



THE EFFECT OF EDUCATIONAL VIDEOS ON KNOWLEDGE AND ATTITUDES OF HEALTHY EATING PATTERNS TO PREVENT ANEMIA IN ADOLESCENT FEMALES

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ABSTRACT

Anemia is a common health problem among adolescent girls and has a significant impact on learning concentration and productivity. One of the main contributing factors is an unhealthy dietary pattern. Educational videos are considered an effective medium to improve adolescents' knowledge and attitudes regarding anemia prevention. To determine the effect of educational videos on knowledge and attitudes related to healthy eating patterns for anemia prevention among adolescent girls at SMP N 1 Cepogo. This study employed a quasi-experimental design with a pretest–posttest control group. A total of 100 female students were selected using proportionate stratified random sampling and divided into intervention and control groups. Data were collected using structured knowledge and attitude questionnaires. Instrument validity was tested using Pearson correlation, showing all items had correlation coefficients greater than the r-table value ($r > 0.209$; $p < 0.05$). Reliability testing demonstrated excellent internal consistency, with Cronbach's alpha values of 0.961 for the knowledge questionnaire and 0.945 for the attitude questionnaire. Data analysis was conducted using the Wilcoxon Signed-Rank test. The control group showed no significant changes in knowledge ($p = 0.472$) or attitude ($p = 0.239$). In contrast, the intervention group showed significant improvements in both knowledge ($p = 0.05$) and attitude ($p = 0.00$). The mean knowledge score increased from 5.33 to 10.44, while the mean attitude score increased from 35.56 to 50.93. Educational videos are effective in significantly improving knowledge and attitudes toward healthy dietary patterns for anemia prevention among adolescent girls.

Keywords: adolescent girls; anemia; attitude; educational video; knowledge

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INTRODUCTION

Anemia remains a significant public health problem among adolescent girls, particularly in developing countries where nutritional deficiencies and inadequate dietary patterns are still prevalent (WHO, 2017). Anemia is defined as a condition in which hemoglobin levels fall below the normal physiological range, resulting in decreased oxygen transport to body tissues (Proverawati, 2011). Inadequate oxygen delivery can lead to various adverse effects, including fatigue, cognitive impairment, reduced concentration, decreased physical endurance, and poor academic performance (Siauta et al, 2020). These conditions may interfere with adolescents' daily activities, reduce productivity, and negatively affect long-term health outcomes (Nasruddin et al, 2021).

Adolescence is a critical developmental period characterized by rapid physical growth and increased nutritional demands; therefore, hemoglobin deficiency during this stage may have more serious consequences than in adulthood (Kemenkes RI, 2016). Adolescent girls are particularly vulnerable to anemia due to the interaction of biological and behavioral factors (Indrawatiningsih et al, 2021). The onset of menarche and regular menstrual cycles increase iron loss, leading to higher iron requirements in adolescent girls (Us & Safitri, 2023). At the same time, accelerated growth during puberty elevates the need for essential micronutrients such as iron, folate, and vitamin B12, which are crucial for erythrocyte formation (Proverawati, 2011). When these increased nutritional

requirements are not adequately met through daily food intake, adolescents are at high risk of developing iron deficiency anemia (Kemenkes RI, 2018).

In addition to biological factors, dietary behaviors play a significant role in increasing anemia risk among adolescent girls. Irregular eating patterns, restrictive dieting for weight control, low consumption of animal-source foods, and inadequate intake of vegetables and fruits contribute to insufficient iron intake (Janah et al., 2023). Limited consumption of fruits rich in vitamin C further reduces iron absorption, thereby worsening anemia risk (Fadia et al., 2023).

In the Indonesian context, adolescents' dietary habits often exacerbate the risk of anemia. Many adolescents frequently consume high-calorie, nutrient-poor foods such as fried snacks, instant noodles, spicy street foods, and fast food (Riskesdas, 2018). In addition, the high intake of sweetened beverages has been shown to reduce overall dietary quality among adolescents (Kemenkes RI, 2018). These foods are inexpensive, widely accessible, and socially appealing, making them popular choices among young people (Nasruddin et al., 2021). Conversely, the consumption of iron-rich foods—including leafy green vegetables, eggs, fish, chicken liver, tofu, tempeh, and legumes—remains insufficient among Indonesian adolescents (Sari et al., 2022). This imbalance between nutrient-dense foods and low-quality diets has been identified as a major contributor to the high prevalence of anemia among adolescent girls in Indonesia (Riskesdas, 2018).

The magnitude of the anemia burden has been well-documented by national surveys. According to the Indonesian Basic Health Research (Riskesdas, 2018), the prevalence of anemia among adolescents reached 48.9%, indicating that nearly half of the adolescent population may be affected. At the regional level, the prevalence in Boyolali Regency is reported at 20.2%, while the Cepogo District records a prevalence of 18.3%. These figures clearly demonstrate that anemia remains a pressing public health concern requiring immediate and targeted intervention strategies. Several contributing factors have been identified, including limited knowledge of balanced nutrition, low awareness about iron-rich food sources, inadequate intake of fruits and vegetables, and insufficient understanding of anemia prevention strategies. These findings highlight the importance of educational approaches to improve adolescent nutritional literacy. In recent years, educational media—particularly video-based learning—has gained widespread recognition for its effectiveness in promoting positive health behaviors. Compared to traditional teaching methods, video-based education delivers information through dynamic visual and auditory modalities, enabling students to understand and retain complex concepts more easily. Videos can illustrate physiological processes, demonstrate healthy dietary practices, and present animated storylines that appeal to younger audiences. This form of media enhances motivation, increases attention, and improves message retention, making it a suitable instructional tool for adolescents who are accustomed to digital content. Additionally, videos ensure consistent delivery of educational messages, reducing the variability often seen in conventional teaching.

Previous studies demonstrate the effectiveness of audiovisual media in improving adolescents' health knowledge and behavior. Anifah (2020) showed that video-based health education significantly increased knowledge about anemia among adolescent girls. Similarly, Saban (2017) reported that educational videos were more effective than printed materials for enhancing comprehension and engagement. These findings suggest that animated and visually enriched materials can help adolescents grasp nutritional concepts more effectively than conventional lecture-based or text-based instruction. Despite the growing evidence supporting video-based health education, research specifically exploring the effects of animated videos on adolescents' knowledge and attitudes regarding healthy eating behaviors for anemia prevention remains limited. This scarcity of research is especially notable in the context of junior high school students in Indonesia

Given the high prevalence of anemia and the limitations in adolescents' nutritional knowledge, the need for effective, accessible, and engaging educational strategies is urgent. Although video-based learning has been increasingly applied in various health contexts, its specific influence on healthy dietary behavior related to anemia prevention has not been extensively studied. This research gap provides a strong rationale for conducting this study. Therefore, the present research aims to determine the effect of educational videos on knowledge and attitudes regarding healthy dietary patterns for anemia prevention among adolescent girls at SMP N 1 Cepogo. By evaluating the effectiveness of video-based education, this study seeks to contribute to the development of more engaging and impactful health promotion strategies for adolescents.

METHOD

This study employed a quasi-experimental design with a pretest–posttest control group to examine changes before and after the intervention while allowing comparison between an intervention group and a control group that received no treatment. This design was selected because it is appropriate for school-based research settings where full randomization is constrained by fixed class structures, administrative regulations, and ethical considerations.

The study population consisted of adolescent girls enrolled at SMP N 1 Cepogo. A total of 100 female students were selected using proportionate stratified random sampling to ensure proportional representation across grade levels and to enhance the precision of the sample. Participants were then divided into intervention and control groups.

Data were collected using structured questionnaires measuring knowledge and attitudes toward anemia and healthy eating patterns. The knowledge questionnaire consisted of 11 items, while the attitude questionnaire comprised 15 items. Prior to data collection, the instruments were tested for validity and reliability to ensure their accuracy and consistency.

Validity testing was conducted using the Pearson product–moment correlation test. Each item was considered valid if the correlation coefficient (r -count) exceeded the r -table value of 0.209 and the significance value was less than 0.05. The results showed that all items in both the knowledge and attitude questionnaires met these criteria, indicating that all questions were valid and appropriate for measuring the intended constructs.

Reliability testing was performed using Cronbach's alpha to assess the internal consistency of the instruments. The knowledge questionnaire demonstrated excellent reliability, with a Cronbach's alpha value of 0.961 across 11 items. Similarly, the attitude questionnaire showed high reliability, with a Cronbach's alpha value of 0.945 across 15 items. Both values exceeded the acceptable threshold of 0.60, confirming that the instruments were highly reliable and suitable for repeated measurements.

Data analysis was conducted using the Wilcoxon signed-rank test because the data distribution did not meet the assumptions of normality required for parametric testing. This non-parametric test was used to evaluate statistically significant differences between pretest and posttest scores in knowledge and attitude within both the intervention and control groups.

RESULT

A total of 100 respondents participated in this study, all of whom were adolescent girls from SMP N 1 Cepogo. Based on age distribution, most respondents were 13 years old (49%), followed by those aged 12 years (27%), 14 years (23%), and 16 years (1%). Regarding grade level, 39% of the participants were enrolled in the seventh grade, while 61% were in the eighth grade. All respondents were female, in accordance with the inclusion criteria of this study.

Table 1.
Respondent characteristics (n= 100)

Characteristics	f	%
Age	27	27.0
12	49	49.0
13	23	23.0
14	1	1.0
16	Min: 12	Max: 16
Mean: 12.99	Modus:13	
Female	100	100.0

The analysis of pretest and posttest scores showed a substantial improvement in both knowledge and attitude among students who received the educational video intervention, with the mean knowledge score increasing from 5.33 to 10.44 and the mean attitude score rising from 35.56 to 50.93. These findings indicate that the video effectively enhanced students' understanding of anemia, its risk factors, and preventive behaviors, while also fostering more positive attitudes toward adopting healthy eating habits. In contrast, the control group showed no meaningful changes in either domain, suggesting that improvements did not occur naturally without intervention. The Wilcoxon Signed-Rank test further confirmed these results, demonstrating significant differences in the intervention group (knowledge: $p = 0.05$; attitude: $p = 0.00$) but no significant changes in the control group (knowledge: $p = 0.472$; attitude: $p = 0.239$). Overall, the consistency between descriptive and statistical findings supports the effectiveness of educational videos in improving adolescents' nutritional knowledge and attitudes toward anemia prevention.

Table 2.
Wilcoxon Test Results (Pre-Post)

Group	Variable	p-value
Control	Knowledge	0.472
Control	Attitude	0.239
Intervention	Knowledge	0.05
Intervention	Attitude	0.00

The analysis using the Wilcoxon Signed-Rank test demonstrated a clear distinction between the control group and the intervention group regarding changes in knowledge and attitude scores before and after the intervention. In the control group, knowledge scores did not show any statistically significant improvement, as indicated by a p-value of 0.472. This finding suggests that, without educational intervention, participants did not experience meaningful changes in their understanding of anemia or healthy dietary practices. Similarly, the attitude scores in the control group also showed no significant change, with a p-value of 0.239, indicating that participants' attitudes toward healthy eating behavior remained relatively stable between the pretest and posttest assessments. The absence of significant changes in the control group strengthens the internal validity of the study, affirming that any improvements observed in the intervention group were not influenced by external factors or repeated testing effects.

In contrast, the Wilcoxon test results for the intervention group revealed significant improvements in both measured variables. The knowledge scores yielded a p-value of 0.05, demonstrating a statistically significant increase at the conventional $\alpha = 0.05$ threshold. This indicates that the educational video successfully enhanced participants' understanding of anemia, its causes, and appropriate preventive strategies. The upward shift in knowledge was also supported by the observed difference between the mean pretest and posttest scores, reflecting a meaningful acquisition of information following exposure to the video-based educational content. Furthermore, attitude scores in the intervention group showed a highly significant improvement, with a p-value of 0.00. This result suggests that the intervention not only enhanced knowledge but also effectively fostered more positive attitudes toward adopting healthy dietary behaviors for anemia prevention. The strong significance of the attitude change indicates that participants were not only able to understand the material but also became more motivated and inclined to practice the recommended behaviors.

Overall, these findings demonstrate that the educational video intervention was highly effective in improving both knowledge and attitudes related to anemia prevention among adolescent girls, whereas no meaningful changes occurred in the control group. This highlights the potential of video-based educational media as an impactful and practical strategy for promoting nutritional literacy and encouraging healthy behaviors in school-based health promotion programs.

DISCUSSION

Anemia remains a major public health problem among adolescent girls, particularly due to increased physiological demands during puberty and regular menstrual blood loss that elevate iron requirements (Kemenkes RI, 2016). When these biological factors are accompanied by inadequate dietary intake, poor nutritional knowledge, and irregular eating behaviors, the risk of iron deficiency anemia increases significantly (Indrawatiningsih et al, 2021). Anemia has been shown to negatively affect physical endurance, cognitive function, academic performance, emotional stability, and future reproductive health, making it a critical issue during adolescence (Proverawati, 2011). Therefore, effective educational interventions during adolescence are essential to prevent anemia and its long-term consequences (Nasruddin et al, 2021).

The findings of this study demonstrate that animated educational videos are effective in improving both knowledge and attitudes related to healthy eating patterns for anemia prevention among adolescent girls (Anifah, 2020). Participants in the intervention group experienced a substantial increase in mean knowledge scores from 5.33 before the intervention to 10.44 after the intervention, indicating a meaningful improvement in their understanding of anemia and its prevention (Saban, 2017). Similarly, the mean attitude score increased from 35.56 to 50.93, reflecting a more positive perception and readiness to adopt healthier dietary behaviors (Sari et al., 2022). In contrast, the control group showed no significant changes in either knowledge or attitude, suggesting that routine exposure to information without structured educational media is insufficient to improve health literacy (Sugiyono, 2018).

Statistical analysis using the Wilcoxon Signed-Rank test confirmed that the improvements observed in the intervention group were statistically significant, while no significant changes were identified in the control group (Notoatmodjo, 2018). The Wilcoxon test was selected because the data did not meet the assumptions of normality required for parametric testing (Arikunto, 2013). This non-parametric method evaluates paired observations by assessing the direction and magnitude of score differences between pretest and posttest measurements (Sugiyono, 2018). The predominance of positive ranks in the intervention group indicates that most participants experienced consistent score improvements, demonstrating that the effect of the intervention was systematic rather than random (Notoatmodjo, 2018).

The effectiveness of the animated educational video observed in this study is consistent with established learning theories that emphasize the superiority of audiovisual media in enhancing attention, comprehension, and memory retention (Azwar, 2013). Animated videos integrate visual imagery, narration, movement, and color, which help simplify complex health information and make it more engaging for adolescents (Jatmika et al., 2018). Adolescents, as digital natives, are more receptive to visually stimulating and interactive learning formats compared to conventional lecture-based methods (Anifah, 2020). The video used in this study presented anemia-related information in a structured and relatable manner, including symptoms, causes, consequences, and examples of iron-rich foods, which likely enhanced students' understanding and recall (Saban, 2017).

The observed improvement in attitudes supports affective learning theory, which explains that attitude formation is influenced by emotional involvement and perceived relevance of information (Azwar, 2013). By illustrating realistic scenarios such as fatigue during school activities, decreased

concentration, and reduced academic performance, the video likely elicited emotional responses that increased students' awareness and concern regarding anemia (Sari et al, 2022). This emotional engagement may have strengthened students' motivation to adopt healthier eating patterns (Nasruddin et al, 2021). Conversely, the lack of attitude change in the control group suggests that passive learning without engaging media does not sufficiently influence adolescents' perceptions or behavioral intentions (Kemenkes RI, 2018).

These findings have important implications for adolescent health promotion programs, particularly within school settings (Kemenkes RI, 2018). Schools provide an ideal platform for implementing nutrition education interventions due to their structured environment and access to large adolescent populations (WHO, 2017). Animated educational videos are practical tools because they are cost-effective, easy to disseminate, and ensure consistent delivery of health messages across different groups (Jatmika et al., 2018). Integrating video-based education into school health units (UKS), nutrition education curricula, and community health outreach programs may enhance adolescents' knowledge and attitudes toward anemia prevention (Sari et al, 2022).

Despite the positive findings, this study has certain limitations that should be considered (Sugiyono, 2018). The study focused on short-term changes in knowledge and attitudes, and it did not assess long-term behavioral changes or actual dietary intake (Notoatmodjo, 2018). Additionally, external factors such as family eating habits, food availability, and socioeconomic conditions were not examined, even though they may influence anemia prevention behaviors (WHO, 2017). Future research is recommended to evaluate long-term outcomes and incorporate broader environmental and behavioral factors (Nasruddin et al., 2021).

In conclusion, this study demonstrates that animated educational videos are an effective and engaging medium for improving adolescents' knowledge and attitudes regarding anemia prevention (Anifah, 2020). The statistically significant results obtained from the Wilcoxon analysis confirm that the intervention produced meaningful and reliable improvements (Sugiyono, 2018). Therefore, video-based education should be considered an essential component of comprehensive strategies aimed at enhancing adolescent nutrition literacy and reducing the prevalence of anemia (Kemenkes RI, 2018).

CONCLUSION

This study concludes that animated educational videos are an effective and impactful medium for improving adolescent girls' knowledge and attitudes regarding healthy eating behaviors for anemia prevention. The intervention group demonstrated a substantial increase in both cognitive and affective outcomes, as evidenced by a rise in mean knowledge scores from 5.33 to 10.44 and attitude scores from 35.56 to 50.93, supported by statistically significant Wilcoxon Signed-Rank test results ($p = 0.05$ for knowledge and $p = 0.00$ for attitude). In contrast, the control group showed no meaningful change, indicating that the improvements observed were directly attributable to the educational intervention. These findings reinforce the notion that visually engaging, multimedia-based education is highly suitable for adolescents, who respond more effectively to dynamic audiovisual content than to conventional didactic methods. Furthermore, the results affirm theoretical perspectives suggesting that increased knowledge is a critical foundation for shaping positive attitudes toward health behaviors. By presenting anemia-related information in a clear, relatable, and emotionally engaging manner, the animated video enhanced students' awareness, understanding, and motivation to adopt healthier nutritional practices. Although this study demonstrates strong short-term effects, long-term behavioral change and biological improvement require continuous reinforcement and supportive environments. Nevertheless, the overall evidence suggests that animated educational videos represent a practical, scalable, and cost-effective strategy for strengthening adolescent health literacy and supporting broader public health efforts to reduce anemia prevalence. Incorporating such media into school-based health programs, digital learning

platforms, and community outreach initiatives could significantly improve adolescents' nutritional awareness and contribute meaningfully to anemia prevention efforts.

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