



ANEMIA PREVENTION EDUCATION THROUGH A COMBINATION OF ANIMATED VIDEO MEDIA AND DIGITAL-BASED LITERACY MEDIA (CANVA) ON ADOLESCENT GIRLS' BEHAVIOR

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ABSTRACT

Adolescents are individuals undergoing significant development. The nutritional intake required by adolescents varies to achieve balanced nutrition, but if not met, it can lead to various health problems, such as anemia. Anemia is one of the health issues commonly experienced by adolescent girls, especially during puberty. Lack of knowledge and awareness about anemia prevention is a primary factor influencing adolescents' behavior in maintaining their health status. The utilization of engaging and interactive educational media, such as animated videos and digital literacy-based media (Canva), can be an effective strategy in improving anemia prevention behavior among adolescents. This study aims to determine the effect of anemia prevention education through a combination of animated video media and digital-based literacy media (Canva) on the behavior of adolescent girls at SMAN 1 Marisa. This study employed a quasi-experimental design with a pretest-posttest approach without a control group. The sample consisted of 196 adolescent girls from grades X and XI, selected using proportional random sampling technique. The instrument used was an anemia prevention behavior questionnaire that had been tested for validity and reliability. Data were analyzed using the Wilcoxon Signed Rank Test. The results showed a significant increase in anemia prevention behavior in the aspects of knowledge ($p = 0.000$), attitude ($p = 0.000$), and action ($p = 0.000$) after the educational intervention. The conclusion of this study states that anemia prevention education using a combination of animated videos and digital-based literacy media (Canva) has an impact on the behavior of adolescent girls at SMAN 1 Marisa, in terms of knowledge, attitudes, and actions. The use of engaging and easily accessible educational media can be an alternative in health promotion among adolescents.

Keywords: adolescent girls; anemia; animated video; canva; digital literacy media; education

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INTRODUCTION

Anemia is one of the health issues frequently affecting adolescents. To date, anemia persists as a global health concern due to its far-reaching consequences, which extend beyond health to social and economic aspects (Kumar dkk, 2020). According to data from the World Health Organization (WHO), the prevalence of anemia among adolescents worldwide in 2015, as reported in the Global Health Observatory (GHO), was estimated to be 32% and increased to 32.8% in 2016. Globally, anemia among adolescents affects approximately 2 billion people, having a significant impact on health and socio-economic development, particularly in developing countries. (Rusdi dkk, 2021). The description of anemia in Indonesia, according to the Basic Health Research (Riskesdas), in 2018, shows that the prevalence of anemia in males reached 20.35%, while in females it was 27.2%. The incidence of anemia was 26.8% in the 5-14 age group and 32.0% in the 15-24 age group. Anemia is characterized as a result of inadequate iron intake, leading to impaired work productivity or learning ability in school, due to lack of enthusiasm and focus in learning. Iron deficiency anemia can also be a problem during the growth process, where height and weight do not develop normally, potentially leading to decreased immunity and increased susceptibility to various diseases. Adolescent girls are at a higher risk of iron deficiency anemia due to their high iron needs to support

growth and development, as well as other factors such as unhealthy dieting behaviors and monthly menstrual cycles (Muyassaroh & Isharyanti, 2020).

According to data from the Pohuwato District Health Office, 2024, the highest number of anemia cases among adolescent girls in schools up to 2023 occurred in Marisa sub-district, with 252 cases. This is consistent with the screening results conducted by the health center team. The government continues to prevent this condition by taking efforts to maintain hemoglobin levels within the normal range. The government has launched various efforts, including providing education through Community Health Centers at the sub-district level to schools, with the aim of reducing the incidence of anemia. The education provided is accompanied by the distribution of iron supplements to adolescent girls aged 12-18 years, which is expected to be an early prevention effort against anemia. The provision of iron supplements is expected to reduce the prevalence of anemia in each region. Anemia management is directed towards iron supplementation. According to the 2023 Indonesian Health Survey report, the proportion of main reasons for not drinking/completing iron supplements (TTD) is 13.9% feeling it has no benefits, 4.3% feeling bored, and 3.4% only drinking it during menstruation (Kemenkes, 2023). These reasons make adolescent girls reluctant to complete their iron supplements, assuming that the education and supplementation do not have a positive impact and benefits for their lives.

One effort to improve behavior is through education. The education provided can be adapted to the current era of development, utilizing technology and digitalization. Education such as providing animated videos can make learning more engaging, as stated by Alifa (2021), the use of animated videos in learning can help students (adolescents) understand abstract material more concretely, so they don't just imagine and visualize. Other educational approaches that can be taken include using reading or visual media to improve students' literacy (reading interest) in the form of leaflets, comics, or animations with a persuasive purpose. This is clarified in a study conducted by Sheladjik & Yulianti, (2023), which states that electronic media, such as booklets, targeted at adolescent girls can increase knowledge scores. Education with an engaging concept makes the content easier to understand, whether delivered directly through communication or through digital media. A popular digital media alternative is Canva, which is easy to understand and user-friendly. Canva is an online design application that provides various graphic designs such as infographics, PPTs, resumes, flyers, posters, and more (Wulandari & Adam, 2022). Triningsih, (2021) explains that Canva can facilitate students in carrying out technology-based learning activities, developing skills, creativity, and other benefits. This is because it can attract the attention and interest of female students/adolescent girls to learn with engaging learning media and materials. Based on the background above, the researcher conducted a study with the aim of determining the effect of anemia prevention education through a combination of animated video media and digital literacy media (Canva) on the behavior of adolescent girls at SMAN 1 Marisa.

METHOD

This study used a quasi-experimental research design with a pre-test and post-test control group design. The independent variable in this study was anemia prevention education through a combination of animated video media and digital literacy media (Canva), while the dependent variable was the behavior of adolescent girls, which was assessed in terms of knowledge, attitude, and action. The population in this study consisted of all female students in grades X and XI at SMAN 1 Marisa, with a sample size of 196 respondents. The sample was determined using purposive sampling technique and met the inclusion and exclusion criteria. The respondents in this study were given an intervention in the form of anemia prevention education through a combination of animated video media and digital literacy media (Canva). This intervention began with digital literacy media using the Canva platform

in the form of images developed by the researcher. The images contained anemia prevention education information that could be accessed directly through a link sent to each adolescent girl's Android device via a WhatsApp group. After reading all the anemia prevention education information on the Canva platform, the adolescent girls were directed to scan the QR code on the image. The researcher also presented the image information through a projector screen and in hard copy (printout) form as a guide for the adolescent girls to access the QR code. The scanned QR code would directly integrate with the YouTube channel "Ayo Sehat" of the Indonesian Ministry of Health, featuring an animated video on anemia prevention as the second media used by the researcher. The respondents in this study underwent measurements of behavior, assessed in terms of knowledge, attitudes, and practices, both before and after the intervention. The instrument used was a questionnaire that had passed validity testing (Sig 2-tailed < 0.05) and reliability testing (Alpha Cronbach > 0.7) to measure knowledge, attitudes, and practices. The data were analyzed using the Wilcoxon test to determine the effect of the anemia prevention education intervention through a combination of animated video media and digital literacy media (Canva) on behavioral changes. This study has received ethical approval from the Health Research Ethics Committee of the Faculty of Sports and Health, Gorontalo State University, with approval number 258A/UN47.B7/KE/2024.

RESULT

Table 1.

Distribution of adolescent girls' behavior scores in terms of knowledge, attitudes, and practices before and after the intervention. (n= 196)

Variable Indicators		Pre Test		Post Test	
		f	%	f	%
Knowledge	Good	15	7,7	150	76,5
	Fair	24	12,2	40	20,4
	Poor	157	80,1	6	3,1
	Total	196	100	196	100
Attitude	Positive	23	11,7	147	75
	Negative	173	88,3	49	25
	Total	196	100	196	100
Action	Good	17	8,7	128	65,3
	Bad	179	91,3	68	34,7
	Total	196	100	196	100

Table 1 shows that the respondents' knowledge in the good category increased after the intervention, from 7.7% in the pre-test to 76.5% in the post-test. Similarly, the respondents' positive attitude also increased after the intervention, from 11.7% in the pre-test to 75% in the post-test. Furthermore, the respondents' good behavior also increased, from 8.7% in the pre-test to 65.3% in the post-test. Therefore, it can be concluded that the behavior of adolescent girls towards anemia prevention, in terms of knowledge, attitude, and action, improved after the intervention.

Table 2.

Analysis of adolescent girls' behavioral scores in terms of knowledge, attitude, and practice before and after the intervention (n= 196)

Variable	Pre test			Post test			p-value
	Mean	SD	Min-max	Mean	SD	Min-max	
Knowledge	4,23	1,671	2-8	8,21	1,139	4-10	0,000
Attitude	16,94	2,075	11-22	31,58	7,984	16-40	0,000
Action	16,98	1,949	13-23	28,87	8,405	15-40	0,000

Table 2 shows the results of the Wilcoxon test, which revealed significant differences in the behavior of adolescent girls in terms of knowledge (p = 0.000), attitude (p = 0.000), and

action ($p = 0.000$) before and after the intervention. This indicates that anemia prevention education through a combination of animated video media and digital literacy media (Canva) had an effect on the behavior of adolescent girls at SMAN 1 Marisa, in terms of knowledge, attitudes, and actions.

DISCUSSION

The effect of anemia prevention education through a combination of animated video media and digital literacy media (Canva) on the behavior of adolescent girls, in terms of knowledge

The data analysis results showed a significant increase in the knowledge aspect. Before the intervention, the mean score of the pre-test was 4.23. After the intervention, which involved anemia prevention education through a combination of media, the results showed a significant increase, with a mean score of 8.21 on the post-test. Furthermore, the Wilcoxon test was conducted, and the p -value for the knowledge aspect was $0.000 < \alpha 0.05$. This indicates that there is a significant difference in the level of knowledge before and after the intervention, suggesting that the education program using a combination of animated video media and digital literacy media (Canva) can influence the behavior of adolescent girls in terms of knowledge. The mean score of respondents before the intervention was in the poor knowledge category. This was because adolescent girls were unaware of how to prevent anemia and the dangers of anemia. Although they had previously received education on anemia prevention, it was not effective due to incomplete and inaccurate information. As a result, the information was not comprehensive, leading to limited knowledge. This condition highlights the need for anemia prevention information to be delivered using a method that is targeted, accessible, and easy to understand, making it more effective. The use of a combination of animated videos and the Canva platform had a significant impact, as evidenced by the mean score of respondents increasing to 8.21, with a difference of 3.98 from the pre-intervention score.

The use of a combination of media is particularly suitable for adolescent girls, as one of its benefits is to provide them with valuable knowledge, especially in school. The girls were enthusiastic about watching and listening carefully to the combined media content, as the information was accessible through their own gadgets or smartphones, making it easy to access. The educational content can be easily re-read, anytime and anywhere, just like the animated videos that can be replayed. This feature allows girls to review the information at their own pace, which can help them better understand and retain the material. This can influence one's thought pattern, where repeated exposure to information can make it more memorable and easier to recall. The provision of education through this combination method is able to provide a deeper understanding to adolescent girls. In addition, the information provided is concise and easy to understand, and uses animations and images that are attractive to look at, so it can be said that after the intervention, students' knowledge becomes better than before. Research by Dewi et al, (2024) states that animated videos have an impact on improving students' knowledge, where before being given animated videos, the knowledge score with a good category was only 9.5%, but after being given the intervention through animated videos, it increased significantly to 71.4%. Other research by Syakir (2018) states that there is a change in the subject's knowledge before and after intervention with animated media, which can be seen from the change in the mean score, which is before being given treatment was 69.88, but after being given treatment, it increased to 77.70, which means there is an effect of nutritional counseling intervention with animated media on knowledge ($p < 0.05$). Furthermore, research by Nurhayani et al, (2019) explains that the effectiveness of anemia prevention education is more influenced by the combination of video media and literacy media (booklet), which is a combination of mean scores of 60.3, higher than single literacy media (booklet) and video media, which are 44.93 and 31.53, with a p -value of 0.000 ($p < 0.05$).

The use of modified videos and literacy (booklets) in interventions provided to adolescent girls will make the information more impressive and profound, forming a good and perfect understanding. In other words, knowledge can be improved by providing anemia prevention education. The change in knowledge obtained is the result of health education with audiovisual media. Audiovisual media is suitable for adolescents because it can develop imagination and learning activities in a fun atmosphere, stimulating interest in learning due to its attractive and easy-to-understand animation. The use of animated media in health education interventions not only results in an effective way of learning in a short time but also leads to the conclusion that something received through audiovisual will be longer and better retained in memory because it involves more senses (Muyassaroh & Isharyanti, 2020). According to Notoatmodjo (2014) video is an educational tool that aims to convey health messages by stimulating the senses of hearing and sight. The increase in subjects' knowledge is influenced by the use of animated media in the form of moving images and sounds that make it easier for subjects to remember the material provided. Combined media is given to increase the interest of adolescent girls in watching animated videos and their ability to read information in the form of education. The use of learning media through the Canva platform can help students respond better and increase their learning motivation, based on attractive visual design, simplification of complex information such as presentation slides, and can be an effective tool in increasing student response and learning motivation.

The impact of providing health education through anemia prevention education has a significant effect on the way of thinking of adolescent girls. Before the intervention, many adolescent girls had a low level of knowledge, but after the intervention, the level of knowledge improved significantly. This is because respondents paid close attention to the health education, watching and listening carefully, which increased their knowledge. The use of video is very effective in improving knowledge, as it is a suitable tool that can convey information through visual and auditory senses, which account for 75% to 87% of the knowledge acquired by an individual. The animated video in this study displayed images that explained various aspects of anemia prevention, making the education and counseling process interesting and memorable for adolescent girls. This condition is able to provide maximum results to achieve the goal of health education, which is to convey messages to increase knowledge.

The effect of anemia prevention education through a combination of animated video media and digital literacy media (Canva) on the behavior of adolescent girls, in terms of attitude

The results of the data analysis showed that the mean score of adolescent girls on the pre-test or before the intervention was 16.94, which then increased to a mean score of 31.58 on the post-test. Based on the Wilcoxon test, the $p\text{-value}$ was $0.000 < \alpha 0.05$, indicating that there is an effect of anemia prevention education through a combination of animated video media and digital literacy media (Canva) on the behavior of adolescent girls, specifically in terms of attitude. The initial scores of adolescent girls on the pre-test were mostly in the negative attitude category, based on their lack of understanding of the dangers of anemia and their perception that taking iron supplements did not have a significant impact on preventing anemia. The pre-test results also showed that adolescent girls did not understand how to use the iron supplements provided by the local health center through the health department's program. However, this also posed a problem, particularly during the distribution process of the supplements, where the medication was not regularly provided by the school or was only given once in large quantities without adequate supervision of its use. As a result, the effectiveness of the supplements in preventing anemia among adolescent girls was compromised. Adolescent girls felt that taking the supplements did not have a quick effect on their needs, and the unpleasant taste was one of the reasons why they did not want to take the

medication. Most adolescent girls also claimed that the education they received did not make them understand the importance of preventing anemia. The education they received was usually in the form of lectures delivered by the health center, but this was not persuasive enough for adolescent girls.

The provision of intervention in this study through a combination of animated video and digital media (Canva) education was proven to increase the mean score of adolescent girls to 31.58, with a difference of 14.64 from the previous score. Although the mean score was still in the negative attitude category, this was likely due to the fact that the education was only provided once, and the post-test was conducted just hours later, so the students may not have been able to retain all the material. However, the post-test results showed that most respondents had understood the proper use of iron supplements, including taking one tablet per week every year, and avoiding consumption with milk and certain medications such as antacids. Additionally, they had a better understanding of the importance of education in preventing anemia. Research by Adila (2020) found that there was an effect of anemia prevention on the attitudes of adolescent girls, with a p-value of 0.000. The mean score increased from 6.00 before the intervention to 9.12 after the intervention using booklet media. This is consistent with research conducted by Berahim (2025) which found a significant difference in attitude scores before and after treatment, with a p-value of 0.000 indicating that there was an effect of using m-health with audiovisual education on treatment adherence behavior in terms of attitude. Other research, such as Nurhayani et al, (2019), also found that there was an effect of combined video and booklet media on the attitudes of adolescent girls towards anemia prevention, compared to single media use. The mean scores for single media use were 27.53 for animated video and 29.53 for booklet, while the combined media score was 32.67. This proves that the combination of media plays a significant role in providing anemia prevention education to adolescent girls, with the goal of persuading them to be more aware of the possibility of experiencing anemia. According to Azwar in Syakir, (2018), one of the factors that influences attitudes is the medium of information delivery, which usually contains suggestions that direct someone's opinion. If the suggestion is strong enough, it will provide an affective basis for evaluating something, thereby forming a direction of attitude that is manifested through action. Attitude is a reaction that is still closed from someone to a stimulus or object, accompanied by a tendency to act. An attitude will be formed when someone has been exposed to repeated information, creating understanding and then forming an attitude. This is because attitude is a form of reaction or response from someone that is still closed to a stimulus or object and a form of evaluation of an aspect around them. Therefore, previous experience is a determining factor in attitude change.

The effect of anemia prevention education through a combination of animated video media and digital literacy media (Canva) on the behavior of adolescent girls, in terms of action

The results of the data analysis showed that the mean score of adolescent girls on the pre-test before the intervention was 16.98, which increased to 28.87 after the intervention using a combination of anemia prevention media. The Wilcoxon test results showed a p-value of $0.000 < \alpha 0.05$, indicating that there was an effect of anemia prevention education through a combination of animated video and digital literacy media (Canva) on the behavior of adolescent girls in terms of action. Initially, the adolescent girls had a mean score in the poor action category. This was based on the questionnaire results, which showed that many adolescent girls rarely had breakfast, had a low consumption of other foods such as vegetables and plant-based foods, and rarely ate fruits. Respondents also stated that they often did not consume or finish the iron supplements provided by the health center, which aimed to reduce the prevalence of anemia. This factor became a habit among adolescent girls that worsened their condition, contributing to the increasing number of anemia cases every year.

Research conducted by Kalsum et al. (2016) found that adolescents who did not have a habit of eating breakfast were twice as likely to develop anemia compared to those who ate breakfast. Many adolescent girls are reluctant to eat breakfast and even develop unhealthy dieting behaviors, resulting in a higher body image concern compared to boys. Adolescent girls try to maintain their bodies to stay slim, so they often control their diet by reducing food portions, meal frequency, or following certain diets incorrectly, which results in unmet nutritional needs (Kalsum et al., 2016). Iron supplements are a pharmacological therapy given to maintain the condition of adolescent girls, particularly in handling the possibility of anemia. The supplements are given once a week and should be consumed for a year. The iron supplements contain 60 mg of iron and 400 mcg of folic acid, which is very good for increasing red blood cells, especially for adolescent girls during menstruation. Menstruation causes adolescent girls to lose many red blood cells, so taking iron supplements can help increase the volume and replace lost red blood cells.

The difference in results on the mean score of adolescent girls after being given an intervention with education through a combination of animated video media and digital literacy media using the Canva platform, with the results increasing to 28.87. This can occur because respondents feel motivated to do good things in preventing anemia, with information through educational content that presents things that can be done to anticipate the possibility of anemia. Respondents often feel tired, lethargic, and weak during school activities, but they don't know what's wrong. However, after reading and watching educational content, they feel motivated and understand the purpose and objectives of the education. Thus, the potential for increasing respondent behavior actions becomes more significant. Although in this case, actions cannot be measured more deeply through habits after receiving this education, it becomes an initial enthusiasm for adolescent girls to make behavioral changes after understanding the importance of maintaining a healthy diet, lifestyle, and avoiding all dangers that cause anemia.

The results of this study are consistent with research conducted by Adila (2021), which found a significant difference between the mean scores before and after treatment, where the mean score for the action aspect increased from 13.71 to 20.31 after treatment, with a p-value of 0.000. This suggests that there is an effect of providing booklet media on the actions of adolescent girls in preventing anemia. Research by Nurhayani (2019) also found that the actions of adolescent girls were influenced by health education on anemia prevention, with the mean score increasing from 34 to 55.7 after treatment. A closer examination of the study revealed differences in the mean scores of various media used, including booklet media (21.7), animated video media (17.97), and a combination of animated video and booklet media (24.37). It can be concluded that the use of various media, both single and combined, has an effect, but the most significant effect is the use of a combination of animated video and booklet media.

CONCLUSION

Anemia prevention education using a combination of animated video and digital literacy media (Canva) has an impact on the behavior of adolescent girls at SMAN 1 Marisa, in terms of knowledge, attitudes, and actions. The use of engaging and easily accessible educational media can be an alternative for health promotion among adolescents.

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