



Education on Iron Supplement Consumption Using Banners among Adolescent Girls at Junior High School Dwi Jendra Denpasar

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ABSTRACT

Background: Nutritional anemia, particularly iron deficiency anemia, is a significant public health problem among adolescent girls, with a prevalence of 45.9% in Bali. One contributing factor to this high rate is the low adherence to iron supplement consumption, which is influenced by limited understanding of its benefits. Visual education, such as banners, is considered potentially effective in improving knowledge and adherence to iron supplement consumption. Methods: This study employed a pre-experimental one-group pretest-posttest design involving 33 adolescent girls at SMP Dwi Jendra Denpasar who received nutrition education about anemia using banners. Students' knowledge was measured using a multiple-choice questionnaire administered before and after the education session. The data were analyzed descriptively and quantitatively using paired t-test to determine the significance of score changes. Results: Knowledge scores significantly increased from a mean pretest score of 58.2 (SD=7.3) to a posttest score of 96.0 (SD=5.0), with $p < 0.001$. The increase in scores indicates that the educational intervention using banners was effective in improving nutrition literacy about anemia. Conclusion: Nutrition education using banners was proven effective in increasing students' knowledge about anemia and the importance of iron supplement consumption. Visual media like banners can be used as a simple yet meaningful educational approach in school-based anemia prevention programs. This study supports the integration of visual media in School Health Units (SHU) as a preventive nutrition promotion effort with direct impact.

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INTRODUCTION

Teenagers, in particular Woman age school, is vulnerable groups experiencing iron deficiency anemia substance iron (ADZB) because need substance increased iron along acceleration growth as well as lost blood consequence Menstruation. This condition is exacerbated by an unbalanced diet and low intake of micronutrients, including iron, folic acid, and vitamin C. According to the 2018 Basic Health Research (Riskesmas) report, the prevalence of anemia among adolescent girls in Indonesia reached 32%, and recent research shows that this figure continues to increase to 44% in several regions of Indonesia, such as West Java (Oktavia et al., 2024). The prevalence in Bali Province, particularly Denpasar, is also quite high, at around 45.9% in junior high school-aged adolescent girls (Poltekkes Denpasar, 2023).

Anemia in adolescents not only impacts physical health and academic productivity, but also has long-term consequences such as the risk of high-risk pregnancies in young adulthood, increased maternal mortality, and fetal growth retardation. Therefore, efforts to prevent and address anemia from adolescence are crucial, particularly through school-based interventions. The Indonesian government has developed a program to provide weekly iron supplement tablets (TTD) to adolescent girls in schools as a national effort to reduce the prevalence of anemia. However, its implementation still faces various obstacles, particularly in terms of compliance (Silitonga et al., 2024).

Low adherence among adolescents to iron supplementation is closely related to a lack of understanding of its benefits and concerns about its side effects. Nutrition education is a crucial strategy to overcome these barriers. Research by Amani & Sebayang (2023) shows that providing education about anemia and the importance of iron supplementation can significantly improve adherence and hemoglobin levels in adolescents. Consistent education and the use of age-appropriate media will be more effective in increasing knowledge and changing behavior.

Visual education media, such as banners, are an easily accessible, affordable, and visually appealing educational tool for adolescents. Banners can convey key messages concisely, clearly, and engagingly, especially when designed with illustrations and engaging language. In a study by Eden et al. (2024), the use of banners as part of a visual education-based school intervention was shown to increase student awareness of nutrition issues and reinforce educational messages conveyed through oral activities. However, the effectiveness of banners as the primary medium for iron supplement consumption education in schools has not been widely evaluated, particularly in junior high schools.

Dwi Jendral Junior High School in Denpasar, one of the schools targeted by the national iron supplement program, has the potential to become a location for visual media-based educational interventions. Based on initial observations, students' understanding of the benefits of iron supplements remains low, and the educational materials tend to be monotonous. Therefore, an outreach approach using banners is expected to reinforce key messages regarding the importance of iron supplement consumption and increase student engagement in the school's anemia prevention program.

This study was designed to test the effectiveness of promoting the benefits of taking iron-containing tablets (TTD) through banners on improving the knowledge of adolescent girls at Dwi Jendral Middle School, Denpasar. This approach combined visual educational strategies with a strategic school context, while also considering the characteristics of adolescent students. This intervention was also supported by the involvement of teachers and community health centers (Puskesmas) as supervisors of the iron-containing tablet program implementation at the school.

Against this backdrop, this research is expected to contribute to strengthening risk communication and nutrition education strategies within school iron supplementation programs. Furthermore, the results can provide practical recommendations for schools, healthcare professionals, and policymakers in selecting effective educational media to increase iron supplement compliance and reduce the prevalence of anemia in adolescents.

METHOD

Types and Design of Research

This research is a descriptive quantitative study using a *one-group pretest-posttest design*. This design was used to determine changes in students' knowledge levels before and after being educated about the benefits of consuming iron (Fe) tablets. This study did not use a control group, but rather only one treatment group, which was measured twice: before and after the educational intervention.

Time and Place of Research

The research was conducted on Wednesday, June 4, 2025, in the auditorium of Dwi Jendra Junior High School, located in North Denpasar District, Denpasar City, Bali Province. The timing and location were chosen based on the school's readiness and coincided with the researchers' implementation of a nutrition education program.

Research Sample

The sample in this study were all female students in grades VII of Dwi Jendra Middle School who participated in educational activities on the day of implementation. The number of respondents involved in this activity was 33 people. The sampling technique used was total sampling, namely all members of the population who met the inclusion criteria were sampled. The inclusion criteria included: (1) female students who were present during the activity, (2) willing to participate in the education in full, and (3) completing questionnaires before and after the education.

Data collection technique

Data were collected in two stages: education and knowledge measurement. The education was conducted using banners as visual aids displayed in the activity room. The educational material covered three main topics: (a) the definition, causes, and symptoms

of anemia; (b) the benefits of iron (Fe) tablets; and (c) how to overcome contraindications when taking iron tablets. Following the presentation, a question-and-answer session was held between the participants and the presenter to deepen their understanding.

Knowledge levels were measured twice: before (pretest) and after (posttest) the education. The instrument used was a closed-ended questionnaire consisting of 10 multiple-choice questions structured based on indicators of understanding of anemia and iron supplements. The questionnaire was distributed to each student to be completed independently without any influence from others.

Data Processing and Analysis Techniques

Data obtained from the pretest and posttest questionnaires were analyzed descriptively quantitatively. Each correct answer was given a score of 1, and each incorrect answer was given a score of 0. The total score was calculated for each respondent and then averaged to obtain the average knowledge score before and after the education. Furthermore, the proportion of respondents with high knowledge after the education was calculated. The results of this analysis were used to assess the effectiveness of nutrition counseling using banner media in increasing knowledge about anemia and iron supplements among adolescent girls.

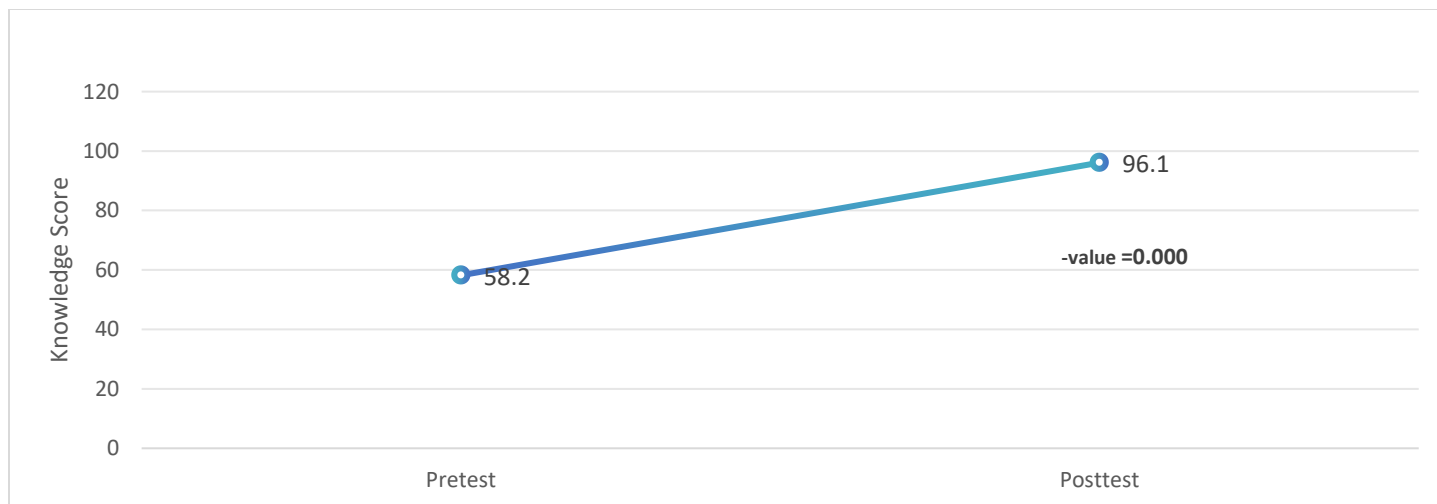
RESULTS

Table 1. Student Knowledge Before and After Nutrition Education at Dwi Jendra Middle School, Denpasar

Parameter	Pretest	Posttest
Amount sample	33	33
Minimum	50	90
Maximum	70	100
Mean	58.2	96.0
Standard deviation	7.3	5.0

Study This aim For know influence education nutrition about anemia using banner media knowledge students at Dwi Jendra Middle School , Denpasar. Evaluation done with measure score knowledge female students before and after activity education use pretest and posttest instruments .

A total of 33 female students participated as respondents in this activity. Based on the measurement results, there was a significant increase in knowledge scores. The average pretest score was 58.2 with a standard deviation of 7.3 , increasing to 96.0 in the posttest with a standard deviation of 5.0 . The minimum score in the pretest was 50 , while in the posttest it increased to 90. Similarly, the maximum score increased from 70 in the pretest to 100 in the posttest (Table 1).



Graph 1. Changes knowledge nutrition Student Between Before and After Nutrition Education

Graph 1 illustrates change average score knowledge nutrition Dwi Jendra Middle School students in Denpasar before and after given education nutrition about anemia using banner media. It can be seen existence improvement score sufficient knowledge sharp , from mark average 58.2 at the time of the pretest became 96.1 on the posttest. Increase score This show impact positive from intervention educational material provided . Graphics show significant slope of the line between two points measurement , marking improvement understanding female students to anemia material after follow education .

statistical tests are presented in chart show mark $p = 0.000$, which means in a way statistics there is very significant difference between pretest and posttest scores ($p < 0.001$). With thus, it can be concluded that education nutrition using banner media effectively increase knowledge nutrition female students related to anemia.

DISCUSSION

Study This prove that education nutrition using banner media significant increase knowledge Dwi Jendra Middle School students in Denpasar regarding anemia. The -average pretest score was **58.2** increase become **96.0** after intervention, showing dramatic increase (~37.8 points), which significantly statistically very significant ($p < 0.001$). Findings This consistent with various studies latest about visual education for anemia literacy among teenager Woman as found in a meta-analysis by Febrianti et al. (2023), which concluded that method learning active and creative very effective increase knowledge of anemia (Febrianti et al., 2023).

More Furthermore, Astuti and Kurniasari (2022) reported that education nutrition through posters and videos significant increase score knowledge of anemia in adolescents (Astuti & Kurniasari, 2022). This support the effectiveness of banners as an affordable and easy visual medium accessible to students. Review literature by Safitri et al. (2024) also found that visual and audiovisual media if used together own influence positive to knowledge teenager about anemia (Safitri et al., 2024).

Furthermore, flipchart research conducted by Khafifa et al. (2023) in a Samarinda Islamic boarding school showed a significant increase in knowledge ($p = 0.001$), reinforcing the finding that simple visual media can be effective in nutrition education in schools (Khafifa et al., 2023). Meanwhile, Nardyawati et al. (2023) showed that education using booklets and PowerPoint increased knowledge with a $p = 0.008$ effect, although it had no effect on attitude change (Nardyawati, Toaha & Adib, 2023).

Another Indonesian study by Zakiah et al. (2023) compared intervention and control groups and found a significant increase in knowledge only in the group receiving nutrition education ($p < 0.001$), while the control group showed no improvement (Zakiah et al., 2023). These findings strengthen the validity of nutrition education's effectiveness in the school context.

Consistently, a review by Wisnuwardani, Wulandari, & Kartika (2024) of an education program in Samarinda showed that the use of videos or leaflets significantly improved students' knowledge of anemia (Wisnuwardani et al., 2024). This confirms that combining visual and audiovisual media can be an effective model for school education. Similarly, a quasi-experimental study by Sulistiyowati et al. (2022) concluded that educational posters reduced the prevalence of anemia and improved students' knowledge in Islamic boarding schools (Sulistiyowati et al., 2022).

Even in an international context, a study by Wiafe et al. (2022) recommended a combination of nutrition education and counseling as an effective strategy to reduce anemia in adolescents (Wiafe et al., 2022). Meanwhile, research in Jordan by Abu-Baker et al. (2021) showed that multimedia education significantly improved anemia knowledge and practices in adolescent female students (AbuBaker, Eyadat & Khamaiseh, 2021). Similarly, banners, as a specific visual medium, in school settings is also apparent suitable for increase understanding female students.

In a way conceptual, banner offers a number of profit practical: always available on site strategic like corridor class (+ visual term long), delivery concise and focused messages, and aesthetics attractive graphics—all factor This facilitate retention cognitive students. This is in line with findings literature review that visual media with element graphic bring effect positive to understanding adolescents (Safitri et al., 2024).

Although proven effective, this study has limitations. First, there was no non-intervention control group, making it difficult to distinguish whether changes in knowledge were due to the banner or other external factors. Second, the posttest measurements were conducted over a short period of time, so it is unknown whether the increased knowledge is sustained in the medium or long term. Third, the study only measured knowledge, without including behavioral or biological indicators such as hemoglobin or iron consumption.

For further research, it is recommended to: (1) involve a control group that does not receive the banner, (2) use a longitudinal design with follow-up measurements, (3) add biological or behavioral outcomes such as Hb levels or iron consumption, and (4) explore the combination of the banner with interactive media such as QR codes or short videos.

From a practical application perspective, these results provide a strong foundation for school health and nutrition education programs: educational banners can be incorporated into classrooms and corridors, combined with short interactive sessions such as Q&A sessions or quizzes. Collaboration between teachers, health workers, health services, and academics is highly recommended to create concise yet effective educational modules.

In summary, this study further strengthens the evidence that visual media—including banners—are effective in improving anemia literacy among adolescent girls. With the right approach, this simple medium can be an easily implemented educational tool and have a direct impact on improving the nutritional knowledge of junior high school students.

CONCLUSION

Nutrition education using banners significantly improved knowledge about nutritional anemia among adolescent girls. This intervention demonstrates the effectiveness of visual educational media in enhancing nutritional literacy.

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