

ARTICLE INFORMATION

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The Effect of Booklet-Based Education on Adolescent Girls' Knowledge Regarding Anemia

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Abstrat

Background: Anemia remains a significant health problem among adolescent girls, particularly in developing countries, including Indonesia. Adolescent girls are at increased risk of anemia due to rapid growth, increased iron requirements, and menstrual blood loss. Inadequate knowledge regarding anemia, balanced nutrition, and iron supplementation may contribute to poor preventive behaviors. Health education using appropriate media, such as booklets, may help improve adolescents' understanding of anemia and its prevention.

Purpose: To determine the effect of booklet-based health education on adolescent girls' knowledge regarding anemia.

Method: This study employed a quantitative pre-experimental design using a one-group pretest-posttest design. The study was conducted in January 2026 at SMPN 02 Kebun Tebu, West Lampung, Indonesia. The population consisted of 112 female students, and 30 respondents were selected using simple random sampling. Data were collected using a structured knowledge questionnaire. The questionnaire was tested for validity using product-moment correlation and for reliability using Cronbach's alpha. Data were analyzed using univariate analysis and a paired-samples t-test.

Results: The mean knowledge score before booklet-based education was 58.00 ± 11.715 , with scores ranging from 35 to 75. After the intervention, the mean score increased to 80.50 ± 8.131 , with scores ranging from 60 to 95. The mean difference was 22.50 points. The paired-samples t-test showed a statistically significant difference in knowledge scores before and after the intervention ($p < 0.001$).

Conclusion: Booklet-based health education significantly improved adolescent girls' knowledge regarding anemia. Booklets may therefore be considered an appropriate health education medium for increasing adolescents' understanding of anemia and its prevention.

Keywords: Adolescent Girls; Anemia; Booklet; Health Education; Knowledge.

INTRODUCTION

Adolescent girls are among the groups at highest risk of developing anemia. Adolescent girls are defined as individuals who have passed through puberty and are entering the transitional period from childhood to adulthood. This period may result in an imbalance between the body's nutritional requirements for iron-rich nutrients to support accelerated growth and development and iron loss during menstruation (Nur et al., 2020).

According to a report by the World Health Organization (WHO), the global prevalence of anemia affects approximately two billion people. A national micronutrient survey reported that 18% of women aged 15–49 years in Ethiopia experienced anemia. The prevalence of anemia in the Somalia region reached 34.8%, while in Africa it was 26.2%, which was considerably higher than the national average (Chisti et al., 2022). In Indonesia, the prevalence of

anemia among individuals aged 15–24 years was reported to be 32% (Riskesdas, 2018).

Meanwhile, based on the 2018 Basic Health Research, the coverage of Iron Supplementation Tablets consumption among adolescent girls remained low. Among the 76.2% of adolescent girls who received TTD, only 1.4% consumed ≥ 52 tablets, while 98.6% consumed < 52 tablets. The main reason adolescent girls did not finish the TTD they received was that 39.7% felt they did not need them. This was partly attributable to inadequate knowledge about anemia and the importance of consuming Iron Supplementation Tablets (TTD) (Ministry of Health of the Republic of Indonesia, 2018).

Lampung Province is one of the provinces with a high prevalence of anemia on the island of Sumatra, with a reported prevalence of 63%. The data also indicate that 24.6% of anemia cases in Lampung Province occur among adolescent girls. Meanwhile, the incidence of anemia among adolescents in West Lampung is relatively high, with several studies reporting a prevalence of up to 53% (Nurazizah et al., 2022).

The high prevalence of anemia among adolescent girls may be caused by several factors, including chronic blood loss, inadequate iron intake, and suboptimal iron absorption. In addition, increased iron requirements during periods of growth, puberty, and breastfeeding also contribute to the high prevalence of anemia (Sab'ngatun & Riawati, 2021). Other factors, such as inadequate nutritional knowledge, socioeconomic status, physical activity, and menstruation, also contribute to the high prevalence of anemia (Budiarti et al., 2020).

Insufficient knowledge about dietary patterns and the consumption of foods low in protein, vitamins, and iron are among the factors contributing to anemia. Therefore, further information about anemia is needed. Efforts to address anemia among adolescent girls include providing education on iron consumption, balanced nutrition, and behavioral motivation, particularly regarding knowledge of anemia and its prevention (Azzahra et al., 2022).

The Indonesian government has implemented various efforts to reduce the prevalence of anemia among adolescent girls, one of which is the Iron Supplementation Tablet program in schools, in accordance with Circular Letter of the Director General of Public Health, Ministry of Health Number

HK.03.03/V/0595/2016. This program requires educational institutions to provide a designated day for adolescent girls to take Iron Supplementation Tablets together, at a dosage of one tablet per week for women of reproductive age (Ministry of Health of the Republic of Indonesia, 2018).

Efforts to improve knowledge among adolescent girls through health education about anemia can increase awareness of personal health maintenance. Knowledge can influence adolescents' lifestyles and dietary patterns. The better adolescents understand anemia, the lower their risk of developing anemia (Aulya et al., 2022).

A study cited by the Oxford Dictionary stated that educational activities can be carefully designed and, after being tested, can significantly improve learning outcomes through the use of booklets. According to the Oxford Dictionary, a booklet is "a small thin book with a paper cover that contains information about a particular subject." Therefore, booklets are highly recommended as a medium for delivering educational information (Pardosi, 2019).

RESEARCH METHOD

This study used a quantitative pre-experimental research design with a one-group pretest–posttest design. The study was conducted in January 2026 at SMPN 02 Kebun Tebu, West Lampung, Indonesia. The intervention consisted of health education regarding anemia delivered using a booklet. Knowledge was measured before and after the educational intervention. The study population consisted of all 112 female students at SMPN 02 Kebun Tebu, West Lampung. A total of 30 respondents were selected as the study sample using simple random sampling. The respondents were adolescent girls who met the study eligibility criteria and were willing to participate in the study. The sample size was determined according to the research design and available study population.

Data were collected using a structured questionnaire measuring respondents' knowledge regarding anemia. The questionnaire covered several aspects of anemia, including its definition, causes, signs and symptoms, risk factors, consequences, prevention, nutritional intake, and iron supplementation.

The validity of the questionnaire was assessed using product-moment correlation. All questionnaire

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items had calculated correlation coefficients greater than the r-table value of 0.444 and were therefore considered valid. Reliability testing using Cronbach's alpha resulted in a coefficient of 0.733, indicating acceptable internal consistency.

The respondents completed the questionnaire before receiving the educational intervention as a pretest. Health education regarding anemia was subsequently provided using a booklet containing information about the definition, causes, risk factors, consequences, prevention, balanced nutrition, iron-rich foods, and iron supplementation.

After the educational intervention, the same questionnaire was administered as a posttest to assess changes in respondents' knowledge. Univariate analysis was used to describe the distribution of knowledge scores before and after the intervention. Bivariate analysis was conducted to examine differences in knowledge scores before and after booklet-based education. Because the study compared knowledge scores in the same respondents before and after the intervention, a paired-samples t-test was used. Statistical significance was determined at a significance level of 0.05.

RESEARCH RESULTS

Table Mean Knowledge Scores of Adolescent Girls Regarding Anemia Before and After Education Using a Booklet

Knowledge	Mean	SD	Min-Max	Mean Difference	p-value
Before (Pretest)	58.00	11.715	35-75	-22.500	0.000
After (Posttest)	80.50	8.131	60-95		

The table above shows that there was an increase in the mean knowledge score of adolescent girls regarding anemia after receiving education using a booklet. The mean knowledge score before the intervention (pretest) was 58.00, with an SD of 11.715 and a score range of 35-75, while after the intervention (posttest), the mean score increased to 80.50, with an SD of 8.131 and a score range of 60-95. The mean difference of -22.500 indicates an increase of 22.500 points in the knowledge score after the intervention. The results of the paired-samples t-test showed a p-value of 0.000 (<0.05), indicating a statistically significant difference in knowledge levels before and after the booklet-based education. Therefore, booklet-based education had a significant effect on improving adolescent girls' knowledge regarding anemia.

DISCUSSION

Based on the results of the study, it was found that before receiving health education on reproductive health, the average knowledge score was 55.83, which was categorized as poor. This score was at the lower limit of the knowledge category according to Notoatmodjo's classification (0-55% = poor).

Therefore, it can be concluded that most respondents did not have adequate understanding of anemia and reproductive health before the intervention was implemented.

The study results showed that the respondents' scores had a minimum value of 35, indicating that some respondents had a very low level of knowledge, even far below the threshold for the adequate category. This was reflected in the large number of respondents who answered several items incorrectly, particularly questions number 3, 6, 8, 11, 14, 16, and 19. For questions number 11 and 14, 25 out of 30 respondents answered incorrectly, while for questions number 8 and 16, 24 respondents answered incorrectly. These findings indicate that most respondents had not yet understood the basic concepts of anemia, its causes, and prevention measures before receiving health education using the Booklet.

However, the maximum score was 75, which was categorized as adequate. This was indicated by the fact that only a small number of respondents were able to answer a greater number of questions correctly, while most respondents still answered several important questions incorrectly. The

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maximum score also indicates that no respondent reached the good knowledge category, and even the respondent with the highest score still had limited understanding, particularly regarding the definition and causes of anemia, as well as anemia prevention and the consumption of iron tablets (Tablet Tambah Darah/TTD).

The low level of knowledge among adolescent girls before receiving education may have been caused by several factors, one of which was limited knowledge. Adolescent girls generally have not received structured and continuous health information, particularly regarding anemia and its prevention. Low knowledge may have a negative impact on the health behaviors of adolescent girls.

The findings of this study are also consistent with a previous study showing that the average knowledge level of adolescent girls before receiving education using a Booklet was 56.24 (Jannati et al., 2020). Based on the results of the study, the researchers believe that adolescent girls' knowledge about anemia remained in the poor-to-adequate category, indicating that the respondents had not received sufficient and continuous health education, particularly regarding anemia prevention and the importance of consuming iron tablets.

Based on the results of the study, after receiving education using the Booklet, the average knowledge score increased to 86.50, which was categorized as good, with an SD of ± 8.131 , a minimum score of 60, and a maximum score of 95. This indicates an increase in the average knowledge score among adolescent girls after receiving education using the Booklet.

The increase in the maximum score to 95 indicates that some respondents had developed a very good understanding of the definition, causes, effects, and prevention of anemia after receiving the education. Although some respondents still obtained a minimum score of 60, overall, the respondents' knowledge level shifted from the poor-to-adequate category to the good category.

The respondents' knowledge increased following the provision of health education. This change occurred because knowledge improved from the poor and adequate categories to the good category. The increase in knowledge may have occurred because the educational medium provided to the respondents was a Booklet, which was able to present information

clearly, systematically, and in a way that was easy for adolescents to understand. The materials presented in the form of concise text accompanied by attractive images facilitated the students' ability to receive and understand information about anemia.

Through the Booklet, students could read the material independently, review it repeatedly, and relate their understanding to their own experiences, thereby making the knowledge acquired more meaningful.

The findings of this study are consistent with a previous study showing an increase in the average knowledge score of adolescent girls regarding anemia from 56.33 in the pretest to 86.67 in the posttest after education using a Booklet (Hutasoit et al., 2023). This study is also supported by previous research showing a significant change in the average knowledge score, from 53.51 before health education to 84.28 after health education (Setiawati et al., 2022).

Based on these findings, the researchers believe that health education using a Booklet is an effective method for increasing adolescent girls' knowledge about anemia. In addition, the respondents' age, which was within adolescence and characterized by active cognitive development, may have enabled them to absorb and understand the health information provided effectively, thereby contributing to the improvement in their knowledge level after the intervention.

Based on the paired samples t-test, the p-value was $0.000 < 0.05$, indicating that H_0 was rejected and H_1 was accepted. These results demonstrate a statistically significant difference in the knowledge level of adolescent girls before and after receiving health education using the Booklet. Thus, education using the Booklet had an effect on adolescent girls' knowledge about anemia.

This difference indicates that the increase in knowledge scores after the intervention was attributable to the provision of health education using the Booklet. This was demonstrated by the increase in the average knowledge score from 55.83 (poor category) before the intervention to 86.50 (good category) after the intervention. This increase reflects a change in the respondents' cognitive ability to understand information about anemia.

Health education media refer to all means used to convey information or messages from educators,

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including print media, electronic media, and outdoor media. Through these media, recipients are expected to gain increased knowledge, which may subsequently encourage changes in health behaviors toward better practices (Jatmika et al., 2019).

A previous study reported that the average knowledge score before the intervention was 60.43 (moderate category), while the average score after the intervention was 87.19 (good category), with a p-value of 0.000 (<0.05), indicating that education using animated videos had an effect on adolescents' knowledge about anemia and iron tablets (Yuliani et al., 2024).

Similarly, a previous study showed that the average increase in respondents' knowledge scores was 19.52, with a p-value of 0.000, indicating that E-Booklet media had an effect on knowledge regarding anemia prevention among adolescent girls at a madrasah aliyah in Bandung Regency (Sheladjik & Yulianti, 2023).

Based on this analysis, the researchers believe that health education using a Booklet is an effective and appropriate method for increasing adolescent girls' knowledge about anemia. The effectiveness of the Booklet is supported by its ability to present information clearly, systematically, and attractively through a combination of text and visual elements, making it easier for respondents to understand and remember the material provided. In addition, the characteristics of adolescent girls, who are in a period of active cognitive development, may further support the success of the education because respondents are able to receive, process, and absorb health information effectively. Therefore, Booklets can be recommended as one of the promotive and preventive strategies to improve knowledge and prevent anemia among adolescent girls in school settings.

CONCLUSION

Booklet-based health education significantly improved adolescent girls' knowledge regarding anemia. The mean knowledge score increased from 58.00 before the intervention to 80.50 after the intervention, with a significant difference ($p < 0.001$). Booklets can be used as an effective health education medium for improving knowledge about anemia among adolescent girls.

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