THE EFFECTIVENESS OF POCKET BOOK-BASED EDUCATIONAL MEDIA IN IMPROVING ANEMIA KNOWLEDGE AMONG ADOLESCENT GIRLS

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ABSTRAK

Latar Belakang : Anemia masih menjadi masalah kesehatan masyarakat utama di kalangan remaja putri, terutama karena peningkatan kebutuhan zat besi selama masa pertumbuhan dan kurangnya pengetahuan mengenai pencegahannya. Pendidikan kesehatan menggunakan media edukasi berbasis buku saku dapat meningkatkan pemahaman remaja tentang anemia dan mendorong perilaku pencegahan. Penelitian ini bertujuan untuk mengetahui pengaruh pendidikan berbasis buku saku terhadap pengetahuan tentang anemia di kalangan remaja putri di Desa Sumberjosari. Metode : Metode penelitian ini kuantitatif dengan pendekatan quasi eksperiment menggunakan desain pretest-posttest satu kelompok dilakukan pada 51 remaja putri yang dipilih melalui pengambilan sampel acak sederhana. Pengetahuan dinilai menggunakan kuesioner 30 item yang telah divalidasi sebelum dan sesudah intervensi pendidikan. Data dianalisis menggunakan uji peringkat bertanda Wilcoxon dengan tingkat signifikansi p < 0,05. Hasil : Sebagian besar peserta adalah remaja awal (10–13 tahun; 69%). Sebelum diberikan intervensi, responden memiliki tingkat pengetahuan yang cukup baik, dengan skor rata-rata 17,71. Setelah pendidikan berbasis buku saku, skor pengetahuan rata-rata meningkat menjadi 21,69, dengan 75% peserta mencapai tingkat pengetahuan yang baik dan tidak ada peserta yang tetap berada dalam kategori pengetahuan yang cukup. Hasil Uji Wilcoxon menunjukkan peningkatan pengetahuan yang signifikan secara statistik setelah intervensi (p = 0,001).

Kata Kunci : *Remaja Putri, Anemia, Pengetahuan*

ABSTRACT

Background: Anemia remains a major public health problem among adolescent girls, primarily due to increased iron requirements during puberty and inadequate knowledge regarding its prevention. Health education using pocket book-based educational media may improve adolescents' understanding of anemia and encourage preventive behaviors. This study aimed to determine the effect of pocket book-based education on anemia knowledge among adolescent girls in Sumberjosari Village, Indonesia. Methods: Quantitative quasi-experimental study with a one-group pretest–posttest design was conducted among 51 adolescent girls selected through simple random sampling. Knowledge was assessed using a validated 30-item questionnaire before and after the educational intervention. Data were analyzed using the Wilcoxon signed-rank test with a significance level of $p < 0.05$. Results: Most participants were early adolescents (10–13 years; 69%). Before the intervention, the majority had a fair level of knowledge, with a mean score of 17.71. After pocket book-based education, the mean knowledge score increased to 21.69, with 75% of participants achieving a good level of knowledge and no participants remaining in the poor knowledge category. The Wilcoxon signed-rank test demonstrated a statistically significant improvement in knowledge after the intervention ($p = 0.001$).

Keywords : *Adolescent Girls, Anemia, Knowledge*

INTRODUCTION

Anemia remains a major public health problem that significantly affects the quality of life of adolescent girls worldwide. According to the **World Health Organization (2024)**, anemia is a global health concern that commonly occurs among adolescent girls due to increased iron requirements during the growth period and blood loss associated with menstruation. In developing countries, the prevalence of anemia ranges from 30% to 40% and contributes to reduced learning concentration, productivity, physical fitness, and an increased risk of reproductive health problems later in life (Christin et al., 2022). Therefore, the WHO recommends preventive strategies, including dietary improvement, iron supplementation, and health education initiated during adolescence (Organization, 2025). The introduction includes the background, research objectives, and literature review, organized without subheadings. A series of stories highlighting the key issues raised in this research should be presented.

In Indonesia, anemia among adolescent girls remains a significant public health concern. Data from the **Ministry of Health of the Republic of Indonesia** indicate that the prevalence of anemia among adolescent girls is approximately 32%, meaning that nearly one in three adolescent girls is affected by anemia (KEMENKES-RI, 2023). This high prevalence is associated with increased iron requirements during puberty, inadequate nutritional intake, and poor adherence to iron and folic acid supplementation (IFAS). In **Central Java Province,** the prevalence of anemia among adolescent girls reached 30.45% in 2023 (BPS JAWA Tengah, 2024). An even higher prevalence was reported in **Grobogan Regency** (43.1%), followed by **Karangrayung District** (41.2%) and **Sumberjosari Village** (40.5%). These findings indicate that anemia among adolescent girls remains a serious public health issue requiring immediate attention.

Iron deficiency is the primary cause of anemia among adolescent girls and is commonly associated with inadequate dietary intake, skipping breakfast, frequent consumption of fast food, and limited knowledge regarding nutrition and anemia prevention (Fathony et al., 2022). Insufficient knowledge often leads to inappropriate health behaviors, including poor adherence to iron and folic acid supplementation (Razak et al., 2024). Although IFAS has become one of the national strategies for preventing anemia among adolescent girls, its implementation remains suboptimal (Hamdiah & Budiyanto, 2023). Despite a distribution coverage of 76.2%, only approximately 1.4% of adolescent girls consume the recommended minimum of 52 iron tablets annually (Helmyati & Syafira, 2023). These findings suggest that supplementation programs alone are insufficient without adequate health education to improve knowledge and promote adherence.

Health education is recognized as an effective strategy for improving knowledge and encouraging healthy behaviors among adolescents. The use of engaging and easily understandable educational media can enhance the effectiveness of health information delivery. One promising educational medium is the pocket book, which is practical, portable, supports self-directed learning, and presents information in a concise and systematic manner (Ramadhani et al., 2024). Furthermore, printed educational materials such as pocket books have been reported to be more effective than verbal information delivery because they can be read repeatedly according to individual learning needs (Mardiana & Yulianto, 2022).

Previous studies have demonstrated that pocket book-based educational media effectively improve adolescents' knowledge of reproductive health and anemia prevention (Bakkara, 2025). However, most of these studies were conducted in school settings, with limited evidence regarding the effectiveness of pocket books among adolescent girls in community-based settings (Rabiatul & Aripin, 2023). Moreover, no previous study has investigated the use of pocket books as an educational intervention for anemia prevention in **Sumberjosari Village.** Consequently, a research gap remains regarding the effectiveness of pocket book-based education in improving anemia-related knowledge among adolescent girls at the community level (Riskia et al., 2024).

A preliminary survey conducted in **Sumberjosari Village** revealed that, among ten adolescent girls interviewed, six were unaware of anemia prevention strategies and the correct use of iron and folic acid supplements, while the remaining four possessed only basic knowledge of anemia. These findings indicate that adolescent girls' knowledge of anemia prevention remains inadequate and should be improved through educational media that are accessible, easy to understand, and suitable for independent learning.

Therefore, this study aimed to analyze the effect of pocket book-based education on the level of knowledge regarding anemia among adolescent girls in **Sumberjosari Village.** The findings are expected to provide evidence supporting the use of pocket books as an effective health promotion medium to improve adolescents' knowledge and contribute to anemia prevention efforts during adolescence.

METHOD

This study employed a quantitative research design using a quasi-experimental approach. A one-group pretest–posttest design was applied to evaluate the causal effect of the intervention within a single group of participants. Participants' knowledge levels were assessed before the intervention (pretest) and reassessed after the intervention (posttest) to determine changes in knowledge following the educational program.

The study was conducted in **Sumberjosari Village, Indonesia,** from **September 2025 to April 2026.** Participants were selected using a simple random sampling technique, in which each member of the target population had an equal probability of being included in the study. Sample selection was performed through a random lottery (spinner) method. Based on the sample size calculation, a minimum sample of **51 adolescent girls** was required and included in the study.

The independent variable was **pocket book-based health education,** whereas the dependent variable was the **knowledge level regarding anemia among adolescent girls.** Knowledge was measured using a structured questionnaire administered before and after the educational intervention. Knowledge scores were categorized into three levels: **poor** (0–59%), **fair** (60–75%), and **good** (76–100%). The effectiveness of the intervention was determined by comparing pretest and posttest knowledge scores. An increase in knowledge after the intervention was considered indicative of an educational effect, whereas no increase indicated no effect.

This study received ethical approval from the **Health Research Ethics Committee (HREC) of Dr. Moewardi Regional General Hospital, Surakarta,** under Ethical Approval Number **082/I/HREC/2026.**

RESULTS AND DISCUSSION

The characteristics of the study participants based on age are presented in Table 1.

Table 1. respondent age characteristics

Karakteristik	Frekuensi N	Persentase %
Early Adolescence	35	69
Middle Adolescence	16	31
Total	51	100

Source : Primary Data, 2026

As shown in Table 1, the majority of the participants were early adolescents (10–13 years), comprising 35 respondents (69%), while 16 respondents (31%) were middle adolescents (14–17 years).

Table 2. Analysis of Anemia Knowledge Levels Before Pocket Book-Based Educational Intervention

Knowledge About Anemia	Pre Test	
	Frequency	Percentage
Poor	9	18%
Fair	31	61%
Good	11	21%
Total	51	100%

Source : Primary Data, 2026

Based on Table 2, the pretest results showed that the majority of participants had a fair level of knowledge, comprising 31 participants (61%), followed by 11 participants (21%) with good knowledge and 9 participants (18%) with poor knowledge.

Participants' knowledge of anemia was assessed using a 30-item structured questionnaire. The frequency distribution of knowledge levels is presented in Table 3.

Table 3. Anemia Knowledge Levels After Pocket Book-Based Educational Intervention

Knowledge About Anemia	Post Test	
	Frequency	Percentage
Poor	0	0%
Fair	13	25%
Good	38	75%
Total	51	100%

Source : Primary Data, 2026

Based on Table 3, the posttest results showed that the majority of participants had a good level of knowledge, comprising 38 participants (75%), while 13 participants (25%) had a fair level of knowledge.

Table 4. Comparison of Anemia Knowledge Levels Among Adolescent Girls Before and After Pocket Book-Based Educational Intervention.

Knowledge About Anemia	*Pre test*	*Post test*	*p-value*
Mean ± SD	2.838	3.409	0.001*
Minimum	10	17	
Maximum	22	30	

Based on Table 4, the mean pretest knowledge score regarding anemia before the pocket book-based educational intervention was 2.838. Based on the knowledge level classification, 9 participants (18%) were categorized as having poor knowledge of anemia.

Table 5. The Wilcoxon Signed-Rank Test

		N	Mean Rank	Sum of Ranks
Post Test - Pre Test	Negative Ranks	0[a]	.00	.00
	Positive Ranks	31[b]	16.00	496.00
	Ties	20[c]		
	Total	51		

Source : Primary Data,2026

Based on Table 5. The Wilcoxon signed-rank test showed 31 positive ranks and 20 ties, with a mean rank of 16.00, indicating an improvement in adolescent girls' knowledge of anemia after the pocket book-based educational intervention compared with the pretest.

Table 6. The Wilcoxon signed-rank test yielded a Z

	Post Test - Pre Test
Z	-4.868[b]
Asymp. Sig. (2-tailed)	.001

Source : Primary Data,2026

Based on Table 6. The Wilcoxon signed-rank test yielded a Z value of −4.868 with an Asymp. Sig. (p-value) of 0.001, which was lower than the significance level ($p < 0.05$). Therefore, the null hypothesis was rejected, and the alternative hypothesis was accepted. These findings indicate that pocket book-based educational media had a significant effect on improving anemia knowledge among adolescent girls in Sumberjosari Village.

Discussion

Participant Characteristics

Based on age characteristics, the majority of participants were early adolescents (10–13 years), accounting for 35 participants (69%), while 16 participants (31%) were middle adolescents (14–17 years). Increasing age is associated with cognitive development, including improved abilities to understand information, think logically, and analyze problems, which contributes to higher levels of knowledge.(Mulyaningsih et al., 2024). Among middle adolescents, more

advanced abstract thinking skills and greater access to various sources of information further support the learning process and the expansion of knowledge (Surtimanah, 2023).

Level of Knowledge about Anemia in Adolescent Girls Before Being Provided Education through Pocket Book Media

Knowledge regarding anemia was assessed using a structured questionnaire consisting of 30 closed-ended items. The questionnaire evaluated respondents' understanding of the basic concepts of anemia, including its definition, causes, signs and symptoms, prevention strategies, and management. Based on the obtained scores, respondents' knowledge was classified into three categories: poor, fair, and good.

The pretest results showed that most respondents had a fair level of knowledge, with 31 participants (61%) classified in this category. In addition, 11 participants (21%) demonstrated good knowledge, indicating a comprehensive understanding of anemia, including its symptoms, prevention, and treatment. Meanwhile, 9 participants (18%) were categorized as having poor knowledge, reflecting limited understanding of the basic concepts, causes, and prevention of anemia.

Overall, the pretest findings indicate that respondents' knowledge of anemia before the educational intervention was predominantly at a fair level. These results highlight the need for health education to improve adolescents' understanding of anemia and support the adoption of appropriate preventive behaviors.

Level of Knowledge about Anemia in Adolescent Girls After Being Provided Education through Pocket Book Media

Participants' knowledge of anemia was assessed using a 30-item structured questionnaire covering the definition, causes, signs and symptoms, prevention, and management of anemia. Knowledge scores were calculated based on the number of correct responses and classified into predefined knowledge categories.

The posttest results demonstrated an improvement in participants' knowledge following the educational intervention. Most participants were categorized as having good knowledge, comprising 38 participants (75%), indicating a comprehensive understanding of anemia, including its definition, causes, symptoms, prevention, and management. The remaining 13 participants (25%) were classified as having a fair level of knowledge, suggesting that although they had acquired a basic understanding of anemia, some aspects of the topic were not yet fully understood.

Overall, the posttest findings indicate a clear shift toward higher knowledge levels after the intervention. These results suggest that the pocket book-based educational intervention had a positive impact on improving adolescent girls' knowledge of anemia.

Differences in Knowledge Levels about Anemia in Adolescent Girls Before and After Education Through Pocket Book Media

The difference in anemia knowledge levels among adolescent girls before and after the pocket book-based educational intervention was analyzed using a comparison of means. Since the data were not normally distributed, the Wilcoxon signed-rank test was used for statistical analysis.

The analysis revealed a difference in participants' knowledge levels before and after the intervention. The mean pretest knowledge score was 17.71. Based on the mean and standard deviation, knowledge levels were categorized, showing that 9 participants (18%) were classified as having poor knowledge of anemia before the educational intervention.

Following the pocket book-based educational intervention, the mean knowledge score increased from 17.71 at pretest to 21.69 at posttest, representing an improvement of 3.98 points. This finding indicates that participants' understanding of anemia improved after receiving the educational intervention. A notable improvement was also observed in the distribution of knowledge levels. Before the intervention, 9 participants (18%) were classified as having poor knowledge, whereas no participants remained in this category after the intervention. These findings suggest that pocket book-based education was effective in improving adolescent girls' knowledge of anemia.

Wilcoxon signed-rank test showed a statistically significant difference in knowledge levels before and after the educational intervention ($p = 0.001$, $p < 0.05$). These findings indicate that pocket book-based education was effective in improving anemia knowledge among adolescent girls in Sumberjosari Village.

The improvement in knowledge may be attributed to the educational approach, which combined the use of a pocket book with interactive discussion and question-and-answer sessions (Kamarudin et al., 2023). During the intervention, participants actively asked questions about the causes, signs and symptoms, and prevention of anemia. This suggests that the pocket book not only facilitated the delivery of health information but also enhanced participants' understanding through active engagement (Ayu Oktavia & Atin Karjatin, 2021). These findings are consistent with the principles of health education, which aim to improve knowledge, increase awareness, and promote positive health-related attitudes and behaviors (Fatiha & Supratman, 2025). Furthermore, pocket books offer several advantages as educational media because they provide concise, easy-to-understand information that can be reviewed repeatedly, thereby enhancing health literacy and supporting anemia prevention behaviors among adolescent girls (Stefani et al., 2023).

CONCLUSION

The findings showed that the majority of participants were early adolescents (10–13 years), accounting for 69% of the sample. Before the pocket book-based educational intervention, most participants had a fair level of knowledge, with a mean score of 17.71. Following the intervention, the mean knowledge score increased to 21.69, accompanied by a higher proportion of participants with good knowledge and the absence of participants with poor knowledge. The Wilcoxon signed-rank test revealed a statistically significant difference in knowledge levels before and after the intervention ($p = 0.001$, $p < 0.05$). Therefore, pocket book-based education was found to be effective in improving anemia knowledge among adolescent girls in Sumberjosari Village.

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Adolescent girls are encouraged to apply the knowledge gained to prevent anemia through a balanced diet and adherence to iron and folic acid supplementation. Future studies should include larger samples, stronger study designs, and comparisons with other educational media to identify the most effective approach for improving anemia knowledge and prevention behaviors.

REFERENCES

Ayu Oktavia, & Atin Karjatin. (2021). Pengaruh Media Buku Saku Digital Terhadap Peningkatan Pengetahuan Pencegahan Anemia Pada Remaja Putri. *Jurnal Kesehatan Siliwangi*, *2*(1), 239–244. https://doi.org/10.34011/jks.v2i1.627

Bakkara, Q. W. (2025). *Pengaruh Media Buku Saku Terhadap Pengetahuan*. *6*, 5728–5734.

Christin, D., Sanggelorang, Y., & Amisi, M. D. (2022). Gambaran Pengetahuan tentang Anemia Gizi Besi pada Remaja Putri di SMP Negeri 1 Polewali Kabupaten Polewali Mandar. *JPAI: Jurnal Perempuan Dan Anak Indonesia*, *3*(2), 33. https://doi.org/10.35801/jpai.3.2.2022.39010

Fathony, Z., Amalia, R., & Lestari, P. puji. (2022). Anemia Prevention Education in Adolescents and the Right Way To Consume Tablets for Adding Blood. *Jurnal Pengabdian Masyarakat Kebidanan*, *4*(2), 49–53.

Fatiha, A. N., & Supratman, S. (2025). Hubungan Tentang Tingkat Pengetahuan Anemia Dengan Pola Makan Pada Siswi Sekolah Menengah Atas Di Sman 2 Sukoharjo. *Jurnal Kesehatan Tambusai*, *6*(1), 2300–2306. https://doi.org/10.31004/jkt.v6i1.42523

Hamdiah, D., & Budiyanto, A. (2023). Hubungan Body Disssatisfaction dengan Perilaku Diet. *Ghidza: Jurnal Gizi Dan Kesehatan*, *7*(2), 166–173. https://doi.org/10.22487/ghidza.v7i2.843

Helmyati, S., Syarifa, C. A., Rizana, N. A., Sitorus, N. L., & Pratiwi, D. (2023). Acceptance of Iron Supplementation Program among Adolescent Girls in Indonesia: A Literature Review. *Amerta Nutrition*, *7*(3SP), 50–61. https://doi.org/10.20473/amnt.v7i3SP.2023.50-61

Kamarudin, A. P., Susanti, Z., Harahap, V. S., Sabirin, S., Subhan, S., Yuniara, R., & Khadijah, K. (2023). Pelatihan Pembuatan Infused Water sebagai Upaya Mengatasi Dehidrasi dan Detoksifikasi Tubuh. *Kontribusi: Jurnal Penelitian Dan Pengabdian Kepada Masyarakat*, *3*(2), 193–206. https://doi.org/10.53624/kontribusi.v3i2.219

Mardiana, M., & Yulianto, Y. (2022). The effect of nutrition education on balanced-nutrition knowledge and macronutrient intake among adolescent. *International Journal of Public Health Science*, *11*(2), 545–551. https://doi.org/10.11591/ijphs.v11i2.20988

Mulyaningsih, Wahyuni, Erika Dewi Noorratri, & Sukardi Sugeng Rahmad. (2024). Karakteristik Remaja Dengan Konsep Diri Positif Di Surakarta. *Intan Husada : Jurnal Ilmiah Keperawatan*, *12*(02), 271–279. https://doi.org/10.52236/ih.v12i2.610

Organization, W. H. (2024). *Guideline on haemoglobin cutoffs to define anaemia in individuals and populations*. World Health Organization. https://www.who.int/publications/i/item/9789240088542

Organization, W. H. (2025). *Anaemia*. WHO. https://www.who.int/health-topics/anaemia#tab=tab_1

Rabiatul, A., & Aripin, A. (2023). Pengembangan Media Booklet Sebagai Media Edukasi Gizi Terhadap Pengetahuan Anemia Pada Santriwati di Pesantren Modern Babun Najah Ulee Kareng Kota Banda Aceh Development of a Media Booklet As A Nutrition Educational Media For Anemia Knowledge In Students . *NASUWAKES: Jurnal Kesehatan Ilmiah*, *16*(2), 126–136. http://ejournal.poltekkesaceh.ac.id

Ramadhani, N. F., Lihawa, F., & Koem, S. (2024). Pengembangan Media Pembelajaran Buku

Saku Berbasis Essay Photograph Di SMA Negeri 1 Tilango. *Jurnal Pendidikan Geografi Undiksha*, *12*(01), 1–12. https://doi.org/10.23887/jjpg.v12i01.62096

Razak, A., Oka, I. A., Persada, A. S., & Jayanti, I. (2024). Edukasi Bahaya Anemia: Mencegah Generasi Junk Food pada Remaja Putri Melalui "Gerakan Mencintai Sayur dan Buah" di SMPN 3 Lamasi. *Idea Pengabdian Masyarakat*, *5*(01), 86–90. https://doi.org/10.53690/ipm.v5i01.347

Riskia, A., Husnah, R., & Laska, Y. (2024). Pengaruh Buku Saku Digital Terhadap Pengetahuan Infeksi Menular Seksual Pada Remaja. *Jurnal Promotif Preventif*, *7*(4), 836–840. http://journal.unpacti.ac.id/index.php/JPP

Sehat), K. K. R. I. (Ayo. (2023). *Anemia*. Ayo Sehat, Kementerian Kesehatan RI. https://ayosehat.kemkes.go.id/penyakit/anemia

Stefani, M., Carin, V., Maisaroh, M., Triyuliana Bahtiar, L., Nur Fauziah, S., Jasmine, N., & Teknologi Pangan dan Kesehatan, F. (2023). Efek Pemberian Buku Saku Terhadap Pengetahuan Gizi Anemia Pada Siswi Kelas 10 Di Smkn 45 Jakarta the Effect of Handbook Provision on Nutritional Knowledge of Anemia Among Grade 10 Students At Smkn 45 Jakarta. *Jurnal Ilmiah Pengabdian Kepada Masyarakat*, *7*(1), 103–108. http://logista.fateta.unand.ac.id

Surtimanah, T. (2023). Determinan Gejala Anemia pada Remaja Putri. *Media Publikasi Promosi Kesehatan Indonesia (MPPKI)*, *6*(6), 1179–1186.

Tengah, B. P. S. P. J. (2024). *Profil Kesehatan Provinsi Jawa Tengah 2023*. Badan Pusat Statistik. https://jateng.bps.go.id/id/publication/2024/05/31/56aabdd7a9151eda1979dd50/profil-kesehatan-provinsi-jawa-tengah-2023.html