EFFECTIVENESS OF EDUCATIONAL MEDIA INSTAGRAM REELS AND TIKTOK ON KNOWLEDGE TO PREVENT IRON DEFICIENCY ANEMIA

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ABSTRACT

The lack of knowledge about iron deficiency anemia is caused by a lack of media that can open up public knowledge about the importance of this. As the industrial era 4.0 progresses, many digital media have emerged as a means to educate the public about preventing iron deficiency anemia, one of which is health promotion media in the form of video media Instagram Reels and TikTok. This study aims to determine the effectiveness of Instagram Reels and TikTok educational media on knowledge about preventing iron deficiency anemia in adolescent girls. The research used quasi experiment method with a pre-posttest group design. The sample amounted to 105 respondents (Instagram Reels n:35, TikTok n:35, and leaflet n:35. Knowledge data were obtained by filling out pre and posttest questionnaires, processed using the Wilcoxon test. The mean difference between the three groups used Kruskal-Wallis and Post Hoc Mann Whitney tests. The effectiveness of the three media was tested using the N-Gain Score. The results of the pre and post-test research on the three media had p-value 0.000 which shows an increase in knowledge. The frequency distribution of knowledge in the TikTok group was 100%, Instagram Reels 94.3% and leaflets 51.4%. The effectiveness test of the N-Gain score of TikTok media is 81% including it in the effective category, Instagram Reels is 60% including in the moderately effective category and leaflets are 28% including in the ineffective category. The conclusion is that TikTok media is most effective compared to Instagram Reels media and leaflets.

Keywords: *educational media, iron deficiency anemia, knowledge.*

INTRODUCTION

Anemia is public health problem that continues to occur throughout the world. The prevalence of anemia in adolescents is 27% in developing countries and 6% in developed countries (Gedefaw et al., 2015). The anemia rate, according to the WHO, in women of childbearing age 15- 49 years in Indonesia is 31.2% (WHO, 2019). National Basic Health Research data shows that the anemia rate was 18.4% in 2013, then increased to 32% in 2018 (in the 15-24 years age group) (RISKESDAS, 2013, & 2018). The anemia rate among adolescent girls in East Java is 42% (East Java Provincial Health Service, 2019). Anemia is considered a public health problem if its prevalence is more than 20% (Tati et al., 2021). According to the Ponorogo District Health Profile, the prevalence of anemia is high, reaching 49.26% in 2023 (Ponorogo District Health Service, 2023).

Anemia in adolescents has an impact on decreased immunity, ability to concentrate at school, physical fitness, and productivity. Apart from that, anemia in young women will have a more severe impact because, as prospective mothers who will become pregnant and give birth, this increases the risk of maternal death, giving birth to premature babies and low birth weight (LBW) babies (Ministry of Health of the Republic of Indonesia, 2014). Knowledge is a key element underlying the prevention of anemia in adolescents through improving health behavior. One of the causes of increasing anemia is a lack of knowledge about anemia (Rina *et al*., 2021).

Research by Hutasoit *et al.* (2023) shows that increasing understanding and knowledge obtained through educational media allows female students to understand the problem of adolescent anemia. Providing information and knowledge can be

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done through health education. Health education is an activity of conveying health messages to communities, groups, and individuals. One aspect of implementing health education is that it can be implemented in schools by involving students through health promotion methods (Marfuah, 2016; Muwakhidah & Primadani, 2021; Sunardiyah, 2022).

Health promotion media is one of the media or efforts that can be used to display health messages or information. Health messages are conveyed to adolescents to increase knowledge, which will ultimately change behavior in a positive direction or improve health (Aeni & Yuhandini, 2018). One effort that can be made to enhance the knowledge and attitudes of young women is by providing health education through health education media. Media is an intermediary in conveying messages from the sender to the recipient: various health education media, educational videos, and audiovisual media (Okiningrum & Handayani, 2023). Nowadays, social networks can be used for multiple purposes. One is that it can motivate efforts to support and maximize learning models in the education industry, especially media for presenting educational content or digital learning (Rusdi, et al. 2021).

According to Sufrate-Sorzano at al. (2024), social networks can be used as a practical learning tool. The social network "*Instagram*" has become a forum/media for forum/media for adolescents to communicate with their peers. *Instagram* also has a new feature, *Instagram Reels*, which is a learning medium. Previous research shows that providing nutrition education via *Instagram* increases knowledge about preventing anemia in adolescents (Rusdi, et al. 2021; Zulfajriani, et al. 2023). As time progresses, *TikTok* also introduces educational video content that is useful, such as educational content (Samuel et al. 2024).

Considering TikTok's immense popularity, scholars and educators have begun examining its usefulness within educational contexts (Hartung et al., 2023). This line of inquiry has led to research being published in diverse academic fields, such as nursing (Conde-Caballero et al., 2024), English language and literature (Yélamos-Guerra et al., 2022), as well as Meetings, Incentive Travel, Conferences, and Exhibitions (MICE) education (Gao et al., 2023). *TikTok* media demonstrated significantly higher effectiveness with an N-Gain score of 86%, categorized as highly effective. Therefore, *TikTok* has the potential enhancing adolescents' knowledge (Widiya & Salmiah, 2024).

Health science disciplines in Islam are defined as medical sciences whose basic models, concepts, values and procedures are in accordance with or do not contradict the Al-Qur'an and As-Sunnah. Islamic health science is universal, covers all aspects, is flexible, and allows the growth and development of various methods of investigation and treatment of disease (Ali & Sultan, 2023). In Surah Al-Mujjadi Verse 11:

> *Meaning: "O you who have believed, when you are told, "Space yourselves" in assemblies, then make space; Allah will make space for you. And when you are told, "Arise, then arise; Allah will raise those who have believed among you and those who were given knowledge, by degrees. And Allah is Aware of what you do."*

Based on these several things, this research aims to determine the effectiveness of the educational media *Instagram Reels* and *TikTok* in increasing knowledge of preventing iron deficiency anemia in adolescents at SMAN 2 Ponorogo.

METHODS

Ethical approval was issued by the Ethical Committee Dr. Moewardi Hospital with number 020/I/HREC/2024. This study uses the quasi-experimental pretest-posttest group design method The samples were divided into three groups: experiment 1, experiment 2, and control. This research began with a pretest before being given media for experimentation and control. After the intervention it continued with the posttest. This research was conducted at Senior High School 2 Ponorogo from November 2023 to March 2024.

In this study, the population of all female adolescents at Senior High School 2 Ponorogo was 178 female students aged 15-17 years. The sampling technique uses a purposive sampling method. Sample calculations obtained 30

respondents, with an addition of 10% of the total respondents, so the entire sample required was 35. In this study, the dependent variables was the knowledge of preventing iron deficiency anemia, and the independent variables were TikTok media and Instagram Reels. The intervention was carried out on female students by providing educational media *Instagram Reels* to experimental group 1, *TikTok* to experimental group 2, and educational media leaflets to the control group. Leaflets were chosen because they are easily accessible, practical and can be distributed widely without the need for technology or internet access. They effectively convey information in a clear and concise format, combining text and images to aid understanding.

The intervention was carried out for one day in the three intervention groups. The first intervention was carried out in the *Instagram Reels* group; then, the female students watched the *Instagram Reels* video for three minutes with two playbacks. The second intervention was carried out in the *TikTok* group; then, the female students watched the *TikTok* video for three minutes with two playbacks. In the leaflet group, students started reading about knowledge about iron deficiency anemia for three minutes.

Respondent inclusion criteria: Student of SMAN 2 Ponorogo aged 15-17 years, have an active Instagram accounts, have an active TikTok accounts, able to communicate well verbally and in writing. Exclusion criteria: respondents withdrew from being respondents during the research and the condition of the respondent who is sick and cannot follow research procedures.

The results of the study were tested for normality using *Shapiro-Wilk*. In each group, the *Wilcoxon* test was used because it was not normally distributed. This test is used to explain the average difference in knowledge before and after in each group. Calculations to determine the difference between each group were using *Kruskal-Wallis* >2 groups. Followed by conducting the *Mann-Whitney post hoc* test to know further differences between two different groups. Analysis of differences in the effectiveness of *Instagram Reels, TikTok*, and leaflet media on adolescent girls' knowledge using the N-Gain score test In conducting health promotion and education, health workers, practitioners, and academics can use media in the form of *Instagram Reels, TikTok* and leaflets (Haninuna *et.al*. 2023).

The N-Gain score is a metric used to measure the effectiveness of an intervention in improving knowledge or skills. It is calculated based on the following formula:

$$N\text{-Gain} = \frac{\text{Post-test Score} - \text{Pre-test Score}}{\text{Maximum Score} - \text{Pre-test Score}}$$

categorized results into effectiveness levels based on the percentage of the N-Gain score:
1. <40%: Not Effective
2. 40 – 55%: Less Effective
3. 56 – 75%: Moderately Effective
4. >76%: Highly Effective

RESULTS AND DISCUSSIONS

Table 1 shows that most respondents were 16 years old in the *Instagram Reels* group 72.7%, *TikTok* 62.9% and 80% in the control group. A majority of the parents (both mothers and fathers) of respondents in all groups had completed high school (30%-60%) and college (22.9%-45.7%). All of the experiment and control groups had a majority of respondents who indicated interest in participating in extracurricular arts activities (*Instagram Reels* group 28.6%, *TikTok* group 43% and leaflet group 42.6%). All respondents in all groups are not going on a diet, and the majority of respondents have routine periods of menstruation (*Instagram Reels* group 91.4%, *TikTok* group 100% and leaflet group 97.1%).

This research was carried out primarily by 16-year-olds, namely 70%, and most of them still need to gain more knowledge. Respondents admitted that they did not know what iron deficiency anemia in adolescent girls was. However, when researchers asked about anemia, respondents only knew that anemia was a lack of blood. The causes and prevention of iron deficiency anemia are still poorly understood. This is in line with research by Basrahma et al*.,* (2023), namely, 37 people participated, 53.7% of whom were mostly 16 years old.

This research found a lack of information regarding anemia among adolescents. For this reason, adolescents need information, materials and counseling related to anemia to become

Table 1. Respondents' Characteristics

Characteristics		Instagram Reels		TikTok		Leaflet	
		n	%	n	%	n	%
Age	15	8	22.9	11	31.4	7	20.0
	16	24	72.7	22	62.9	28	80.0
	17	3	9.1	2	5.7	0	0
Father's last education	Elementary School	3	8.6	2	5.7	3	8.6
	Junior High School	1	2.9	1	2.9	4	11.4
	Senior High School	16	45.7	19	54.3	19	54.3
	Higher education/ college	15	42.8	13	37.1	9	25.7
Mother's last education	Elementary School	3	8.6	3	8.6	2	5.7
	Junior High School	1	2.9	3	8.6	8	22.9
	Senior High School	15	42.9	21	60.0	11	31.4
	Higher education/ college	16	45.7	8	22.9	14	40
Type of Extracurricular	Sports	6	17.1	0	0	6	17.2
	Arts	10	28.6	12	34.3	15	42.6
	Academic	10	28.6	11	31.4	0	0
	Leadership	9	25.7	12	34.3	13	37.2
	environment or adventure	0	0	0	0	1	3
Go on a diet	Yes	0	0	0	0	0	0
	No	35	100	35	100	35	100
Menstrual pattern	Routine	32	91.4	35	100	34	97.1
	Not a routine	3	8.6	0	0	1	2.9

more knowledgeable. This is in accordance with research by Primanda et al*.,* (2024) which states that there is a relationship. Table 2 shows the frequency distribution of respondents' knowledge priore to the intervention, indicating that the majority of respondents in all groups acquired inadequate knowledge. Following that, the majority of respondents experienced an increase in their knowledge following the educational intervention, which applied *Instagram Reels and TikTok*. In contrast, only a small percentage of respondents who received education with leaflets found an increase in their knowledge, while others did not.

Menstruation is a natural process that occurs in women. Women usually experience menstruation for the first time between the ages of 12-16 years (Noviyanti & Dardjito, 2018; Khadijah et al*.,* 2020). Researchers found that the majority of 96% of respondents menstruate regularly 1-2 times a month. Meanwhile, 4% of respondents do not do it regularly. The reason is, differences in menstrual cycles can be caused by various factors including nutritional status, age, physical activity, food intake, disease, stress and the effects of smoking (Indriyani *et.al.* 2023). Researchers found that 100% of the 105 respondents were self-confident and didn't care about their ideal body shape, so many didn't diet. This is not in line with research by Zogara et al*.,* (2023), which states that many adolescent girls follow body shape trends that tend to be thin/slim. This condition causes adolescent girl to adopt dieting behavior.

Table 3 shows that the result of the *Wilcoxon* test is *p-value* = 0.000. The p-value is <0.05, so it is concluded that there is a significant difference in knowledge between before and after the intervention.

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Table 2. Frequency Distribution of Knowledge of *Instagram Reels, TikTok* and *Leaflet* Media

Category	Experimental Group								Control Group			
	Instagram Reels				*Tiktok*				*Leaflets*			
	Pretest		Posttest		Pretest		Posttest		Pretest		Posttest	
	n	%	N	%	n	%	n	%	n	%	n	%
High	2	5.7	33	94.3	1	2.9	35	100	2	5.7	18	51.4
Low	33	94.3	2	5.7	34	97.1	0	0	33	94.3	17	48.6
Total	35	100	35	100	35	100	35	100	35	100	35	100

Table 3. The Effect of Education with Instagram Reels, TikTok, and Leaflets on Adolescent Knowledge of Anemia

Groups	Before		After		*p-value*
	Median ± SE	Min-Maks	Median ± SE	Min-Maks	
Instagram Reels	55.00 ± 1.550	45-80	80.00 ± 1.260	69-95	0.000
Tiktok	55.00 ± 1.525	40-80	90.00 ± 1.044	80-100	0.000
Leaflet	60.00 ± 1.587	35-80	75.00 ± 1.233	60-85	0.000

Wilcoxon Test

Instagram Reels group, getting an average pretest result of 58.00 and getting a score of 83.43 in the posttest. This is in line with research by Rinarto et al*.,* (2022) which obtained a significance value of 0.002 with an *Instagram* value before intervention of 73.65 and a value after intervention of 80.2 which states that there is a difference in knowledge about balanced nutrition before and after being given intervention on social media.

This research shows that young women are interested in increasing awareness about iron deficiency anemia through social media. Most respondents thought that education about iron deficiency anemia was easier to understand and accept in *TikTok* videos than in *Instagram Reels* videos. This is proven by an increase in knowledge in the *TikTok* group with an average pretest score of 56.29 and posttest of 91.71.

TikTok is a social media platform that is widely used by millennials due to its ease of use. It also offers advertising features that allow content to be optimized for better delivery. Recent studies have shown that *TikTok* is better at educating teenage girls about iron deficiency anemia compared to *Instagram Reels*. This is in line with research conducted by Muthemainnah et al*.,* (2022) which found there is a difference in the average knowledge of high school adolescents before and after education, namely 4.82 to 8.42 with a p value of 0.000 <0.05, which means there is an influence of *TikTok* media on high school adolescents' knowledge regarding premarital sexual behavior.

The results of this research show that the leaflet group's knowledge increased and some respondents were still able to obtain good information using leaflet media as indicated by the average pre-test score of 60.29 and post-test of 73.57. This research is in line with research by Jamalludin et al*.,* (2025) regarding the influence of education through leaflet media on knowledge. However, leaflets were used as the intervention group, whereas in this study, leaflets were used as the control group.

Table 4 shows that the average rank value among *Instagram Reels*, *TikTok* and leaflet media, the highest value is *Instagram Reels* 46.76 and *TikTok* 52.01. Meanwhile, the media *Instagram Reels* with *TikTok*, the highest value is *TikTok* which is 45.83.

Table 5 demonstrates that TikTok is the most effective educational tool for enhancing the knowledge of adolescent anemia. This is evident in the average N-Gain score of the TikTok group, which is 80.5981 or 81%. The N-Gain score value is a minimum of 60% and a maximum of 100%.

In this study, before the intervention, there was no significant difference between the *Instagram Reels*, *TikTok* and leaflet groups. However, after being given intervention through

educational media *Instagram Reels*, *TikTok* and leaflets there are significant differences. With a mean rank value in the three groups, *Instagram Reels* 46.76 and *TikTok* 52.01 are higher than the leaflet, while the *TikTok* value of 45.83 is higher when compared to *Instagram Reels* 25.17. In this study, respondents gained better knowledge about iron deficiency anemia after receiving better education through social media than through leaflets.

This study used the N-Gain score test to show the effectiveness of educational media, namely *TikTok* media 81.38% included in the effective category, *Instagram Reels* 59.94% included in the moderately effective category, leaflets 29.54% included in the ineffective category. This was observed in all three media, where the media in the experimental group (*Instagram Reels* and *TikTok*) achieved better knowledge results than the control group media (leaflet) and knowledge after the intervention regarding the use of social media was better than the leaflet. Social media has the potential to disseminate knowledge about health promotion and other health interventions to students and facilitate the achievement of goals at all levels. There is evidence that the use of social media is effective in health promotion efforts aimed at increasing understanding and support for healthy behavior in the community (Mehmet et el., 2020).

In this research, *Instagram Reels* and *TikTok* media are an experimental group based on audiovisual elements. As well as leaflets as a visual control group. *Instagram Reels* media uses cartoon and animated images accompanied by music and voiceovers, which is different from *TikTo*k media which is easy for female students to remember because it uses original videos or original images, and the presentation of the material is simply accompanied by music and voiceovers. Meanwhile, leaflet media only contains text and a few pictures. Therefore, students find reading boring and difficult to remember.

Table 4. Comparative Analysis Between *Instagram Reels, TikTok* and *Leaflet* Groups

Media	Mean± SD	*Mean Rank*	*p value*
Instagram Reels + leaflet	82.90±10.16	46.76 +24.24	0.000
TikTok + leaflet	82.90±10.16	52.01+ 18.99	0.000
Instagram Reels +TikTok	82.90±10.16	25.17+45.83	0.000

Post-hoc Mann Whitney

Table 5. Effectiveness on *Instagram Reels, TikTok* and *Leaflet* Media

Experimental Group	Average (%)	Min-Max
Instagram Reels	59.9456	20-90
TikTok	81.3893	60-100
Leaflets	29.5458	0-66

N-Gain Score Test

This is in accordance with research by Masyur (2021) which states that delivering material that only uses words is very less effective or has the lowest intensity, leaflets are included in the second level, and video games are at a level two higher than leaflets so that the delivery of video games can be more effective than delivery using leaflets. Pratiwi & Sunarso (2020) research states that there is a difference between the use of audiovisual media and image media on learning outcomes. Audiovisual media is more effectively used in the learning process of social sciences with economic activities.

Video media is audiovisual media, namely media that contains sound elements and also contains image elements that are presented like videos. Video can capture 94% of the news and information that enters the human mind through the eyes and ears, and can usually remember 50% of what is seen and heard in broadcast programs. Messages conveyed through video media can evoke strong emotions and can also quickly achieve results that cannot be achieved with other media (Ummami et al., 2021; Wu et al., 2025). This has been proven by research on leaflet media. Even though leaflet media is attractive in terms of design, school age teenagers are basically used to reading textbooks and are used to reading books to learn, but leaflets contain more words so they are boring and they have little desire to read.

However, the situation is different when reading visual information such as leaflets. Audiovisual is an educational method that uses interesting images and sounds to convey content. Audiovisual media stimulates the senses of hearing and sight, so that the results of understanding are maximized (Pratiwi & Sunarso, 2020). In

particular, the *TikTok* application coincides with the evolution of maturity, experience and characteristics of the Millennial generation, which is closely connected to the digital world, especially utility devices (Firdawiyanti & Kurniasari, 2023). *TikTok* provides visual and audio effects that help high school teens understand information and expand their knowledge. The *TikTok* media used by researchers packages popular music as interesting as possible, so that high school students don't get bored and consider the education provided as entertainment. *TikTok* has an impact in supporting the educational process and expanding the knowledge of teenagers in high school. This is proven by the increase in posttest results (Muthemainnah *et al*.,2020).

This finding shows that social media platforms like *TikTok* and *Instagram Reels* are effective in increasing adolescent knowledges about anemia prevention. Therefore, social media can be used as a health promotion strategy in schools and communities, replacing traditional method like leaflets, to reach and educated adolescents more effectively. This study has several limitations, including a limited sample size (105 respondents) and being conducted at only one school, making the results difficult to be generalized.

Additionally, the research design used a control group with leaflets as a comparison, which did not include other media variations. Nevertheless, the results of this study provide valuable insights into the effectiveness of *TikTok* and *Instagram Reels* media in increasing knowledge about iron deficiency anemia prevention among adolescent girls.

CONCLUSION

Based on the research results regarding the effectiveness of *TikTok*, *Instagram Reels* and leaflet educational media in improving adolescent girls' knowledge about iron deficiency anemia prevention, the findings show that *TikTok* media is more effective compared to *Instagram Reels* and leaflets. Therefore, *TikTok* is considered the most effective media for increasing adolescents' knowledge about anemia prevention.

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