



The Effect of Comic Media on Adolescent Girls' Perceptions of the Importance of Iron Supplement Tablets for Preventing Anemia

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ABSTRACT

Background: Adolescent girls are a group that is vulnerable to anemia due to increased iron requirements during periods of growth and menstruation. Anemia among adolescent girls can lead to decreased learning concentration, reduced immune function, and an increased risk of anemia during pregnancy later in life. One strategy for preventing anemia is the consumption of iron supplement tablets; however, adolescent girls' perceptions of iron supplement tablet consumption tend to be negative. Attractive educational media that are appropriate to adolescents' characteristics, such as comic media, are needed to foster positive perceptions. This study aimed to determine the effect of comic media on adolescent girls' perceptions of the importance of consuming iron supplement tablets to prevent anemia.

Methods: This study employed a pre-experimental design using a one-group pretest–posttest approach. The study was conducted at SMPN 1 Mandastana from November to December 2025. The research subjects consisted of 55 adolescent girls selected using a total sampling technique. The instruments used in this study were comic media and a questionnaire. The comics were developed using the Pixton application. The questionnaire used in this study was constructed by the researchers based on relevant theories and had undergone validity and reliability testing prior to use. The data obtained were then analyzed using a paired t-test.

Result: The results showed an improvement in adolescent girls' perceptions after receiving education using comic media. Statistical analysis indicated a p-value of 0.000 ($p < 0.05$), which means that there was a statistically significant difference between perceptions before and after the intervention.

Conclusion: Health education using comic media has a significant effect on improving adolescent girls' perceptions of the importance of consuming iron supplement tablets. Comic media can be used as an effective alternative educational medium in efforts to prevent anemia among adolescent girls.

Keywords: *adolescent girls; comic media; perception; iron supplementation; anemia*

INTRODUCTION

Anemia is a major public health problem affecting various population groups, ranging from young children and adolescent girls to women of reproductive age, as well as pregnant and breastfeeding women. This condition is characterized by low hemoglobin levels or a reduced number of red blood cells, which results in a decreased capacity of the blood to transport oxygen. The groups most vulnerable to anemia include children under two years of age, menstruating adolescent girls, pregnant women, and postpartum women.^[1]

The World Health Organization (WHO) estimates that the global adolescent population reaches approximately 1.2 billion individuals, accounting for about 18% of the total world population. The prevalence of anemia among adolescents ranges from 40% to 88%. In developing countries, more than half of adolescent girls (53.7%) are reported to experience anemia.^[2]

In Indonesia, the prevalence of anemia among adolescents remains relatively high. The 2021 Basic Health Research (Riskesdas, 2021) reported an anemia prevalence of 22.7% among adolescents aged 13–18 years, with a higher prevalence among females (27.2%) compared to males (20.35%). Similar findings were reported by the 2022 Indonesian Demographic and Health Survey (IDHS), which documented anemia prevalence rates of 23% among adolescent girls and 17% among adolescent boys.^[3] Furthermore, the 2023 Indonesian Health Survey (IHS) recorded an anemia prevalence of 15.5% among individuals aged 15–24 years, with rates of 18% among adolescent girls and 14.4% among adolescent boys.^[4]

The iron supplementation program through the provision of iron supplement tablets (IST) is one of the government's specific strategies to support anemia prevention efforts among adolescent girls. This program is strengthened through

health education activities aimed at improving adolescents' understanding and perceptions of the importance of iron supplement consumption. This strategy is also aligned with the national agenda for accelerating stunting reduction, which emphasizes anemia prevention and efforts to reduce early marriage rates. The government provides iron supplement tablets to all adolescent girls aged 12–18 years or equivalent to grades 7–12, regardless of anemia status. Distribution is carried out simultaneously in schools or madrasahs and may also be conducted through adolescent health posts. Each female student receives one tablet per week throughout the year, with the primary objective of preventing anemia and increasing the body's iron reserves.^[5]

Law Number 36 of 2009 on Health and Presidential Regulation Number 72 of 2021 on the acceleration of stunting reduction designate adolescent girls as one of the priority target groups. In the National Medium-Term Development Plan (RPJMN) 2020–2024, the government set a target to reduce stunting prevalence to 14% by 2024. Achieving this target requires the implementation of various specific interventions. The Ministry of Health plays a crucial role in this effort, one of which is increasing iron supplement tablet consumption among adolescent girls, with a minimum coverage target of 58% by 2024.^[5]

The prevalence of anemia in South Kalimantan Province remains relatively high at 27.03%, with the highest rates observed in Hulu Sungai Utara Regency (29.92%), Barito Kuala Regency (28.95%), and Banjarbaru City (26.17%).^[6] These data indicate that anemia remains a significant public health problem, particularly among adolescent girls as a vulnerable population.

Data from the Barito Kuala District Health Office indicate an increase in anemia cases among adolescent girls, from 8% in 2024 (1,029 cases out of 12,379 adolescent girls) to 10% in 2025 (1,344

cases out of 13,528 adolescent girls). The highest number of cases was recorded at Tabunganen Community Health Center (391 cases), followed by Mandastana Community Health Center (276 cases) and Berangas Community Health Center (117 cases).

A preliminary study conducted at SMPN 1 Mandastana on September 9, 2025, through interviews with ten seventh-grade female students, revealed that most students still had limited understanding of the importance of consuming iron supplement tablets for anemia prevention. Seven students reported rarely or irregularly consuming iron supplement tablets due to reasons such as forgetfulness, boredom, or fear of side effects. Educational media available at the school, such as leaflets or posters, were perceived as unattractive and monotonous, resulting in limited student engagement. This condition indicates a substantial challenge in delivering information regarding the importance of iron supplement tablets. Considering that adolescents tend to be more interested in visual content that is narrative and entertaining, innovative educational media that align with their characteristics are required. One potential alternative is educational comic media, which are expected to enhance students' positive perceptions of the importance of iron supplement tablet consumption as an effort to prevent anemia.

Comic media are an attractive educational tool for students because they are easily accessible and enable students to recognize and remember characters more effectively. Numerous studies have demonstrated that the use of comic media can enhance students' comprehension and learning interest, as material presented through images and narratives is easier to understand and less monotonous.^[7] Comics have the advantage of integrating visual elements with strong storylines, allowing readers to become emotionally engaged and making educational content more appealing. Research findings also indicate

that comic-based interventions can improve students' knowledge about anemia.^[8]

According to the Cognitive Theory of Multimedia Learning, learning becomes more effective when information is presented through an integrated combination of text and images that are systematically organized. Comic media not only combine text and images but also present information in a sequential narrative format, thereby facilitating the comprehension process and enhancing memory retention. In contrast to leaflets or posters, which tend to present information in a brief and static manner, comics are systematically structured to attract attention and increase reader engagement, particularly among adolescents, making them more effective in improving perceptions and understanding.^[9]

These findings are supported by previous studies that demonstrate the effectiveness of comic media as a health education tool for adolescents. Nutrition education using comic media has been shown to significantly improve adolescents' knowledge and attitudes toward anemia.^[10] Educational comic media are also considered more effective than leaflets in enhancing adolescent girls' understanding of anemia.^[11,12] In addition, educational comics can improve adolescents' readiness and understanding of health-related changes during puberty as well as reproductive health issues.^[13,14] Perception is a crucial factor in the success of educational message delivery; therefore, comic media have considerable potential to shape adolescents' positive perceptions of the importance of consuming iron supplement tablets.^[15]

Based on this background, the researchers were interested in conducting a study entitled "The Effect of Comic Media on Adolescent Girls' Perceptions of the Importance of Iron Supplement Tablet Consumption for the Prevention of Anemia."

METHODS

This study was a quantitative study with a *pre-experimental design* using a *one-group pretest–posttest* approach. The study was conducted among seventh-grade adolescent girls at SMPN 1 Mandastana from November to December 2025. The population in this study consisted of all seventh-grade adolescent girls, with a total sample of 55 respondents selected using a *total sampling technique*.

Data collection was carried out using a questionnaire to measure adolescent girls' perceptions of the importance of consuming iron supplement tablets as an effort to prevent anemia. The questionnaire was developed based on perception indicators, including understanding of anemia, the causes and impacts of anemia, and the benefits of iron supplement tablet consumption. The research instrument underwent *validity* and *reliability* testing and was declared appropriate for use prior to data collection.

Data collection techniques in this study included observation and questionnaires. Prior to the study, the researchers explained the objectives and procedures to the prospective respondents and obtained their informed consent. Respondents first completed a pretest questionnaire for 15–20 minutes to assess their initial perceptions of iron supplement tablets. Afterward, the researchers provided an educational intervention using comic media for 15–20 minutes, accompanied by explanations and brief discussions. Subsequently, respondents completed a posttest questionnaire within the same duration to evaluate changes in perception after the intervention.

The collected data were processed through the stages of editing, coding, and data entry into a data processing program. Univariate analysis was performed to describe the frequency and percentage distribution of respondents' perceptions before and after the intervention.

Bivariate analysis was conducted using a paired t-test to analyze differences

in mean perception scores before and after the provision of education using comic media. Interpretation of the analysis results was based on the p-value with a significance level of 0.05.

The reliability test of the research instrument using Cronbach's alpha yielded a value of 0.852, indicating good internal consistency. The comic media used in this study underwent feasibility assessment by experts (expert judgment) and were deemed appropriate for use as educational media. This study received ethical approval from the Research Ethics Committee of Universitas Muhammadiyah Banjarmasin with approval number 555/UMB/KE/XI/2025, and all respondents provided written informed consent prior to participation in the study.

RESULT

Based on Table 1, a total of 55 adolescent girls participated in this study. Respondents were distributed across three classes, with the highest proportion coming from class VII A and VII C. Most respondents were aged 12 years, indicating that the study population was dominated by early adolescents. Regarding iron tablet consumption in the last month, the majority of respondents reported occasional consumption, while only a small proportion consumed iron tablets regularly on a weekly basis. This distribution indicates that adherence to iron tablet consumption among adolescent girls remains relatively low.

This study involved 55 seventh-grade adolescent girls at SMPN 1 Mandastana. All respondents participated in both the pretest and posttest measurements.

The *pretest* results on Table 2. showed that 32 respondents had negative perceptions and 23 respondents had positive perceptions regarding the importance of consuming iron supplement tablets. These findings indicate that the majority of respondents held negative perceptions toward the importance of iron

supplement tablet consumption prior to the intervention.

Table 1. Frequency Distribution of Respondents' Characteristics

Characteristics	Category	Frequency (n)	Percentage (%)
Class	VII A	21	38,2
	VII B	13	23,6
	VII C	21	38,2
Age (Years)	12	29	52,7
	13	21	38,2
	14	5	9,1
Iron Tablet Consumption	Never	13	23,6
Frequency (Last Month)	Occasionally	36	65,5
	Weekly	6	10,9
	Total	55	100%

Table 2. Distribution of Adolescent Girls' Perceptions Before the Intervention (Pretest)

Perception	Frequency (n)	Percentage (%)
Negative	32	58.2
Positive	23	41.8
Total	55	100

Table 3. Distribution of Adolescent Girls' Perceptions After the Intervention (Posttest)

Perception	Frequency (n)	Percentage (%)
Negative	0	0
Positive	55	100
Total	55	100

Table 4. Difference in Perception Scores Before and After the Intervention

Variable	n	Mean $\pm$ SD	P-value
Pretest	55	50.02 $\pm$ 3.75	
Posttest	55	68.03 $\pm$ 5.12	p < 0.001

The posttest results on Table.3 after the comic-based intervention demonstrated a clear improvement, with all respondents (55 participants) exhibiting positive perceptions and none exhibiting negative perceptions. This indicates that all respondents experienced a positive change in perception after receiving health education using comic media.

The paired sample t-test results, as presented in Table 4, showed a p-value of 0.000 ($p < 0.05$), indicating a statistically significant difference between adolescent girls' perception scores before and after receiving education using comic media. The mean perception score increased from 50.02 in the pretest to 68.03 in the posttest, with a difference of 18.02 points. These results indicate that health education using comic media had a significant effect on improving adolescent girls' perceptions of the importance of consuming iron supplement tablets for anemia prevention.

DISCUSSION

The pretest results indicated that out of a total of 55 adolescent girls, 32 respondents (58.2%) had negative perceptions and 23 respondents (41.8%) had positive perceptions regarding the importance of consuming iron supplement tablets as an effort to prevent anemia. This condition demonstrates that prior to the intervention using comic media, adolescent girls' perceptions were predominantly negative. This finding suggests that information related to iron supplement tablet consumption had not been optimally understood by the respondents.

Notoatmodjo explains that perception is an individual process of receiving, organizing, and interpreting

stimuli obtained through the senses, which is influenced by the level of knowledge, experience, and information possessed.^[16] This is consistent with the study by Hafsa Us and Aida S, which reported that a low level of knowledge among adolescent girls regarding anemia and iron supplement tablets contributes to the formation of inaccurate perceptions.^[17] Initial unpleasant experiences, such as assumptions about the side effects of iron supplement tablets, negative stigma related to tablet taste, and unengaging educational methods, can further reinforce negative perceptions. Therefore, the low perception levels observed in the pretest results not only reflect respondents' limited understanding but also indicate the need for health education approaches that are more engaging and easily accepted by adolescents.

A study by Kandi et al. stated that, in addition to knowledge factors, stimulus characteristics also strongly influence the formation of perception. Monotonous stimuli with limited visual elements can hinder understanding.^[18] This finding is supported by research conducted by Izzara et al., which reported that the delivery of less engaging health information reduces adolescents' motivation to understand and apply anemia prevention behaviors.^[19] In this study, educational media prior to the intervention were limited to posters and leaflets, which were considered insufficiently engaging to optimally attract the attention of adolescent girls. Furthermore, the school environment had not optimally involved personnel or students participating in the School Health Unit (Usaha Kesehatan Sekolah/UKS), such as UKS coordinators, student health volunteers (dokter kecil), or school health cadres. This condition is consistent with the study by Aulia et al., which stated that the suboptimal functioning of UKS and the absence of school health cadres result in less effective health education activities.^[20] Therefore, strengthening the role of UKS through the establishment of school health

cadres is important to support adolescent health education that is more engaging, structured, and sustainable.

The findings of this study are consistent with the research conducted by Putu N. et al., which showed that prior to receiving education using visual media, adolescent girls had low levels of understanding and perception regarding anemia.^[21] Palungan and Zamli also reported that negative perceptions of iron supplement tablets are influenced by concerns about side effects such as nausea and dizziness.^[22] This condition explains why, at the pretest stage, respondents tended to avoid or refuse the consumption of iron supplement tablets. Based on these findings, it can be understood that the low perceptions observed among adolescent girls at the pretest stage were not only due to cognitive limitations but were also influenced by affective factors, such as fear and imagined experiences related to the side effects of iron supplement tablets.

A study by Ariani A. et al. also demonstrated that low perceptions among adolescent girls regarding anemia contribute to low adherence to iron supplement tablet consumption.^[23] This finding indicates that perception-related issues are not merely theoretical but also occur in real conditions at the research site. These results are further supported by studies conducted by Hannanti et al. and Nafala, which stated that education using comic media is able to increase adolescents' interest, understanding, and perceptions through visual and narrative presentations.^[12,24]

The predominance of negative perceptions at the pretest stage indicates that the health information received by adolescent girls had not been delivered effectively and had not been tailored to adolescents' characteristics. Therefore, the use of comic media as an educational tool is considered relevant. The selection of comic media in this study was based on the need for educational media that align with the characteristics of adolescent girls in

order to foster positive perceptions toward iron supplement tablet consumption as an effort to prevent anemia.

The posttest results showed that all respondents, namely 55 adolescent girls (100%), had positive perceptions of iron supplement tablet consumption as an anemia prevention effort. This finding demonstrates a very clear improvement in perceptions following the educational intervention using comic media.

The improvement in perceptions is consistent with Sugiyono's view, which states that perception can be measured using a Likert scale to assess individuals' attitudes, opinions, and responses toward a particular phenomenon.^[25] This indicates that comic media can function as an effective educational tool, as it is able to deliver health information in an engaging and easily understandable manner for adolescent girls, thereby supporting anemia prevention efforts. With better understanding, adolescent girls are expected to be more consistent in consuming iron supplement tablets. This finding is in line with the study by Nisa et al., which reported that improvements in the quality of health information can have a positive influence on adolescents' perspectives and perceptions of health-related behaviors.^[26] In this study, the delivery of information through comic media helped respondents understand the messages more clearly, leading to the formation of positive perceptions.

The formation of perception is also influenced by the characteristics of the stimulus provided. Stimuli presented in a visual, engaging, and concrete manner are more easily received and understood, thereby fostering more positive perceptions compared to stimuli delivered in an abstract and monotonous way.^[18] This is supported by the study by Nurrahmi et al., which stated that visual media are able to increase adolescents' attention and interest.^[27] These findings are consistent with the research by Ulfah and Fika, which showed that the use of visual media

significantly improved adolescent girls' knowledge and understanding of iron supplement tablets because such media are engaging, easy to comprehend, and aligned with adolescents' characteristics.^[28] This condition was evident after the use of comic media, where all respondents demonstrated positive perceptions.

A study by Karyati et al. also demonstrated that comic media are effective as a health education tool because they are able to improve adolescents' knowledge and attitudes. The communicative delivery of material, engaging visuals, and the use of simple language facilitate adolescents' acceptance and understanding of health messages.^[29] These findings are reinforced by the study conducted by Hidayah et al., which reported that comic media are effective in improving adolescents' health attitudes.^[30] These results are relevant to the conditions at the research site, where adolescents have limited exposure to engaging health education media, particularly comic-based media, and where conventional methods of information delivery are less effective in attracting students' attention.

Research by Hannanti et al. also reported that comic media can influence adolescents' attitudes and perceptions toward health behaviors. Comic media are considered capable of capturing adolescents' attention and delivering health information in a more enjoyable manner, thereby making the messages easier to receive.^[12]

In this study, comic media helped adolescent girls understand anemia and the importance of consuming iron supplement tablets. The simple presentation of material combined with engaging visuals facilitated respondents' acceptance of information, leading to the formation of positive perceptions. These results indicate that comic media are appropriate for use as a health education medium for adolescent girls in efforts to prevent anemia.

The results of data analysis using the paired t-test demonstrated a statistically

significant difference in the mean perception scores of adolescent girls before and after receiving anemia education using comic media. The obtained p-value was < 0.001 ($p < 0.05$), indicating that the comic-based educational intervention had a significant effect on improving adolescent girls' perceptions of the importance of iron supplement tablet consumption as an effort to prevent anemia.^[25]

The posttest results showed that all respondents had positive perceptions. Almost all questionnaire items were dominated by "agree" and "strongly agree" responses, covering aspects of the definition of anemia, causes of anemia, the impact of anemia on health, and the benefits of consuming iron supplement tablets. These findings indicate that the information delivered through comic media was well received and successfully formed positive perceptions regarding anemia prevention.

Theoretically, perception is influenced by knowledge, experience, and the information received by individuals.^[16] Health information that is delivered clearly and in an easily understandable manner can enhance understanding and foster positive perceptions toward health-related behaviors. This is consistent with previous studies stating that health information tailored to adolescents' characteristics can improve the acceptance and comprehension of health messages.^[31] In this study, comic media played an important role in simplifying information about anemia, making it easier for adolescent girls to understand. This condition is relevant to the situation at the research site, where information about anemia had previously been delivered in a conventional and limited manner.

The formation of perception is also related to adolescents' ability to receive and process information in accordance with their developmental stage. Adolescents are in a phase of cognitive and emotional development that requires educational approaches that are engaging

and easy to understand.^[32,33] Therefore, the use of comic media in this study was considered appropriate, as it presents information in visual and narrative formats that align with the characteristics of adolescent girls.

Other studies have also reported that visual-based educational media can enhance adolescents' attention and understanding of health-related topics.^[34] These findings are consistent with the results of this study, in which most respondents were early adolescents who were not yet accustomed to routinely consuming iron supplement tablets. Previous unpleasant experiences tended to shape negative perceptions at the initial stage. Comic media helped explain information in a manner more suitable to the respondents' age and experiences, enabling health messages to be better received and resulting in positive perceptions among all respondents after the intervention.

The relatively uniform improvement in respondents' perceptions in this study is presumed to be influenced by the elements embedded in the comic media used. The comics were developed with relevant content, including the definition of anemia, its causes, impacts, prevention strategies, and the importance of regular iron supplement tablet consumption. The presentation of material in a sequential storyline format enabled respondents to understand the information gradually.

The use of simple language and engaging illustrations helped increase reading interest and facilitated comprehension among adolescent girls. Characters in the comics that reflect adolescents' daily lives also made it easier for respondents to relate the information to their own experiences. This combination of visuals and narrative allowed the information to be more easily understood and retained, thereby contributing to a more uniform improvement in respondents' perceptions.

Overall, this study demonstrates that education using comic media has a significant effect on improving adolescent girls' perceptions of the importance of iron supplement tablet consumption. Comic media are considered effective because they are able to convey information in a simple, visual, and developmentally appropriate manner, making them suitable for use as a health education medium in efforts to prevent anemia among adolescent girls. Education using comic media helps adolescent girls understand the importance of consuming iron supplement tablets in anemia prevention. The simple and engaging presentation of material makes information easier to accept, thereby enhancing understanding and fostering positive perceptions toward anemia prevention among adolescent girls.

RESEARCH LIMITATIONS

This study has several limitations, as it did not include a control group. Therefore, the possibility of other factors influencing the study outcomes cannot be fully controlled.

CONCLUSION

This study found that the mean perception score of adolescent girls prior to the educational intervention using comic media was 50.02, which increased to 68.03 after the intervention. The results of the paired sample t-test showed a statistically significant difference between perceptions before and after the intervention, with a p-value of < 0.001 . Health education delivered through comic media was proven to be effective in improving adolescent girls' perceptions of the importance of iron supplement tablet consumption as an effort to prevent anemia.

This study provides important implications for knowledge development by serving as a reference for the use of visual-based educational media, particularly comic media, as an effective non-pharmacological health education strategy to improve adolescent girls'

perceptions in supporting anemia prevention efforts in school settings.

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