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The Effectiveness of Education Using Monopoly Media on Increasing the Knowledge and Attitudes of Teenage Girls About Anemia Prevention

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Abstract
Anemia remains a significant public health issue among adolescent girls in Indonesia, impacting physical development, cognitive function, and productivity. This study aimed to analyze the effectiveness of nutrition education using monopoly game media in increasing knowledge and attitudes regarding anemia prevention among adolescent girls. A quasi-experimental pretest-posttest control group design was employed, involving 92 female students from SMAN 3 Cikarang Utara, selected through purposive sampling. The intervention group received nutrition education via monopoly games, while the control group received conventional lectures. Data were collected using validated questionnaires and analyzed with univariate and bivariate methods, including the Wilcoxon test, using SPSS. The results showed significant improvements in both knowledge and attitudes in both groups, with the monopoly game group demonstrating a higher increase. The findings indicate that interactive educational media, such as monopoly games, are effective in enhancing knowledge and attitudes toward anemia prevention. It is recommended that schools integrate such interactive methods into health education programs.

Keywords: Adolescent Girls, Anemia Prevention, Educational Media, Health Education, Knowledge

INTRODUCTION

Research Phenomenon

Anemia in adolescent girls remains a significant public health problem in Indonesia, with a high prevalence and serious impacts on the physical, cognitive, and productivity development of the younger generation (Amalia & Diani, 2024; Baihaqi et al., 2023). The 2018 Basic Health Research (Riskesdas) data showed the prevalence of anemia among adolescents aged 15–24 years was 32%, while local research at SMAN 3 North Cikarang reported a figure of 49.3% (Rahmatunnisa, 2023; Anisa Yulianti et al., 2024). This situation demands effective interventions to improve the health status of adolescent girls, particularly through nutrition education that can shape positive knowledge and attitudes toward anemia prevention (Rotua, 2018; Safitri & Fitranti, 2016).

Research Problems

The causes of anemia in adolescent girls are complex, including menstrual patterns, infectious diseases, lack of rest, inadequate nutritional intake, and family socioeconomic conditions (Anisa Yulianti et al., 2024; Mauridha & Hardiningsih, 2023). Insufficient knowledge and suboptimal attitudes toward anemia prevention pose challenges, as conventional nutrition education, such as lectures, is often less engaging and fails to fully enhance learning motivation (Asmi et al., 2023; Baihaqi et al., 2023). Various studies have shown that game-based educational media, such as Monopoly, can significantly improve the knowledge and attitudes of adolescent girls (Safitri, 2023; Ramdany, 2021). Monopoly utilizes the senses of sight and hearing, and fosters communication and creativity, making the learning process more interactive and enjoyable (Lolan & Sinaga, 2024; Dwiyana et al., 2024).

While lectures remain effective, games like Monopoly provide added value through emotional and interactive engagement in learning, which has been shown to improve knowledge and attitudes about anemia prevention in adolescent girls (Baihaqi et al., 2023; Safitri, 2023). However, further research is needed to systematically compare the effectiveness of these two methods and identify factors influencing the outcomes of nutrition education interventions.

Purpose, Urgency, and Novelty of the Research

This study aims to analyze the effect of nutrition education using the Monopoly game on improving knowledge and attitudes towards anemia prevention in adolescent girls at SMAN 3 North Cikarang. The urgency of this research lies in the high prevalence of anemia and the need for innovative and effective educational strategies to shape healthy behaviors in adolescent girls (Amalia & Diani, 2024; Baihaqi et al., 2023). The novelty of this study is the use of the Monopoly game as a nutritional education tool that not only assesses knowledge gains but also analyzes changes in adolescent attitudes towards anemia prevention after the intervention, thus providing a new contribution to the development of adolescent health education methods (Safitri, 2023; Ramdany, 2021).

RESEARCH METHODS

Types and Methods of Research

This study used a quasi-experimental design with a pretest-posttest control group approach to analyze the effectiveness of nutrition education using the Monopoly game on improving knowledge and attitudes about anemia prevention in adolescent girls. Two groups were formed: an intervention group that received nutrition education through the Monopoly game and a control group that received nutrition education using a conventional lecture method. This design was chosen because it allowed researchers to systematically compare changes in knowledge and attitudes before and after the intervention in both groups (Sugiyono, 2022; Cresswell & Cresswell, 2022). Similar research has been widely used in adolescent health intervention studies in Indonesia (Amalia & Diani, 2024; Baihaqi et al., 2023).

Data Analysis Instruments and Techniques

The research instruments consisted of a respondent identity questionnaire, a knowledge questionnaire, and a previously validated attitude questionnaire. Data were collected through pretests and posttests in both groups. Data analysis was performed univariately to describe the frequency distribution of respondent characteristics, and bivariately to test the effect of the intervention using the Wilcoxon test. Data processing was assisted by SPSS software. This analysis technique aligns with recommendations for quantitative research in public health (Sudaryono, 2023; Emzir, 2021). Instrument validity and reliability were also considered to ensure the accuracy of the results (Baihaqi et al., 2023; Lolan & Sinaga, 2024).

Population and Sample

The study population consisted of 516 female students at SMAN 3 North Cikarang. The sample was determined using the Slovin formula with a 10% margin of error, resulting in 92 female students who met the inclusion criteria: students in grades XI and XII, in good health, willing to be respondents, and participating in the entire intervention series. Exclusion criteria included students who withdrew, changed schools, were sick, were on a diet, or did not participate in the full intervention. A purposive sampling technique was used to ensure the selected sample was relevant to the research objectives (Sugiyono, 2022; Sigit et al., 2024). Appropriate sample selection is crucial to increase the external validity of the research results (Amalia & Diani, 2024; Rahmatunnisa, 2023).

Research Procedures

The research procedure began with obtaining permission from the school, followed by screening respondents' general data and completing informed consent. Respondents were divided into two groups: intervention and control. Both groups were given a pretest to measure initial knowledge and attitudes. The intervention group received nutrition education through a Monopoly game for three sessions (60 minutes each), while the control group received nutrition education through a lecture. After the intervention, both groups were given a posttest to measure changes in knowledge and attitudes. All stages of the study followed the principles of quantitative research and health research ethics (Cresswell & Cresswell, 2022; Maulina et al., 2025). This procedure also referred to best practices in adolescent nutrition education intervention research (Baihaqi et al., 2023; Lolan & Sinaga, 2024).

RESULTS AND DISCUSSION

Data analysis

Univariate and bivariate analyses were conducted to describe and test the influence of educational media on knowledge and attitudes regarding anemia prevention. The independent variable was monopoly media, while the dependent variables included students' knowledge, attitudes, and practices.

Univariate Analysis Results

Respondent characteristics are shown in the following table:

Table 1. Frequency Distribution of Respondent Characteristics

Characteristics	Frequency (n)	Percentage (%)
Class		
10	81	88
11	11	12
Age		
15	15	16
16	63	68
17	12	13
18	2	3
Parents' Income		
Low	11	12
Currently	43	47
Tall	38	41
Information Exposure		
Not enough	9	10
Good	83	90
Knowledge (Pretest)		
Not enough	28	30
Enough	50	55
Good	14	15
Knowledge (Posttest)		
Not enough	0	0
Enough	15	17
Good	77	83
Attitude (Pretest)		
Not enough	7	8
Enough	36	39
Good	49	53
Attitude (Posttest)		
Not enough	0	0
Enough	14	16
Good	78	84
Practice (Pretest)		
Not enough	14	15
Enough	34	37
Good	44	48
Amount	92	100

The majority of respondents were from grade 10 (88%), 16 years old (68%), and had moderate parental incomes (47%). Most had good exposure to information (90%). Pretest results showed adequate knowledge (55%) and good attitudes (53%), while posttest results increased in the good knowledge (83%) and good attitudes (84%).

Table 2. Frequency Distribution of Knowledge of Young Women

Knowledge Category	Pre Intervention (%)	Post Intervention (%)	Pre Control (%)	Post Control (%)
Not enough	19 (41%)	0 (0%)	9 (20%)	0 (0%)
Enough	24 (52%)	12 (26%)	26 (57%)	3 (7%)
Good	3 (7%)	34 (74%)	11 (24%)	43 (93%)
Amount	46 (100%)	46 (100%)	46 (100%)	46 (100%)

The intervention group showed a significant improvement from the fair (52%) to good (74%) category. In the control group, the majority also improved from fair (57%) to good (93%).

Table 3. Pretest–Posttest Knowledge Overview

Group	n	Min–Max	Mean±SD
Pre-Intervention	46	23–85	58.13±15.857
Post-Intervention	46	62–100	86.65±11.864
Pre-Control	46	38–92	72.08±14.33
After Control	46	77–100	95.67±7.29

It was seen that the average increase in knowledge in the intervention group was 28.52 points, while in the control group the increase was higher, namely 23.59 points.

Table 4. Frequency Distribution of Attitudes of Young Women

Attitude Category	Pre Intervention (%)	Post Intervention (%)	Pre Control (%)	Post Control (%)
Not enough	3 (7%)	0 (0%)	4 (9%)	0 (0%)
Enough	19 (41%)	6 (13%)	17 (37%)	8 (17%)
Good	24 (52%)	40 (87%)	25 (54%)	38 (83%)
Amount	46 (100%)	46 (100%)	46 (100%)	46 (100%)

The intervention group increased from 52% to 87% in the positive attitude category. The control group also increased from 54% to 83%.

Table 5. Pretest–Posttest Attitude Description

Group	n	Min–Max	Mean±SD
Pre-Intervention	46	50–100	81.95±15.72
Post-Intervention	46	80–100	95.65±7.196
Pre-Control	46	50–100	81.95±15.72
After Control	46	80–100	95.65±7.196

Both the intervention and control groups showed an average increase in attitudes of 13.7 points.

Table 6. Frequency Distribution of Young Women's Practices

Practice Category	Intervention (%)	Control (%)
Not enough	7 (15%)	7 (15%)
Enough	19 (41%)	15 (33%)
Good	20 (43%)	24 (52%)
Amount	46 (100%)	46 (100%)

Table 7. Pretest Practice Overview

Group	n	Min–Max	Mean±SD
Intervention	46	54–97	76.47±14.254
Control	46	52–97	78.02±14.73

The results showed that the average practice scores in both groups were still relatively the same before the intervention.

Bivariate Analysis Results

Table 8. Influence of Students' Knowledge Regarding Anemia Prevention

Group	Mean±SD (min–max)	After	Difference	p-value
Intervention	58.13±15.857 (23–85)	86.65±11.864 (62–100)	+28.52	0,000
Control	72.08±14.33 (38–92)	95.67±7.29 (77–100)	+23.59	0,000

The results showed a significant difference in knowledge before and after nutrition education in both the intervention and control groups (p=0.000).

Table 9. Influence of Female Students' Attitudes Regarding Anemia Prevention

Group	Mean±SD (min–max)	After	Difference	p-value
Intervention	81.95±15.72(50–100)	95.65±7.196 (80 100)	+13.7	0,000
Control	81.95±15.72 (50–100)	95.65±7.196 (80–100)	+13.7	0,000

The analysis shows a significant influence of nutrition education through both monopoly games and lecture methods on improving the attitudes of adolescent girls in preventing anemia (p=0.000).

Discussion

Characteristics of Adolescents at SMAN 3 North Cikarang

The characteristics of the respondents in this study involved 92 adolescent girls divided into two groups: intervention and control. The majority of respondents were 16 years old (68%). Age is a significant factor influencing an individual's ability to receive and process information. With age, understanding and thought patterns mature, enabling individuals to better compare information, think logically, and draw sound conclusions. This aligns with the findings of Darsini et al. (2019) and Yulianti (2022), who stated that increasing age is closely related to increased maturity of thinking.

Economically, the majority of respondents came from families with middle incomes (47%). Compared to the 2025 Bekasi minimum wage of IDR 5,558,514 per month, this middle category indicates that most families are able to meet basic needs, but may still have limited access to nutritious food or health supplements. Research by Mauridha & Hardiningsih (2023) confirms that families with higher incomes tend to have better nutritional status among adolescents because they are able to provide adequate nutritional intake.

Furthermore, 90% of respondents had good exposure to information, whether from digital media, school, or their social environment. This aligns with research by Viona et al. (2025), which found a significant relationship between information exposure and adolescents' knowledge levels. In other words, the more frequently adolescents are exposed to health information, the greater their likelihood of developing positive knowledge and attitudes toward anemia prevention.

Pretest results also showed that the majority of respondents were in the adequate knowledge (54%), good attitude (53%), and good practice (48%) categories. These findings indicate that adolescents already have a foundation of basic understanding, even without intervention. Lestari (2022) also found that adequate knowledge plays a crucial role in shaping attitudes and actions regarding anemia prevention.

Anemia Prevention Knowledge Overview

The results showed an increase in knowledge scores in both groups after nutrition education. In the intervention group, the average score increased by 28.52 points, while the control group increased by 23.59 points. This increase is consistent with research by Rahmy et al. (2022) at SMKN 3 Padang and Triatmaja (2019), which both showed that nutrition education interventions can significantly improve the knowledge of adolescent girls.

The advantages of using Monopoly games are evident in the respondents' active involvement. This media utilizes multiple senses—sight, hearing, and touch—making the learning process more enjoyable and meaningful. This aligns with Marini et al.'s (2015) finding that educational games can encourage active participation and optimize understanding through group interaction.

Conversely, a one-way lecture method can potentially lead to student boredom, resulting in the information not being fully absorbed (Asmi et al., 2023). Therefore, while lectures remain effective, games like Monopoly offer added value in the form of emotional and interactive engagement in learning.

Overview of Anemia Prevention Attitudes

The results showed a significant increase in anemia prevention attitudes in both groups. The intervention group saw a positive attitude increase from 52% to 87%, while the control group saw an increase from 54% to 83%.

This improvement in attitudes aligns with research by Baihaqi et al. (2023), which shows that nutrition education can improve attitudes to the stage of internalization or characterization. At this stage, individuals not only understand the concept but also incorporate it into their personal value system, guiding their daily behavior.

The attitude instruments used in this study covered cognitive, affective, and conative aspects, ranging from awareness of anemia symptoms, willingness to seek medical attention, to nutritious food consumption habits. The positive responses shown by respondents after the intervention indicate that

nutrition education successfully fostered deeper awareness, enabling them to consider and choose appropriate behaviors.

Differences in Knowledge and Attitudes Before and After Education

Both the monopoly and lecture methods proved equally effective in improving adolescent girls' knowledge and attitudes regarding anemia prevention. Statistical tests showed a significant difference before and after the intervention (p=0.000), but no significant difference was found between the two methods. This finding aligns with research by Safitri & Fitranti (2016), which reported that different educational media can still produce comparable results.

However, in percentage terms, the intervention group with monopoly showed a higher improvement in attitudes (87%) than the lecture group (83%). This can be explained by the monopoly game mechanism, which involves "chance" and "general fund" cards containing questions related to anemia. This mechanism encourages respondents to think critically, discuss answers, and listen to information from fellow participants. This interactive learning process strengthens understanding while fostering more consistent positive attitudes.

Similar results were also found in research by Putra et al. (2019) at Semarang Middle School and Amanah et al. (2019) at Cinunuk Elementary School, which showed an improvement in attitudes after nutrition education, although without significant differences between methods.

CONCLUSION

This study demonstrates that nutrition education using monopoly game media and conventional lectures both significantly improve the knowledge and attitudes of adolescent girls regarding anemia prevention. The intervention group, which participated in the monopoly game, showed a substantial increase in the proportion of students with good knowledge and positive attitudes, while the control group receiving lectures also experienced notable improvements. These findings align with previous educational research indicating that interactive and engaging strategies can effectively enhance health-related knowledge and foster positive behavioral changes among adolescents. However, the study did not find a statistically significant difference in effectiveness between the two methods, suggesting that both approaches are viable for health education in school settings.

Despite these promising results, the research has several limitations. The study was conducted in a single school with a relatively small sample size, which may limit the generalizability of the findings to broader populations. Additionally, the absence of a long-term follow-up means the sustainability of the observed improvements in knowledge and attitudes remains uncertain. Future research should involve larger, more diverse samples and consider longitudinal designs to assess the lasting impact of educational interventions. Practically, schools are encouraged to incorporate interactive educational media, such as monopoly games, alongside traditional lectures to maximize student engagement and learning outcomes in health promotion programs. Policymakers and educators should also consider integrating nutrition education into the broader school curriculum to address the persistent issue of anemia among adolescent girls in Indonesia.

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