, IPC supports building trust and rapport, which is critical in encouraging behavioral change among adolescents. These findings align with the work of Agustina et al. (2020), who found that IPC significantly improved participants' knowledge and attitudes toward health behavior. However, it is important to note that the effectiveness of IPC may also depend on the local context, including cultural norms and the educational background of participants, which could influence how information is received and applied (18). Other studies have also explored various educational approaches, such as multimedia-based interventions or group discussions, which have yielded mixed results. For example, a study found that multimedia education had less impact than IPC in rural areas, where personal interaction was more highly valued. The differences in outcomes across studies highlight the importance of contextualizing educational strategies to the target population's needs and preferences (19,20)(21) (22).

It is important to acknowledge potential biases in this study, such as the small sample size (13 participants) and the absence of a control group, which limits the generalizability of the findings. The use of interview-based data collection could also introduce bias, as participants might provide socially desirable responses. Additionally, external factors such as the time of year or the participants' prior exposure to health education may have influenced the outcomes. Future studies should aim to control for these factors to strengthen the internal validity of the findings.

The limitations of this study include the small sample size, which restricts the ability to generalize the results to a broader population. Moreover, the lack of a control group makes it difficult to isolate the effect of the IPC-based nutrition education from other external influences. The absence of long-term follow-

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up also means we cannot assess the sustainability of the knowledge gained. Additionally, the potential biases in the interview process and the subjective nature of self-reported knowledge must be considered when interpreting the results.

Despite these limitations, the study's findings have practical implications for public health programs targeting adolescent girls, particularly in school settings. School-based nutrition education programs utilizing IPC could be an effective strategy for improving knowledge and behavior related to iron supplementation, which is crucial in addressing anemia in adolescent girls. Local health offices can implement these findings by incorporating IPC techniques into their campaigns to raise awareness about the importance of iron supplementation. Furthermore, adolescent communication campaigns could use interactive methods to engage this age group and improve adherence to health recommendations.

Further research is needed to evaluate the long-term impact of IPC-based nutrition education on adolescent girls' knowledge and behavior. Studies with larger and more diverse samples, including a control group, would help enhance the external validity of the findings. Additionally, testing other communication methods, such as digital platforms or peer-led education, could offer insights into more scalable and cost-effective interventions for improving adolescent health education.

CONCLUSION

The findings of this study suggest that nutrition education using an interpersonal communication approach can effectively enhance the knowledge of adolescent girls at SMP Muhammadiyah, Maros Regency. These results have significant implications for the design of school-based nutrition education programs, as they demonstrate the effectiveness of interactive communication methods in improving adolescent nutrition knowledge. However, the small sample size (n=13) limits the generalizability of these findings. To strengthen these results and ensure broader applicability, further research with a larger sample size and a control group is necessary. Additionally, sustaining such education programs in schools, with periodic reinforcement, could enhance long-term retention of nutritional knowledge and behavioral changes among adolescent girls. Future studies should also explore other communication methods, such as digital platforms or peer-led sessions, to evaluate their effectiveness in diverse contexts.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest in this study.

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