THE RELATIONSHIP OF EDUCATION BY ANIMATED VIDEOS AND LEAFLETS WITH MOTHERS' KNOWLEDGE ABOUT ANEMIA IN PREGNANT WOMEN

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ABSTRACT

Background: Anemia in pregnant women remains a significant public health issue in Indonesia, including in the working area of the UPTD Kereng Bangkirai Community Health Center in Palangka Raya City. Based on data from 2023 and 2024, there has been an increase in cases of anemia in pregnant women from 5 cases to 25 cases. This study aims to determine the relationship between pregnant women's knowledge level and the incidence of anemia, and to evaluate the effectiveness of health education in improving their knowledge and awareness.
Methods: The method used is a pre-experimental approach. The design used was a one-group pretest-posttest design with a sample consisting of 77 pregnant women at the UPTD Kereng Bangkirai Community Health Center in Palangka Raya City, selected using purposive sampling based on inclusion criteria. Education was provided through animated videos and leaflets, accompanied by pretest and posttest questionnaires.
Results: The results showed a significant increase in knowledge after the education intervention (p=0.000). The results of this study indicate that education by animated videos and leaflets is effective in increasing mothers' knowledge about anemia during pregnancy.
Conclusion: There is a relationship between education by animated videos and leaflets and mothers' knowledge about anemia in pregnant women. This is important in maternal health services at community health centers to reduce the rate of anemia and improve the quality of maternal health during pregnancy.
Keywords: anemia, antenatal care, iron tablet supplements, nutrition, pregnant

INTRODUCTION

Anemia during pregnancy remains a significant public health concern in Indonesia because it is associated with a range of adverse maternal and fetal outcomes, including increased risk of postpartum hemorrhage, preterm labor, low birth weight, and maternal and neonatal mortality (Kementerian Kesehatan RI, 2023). According to the Indonesian Health Survey, the prevalence of anemia among pregnant women reached 42.5% in 2023 (Kementerian Kesehatan RI, 2023). In Central Kalimantan Province, the prevalence was slightly higher at 43.4%, as reported in the Provincial Health Profile (Dinas Kesehatan Provinsi Kalimantan Tengah, 2023). At a more localized level, data from the UPTD Kereng Bangkirai Community Health Center revealed a fivefold increase in reported anemia cases from 5 cases in 2023 to 25 cases in 2024 (Puskesmas Kereng Bangkirai, 2024). This increase highlights the urgent need for targeted interventions, particularly in

rural and underserved areas where healthcare resources and access to nutritional information may be limited (Kementerian Kesehatan RI, 2023).

In an effort to address this issue, the Indonesian government has integrated iron and folic acid supplementation, commonly referred to as an iron tablet, as part of routine Antenatal Care (ANC) (Dinas Kesehatan Provinsi Kalimantan Tengah, 2023). However, the implementation and impact of this initiative have not reached optimal levels, due in part to factors such as inadequate maternal nutrition knowledge, poor adherence to iron tablet consumption, and variable quality of ANC services (Dinas Kesehatan Provinsi Kalimantan Tengah, 2023). The Ministry of Health in Indonesia has adopted a similar guideline, ensuring that iron tablet is distributed through primary healthcare facilities, schools, and community-based programs (Kementerian Kesehatan RI, 2023). However, despite these efforts, the implementation and impact of this initiative have not reached optimal levels, due in part to factors such as inadequate maternal nutrition knowledge, poor adherence to iron tablet consumption, and variable quality of ANC services (Dinas Kesehatan Provinsi Kalimantan Tengah, 2023).

Strengthening maternal education and counseling within ANC sessions could significantly improve adherence to iron tablet supplementation and ultimately lead to better maternal and fetal outcomes (Pratiwi et al., 2025). Moreover, maternal knowledge plays a critical role in shaping health-related behaviors (Putri et al., 2023) because, with a limited understanding of the benefits of iron tablets, the risks of anemia, and the importance of dietary iron intake, women are less likely to comply with supplementation recommendations (Utami & Sudaryanto, 2025). This is particularly evident in rural areas, where access to health education and reliable sources of information may be restricted. Therefore, improving maternal knowledge is a crucial step in enhancing compliance and reducing the prevalence of anemia (Purwaningtyas & Prameswari, 2017).

This study aims to investigate the relationship between education by animated videos and leaflets with mothers' knowledge about anemia in pregnant women at the UPTD Kereng Bangkirai Community Health Center in the year 2025 (Puskesmas Kereng Bangkirai, 2024). By exploring this relationship, the research is intended to contribute to the existing body of knowledge and serve as a basis for designing targeted health education programs to help reduce the prevalence of anemia during pregnancy (Sumiati et al., 2025). The findings are expected to provide evidence-based recommendations for healthcare providers, particularly midwives and community health workers, who are at the frontline of delivering ANC services (Chandra et al., 2019).

The novelty of this study is that there has been no previous research on the relationship between education through animated videos and brochures with maternal knowledge about anemia in pregnant women at the Kereng Bangkirai Community Health Center (UPTD Kereng Bangkirai) in Palangka Raya City. A preliminary study at the Kereng Bangkirai Community Health Center revealed a fivefold increase in reported anemia cases, from 5 cases in 2023 to 25 cases in 2024. Anemia during pregnancy continues to pose a significant challenge to maternal and child health in Indonesia, particularly in high-burden areas like Central Kalimantan, while iron tablet supplementation has been widely implemented (Nurvembrianti et al., 2021). Focusing on improving maternal education through animated videos and leaflets can inform future public health interventions aimed at reducing the prevalence of anemia among pregnant women. The study's findings are expected to contribute to policy development, health education strategies, and ultimately the achievement of national and global maternal health targets.

RESEARCH METHOD

This research design uses a pre-experimental approach with a one-group pretest-posttest design that involved pregnant women at the Kereng Bangkirai Community Health Center, Palangka Raya, Central Kalimantan, during the period 1st January 2024-2025. This research was conducted from 14th to 19th July 2025, in the Kereng Bangkirai Community Health Center (UPTD) working area. The population of pregnant women was 235, and calculations were performed using the Slovin Formula with a 10% margin of error, resulting in an estimated sample size of 77 women with a sampling technique using purposive sampling.

There were inclusion and exclusion criteria. The following inclusion criteria were pregnant women (1st to 3rd trimester) who had ANC at Kereng Bangkirai Community Health Center and were willing to be respondents by signing the informed consent form. The exclusion criteria were Pregnant women who were not present during the activity and were not willing to fill out the informed consent form. Education was provided through animated videos and leaflets, accompanied by pretest and posttest questionnaires.

This stage begins with preliminary data collection, research proposal development, and ethical review, followed by an official permit application and request to the Head of Kereng Bangkirai Community Health Center. The tools used in this study were writing instruments, paper, laptops, internet quota, printers, and speed. The research material consists of a questionnaire on the importance of nutritional knowledge, iron tablet consumption, and antenatal care. Data obtained from the questionnaire were recorded, including pre- and post-education scores, education level, and occupation, and then entered into a table for analysis. In this study, data analysis was conducted using descriptive analysis and monitored in a table (Wahyuni, 2020).

Data processing on the importance of nutritional knowledge, iron tablet consumption, and Antenatal care (ANC) was conducted using questionnaires distributed during visits to the Kereng Bangkirai Community Health Center (UPTD). After receiving education, the study participants were asked to complete the questionnaire again to assess their knowledge after the education. The assessment system was divided into two parts: the pre- and post-education scores, and the pre- and post-test scores were then summed. Prior to implementation, formal permission was sought from the Head of the Program Implementation and Independent Midwifery Practices operating within the Community Health Center's working area. The involvement and approval of Independent Midwifery. This study has passed ethical review with number 155/UN24.9/LL/2025. This study was conducted based on the specified criteria, which include explaining the study benefits and the respondents' rights, protecting the privacy of respondents, and upholding aspects of fairness and the principle of openness by explaining research procedures and informed consent. Written informed consent was given to participate.

RESULTS

The results of this study about the relationship between education by animated videos and leaflets with mothers' knowledge about anemia in pregnant women at the UPTD Kereng Bangkirai Community Health Center in 2025 are summarized in the following findings.

Table 1. Respondent Characteristics

Variables	Frequency (n)	Percentage (%)
Education		
Elementary school	10	13
Junior high school	21	27.3
Senior high school	34	44.2

Variables	Frequency (n)	Percentage (%)
Diploma (D3)	3	3.9
Bachelor (S1)	9	11.7
Occupation		
Housewife	62	80.5
Employee	14	18.2
Government employees/TNI/Polri	1	1.3
Total	77	100

Based on Table 1, the majority of respondents' education was senior high school (44.2%), and the majority of respondents' occupation was housewives (80.5%).

The education sessions were delivered through a combination of audiovisual media (animated videos) and printed educational materials (leaflets), which were designed to be culturally appropriate and easily understandable by pregnant women of various educational backgrounds. Facilitators, including midwives and health cadres, reported a high level of participant attentiveness and enthusiasm throughout the sessions. Most participants demonstrated active participation during discussions and were willing to ask questions related to anemia prevention, iron supplementation, and nutritional intake.

Table 2. Result of Pre-test and Post-test Scoring

Scoring	Frequency (n)	Percentage (%)
Score Pre-Test		
Poor	24	31.2
Enough	17	22.1
Good	36	46.8
Score Posttest		
Enough	14	18.2
Good	63	81.8
Total	77	100

Based on the pretest scores, the majority of respondents were in the good category (score >80), accounting for 46.8%, while the poor category was 31.2% (score <60). In the post-test, the proportion of respondents in the good category increased significantly to 81.8%, while 18.2% were in the enough category. Next, a normality test using the Kolmogorov–Smirnov test was performed, and the significance value for the pretest and posttest data was <0.001, indicating that both data sets were not normally distributed. Therefore, further data analysis used a non-parametric test, namely the Wilcoxon Signed Ranks Test.

Table 3. Wilcoxon Ranks Test

		N	Mean Rank	Sum of Ranks
Post-Pre	Negative Ranks	0[a]	.00	.00
	Positive Ranks	64[b]	32.00	2016.00
	Ties	13[c]		
	Total	77		

a. Post < Pre
b. Post > Pre
c. Post = Pre

Based on the results of the Wilcoxon Signed Ranks Test, the Asymp. Sig. (2-tailed) value was 0.000 (p < 0.05), indicating a significant difference between the pretest and

posttest scores. This indicates that education has an effect on increasing respondents' knowledge, as indicated by an increase in scores after the educational intervention.

Table 4. Analysis of Statistical Results

	Post-Pre
Z	-6.920^{b}
Asymp. Sig. (2-tailed)	.000

The Wilcoxon test results showed that out of a total of 77 respondents, 64 experienced an increase in their posttest scores compared to their pretest scores (Positive Ranks = 64, Mean Rank = 32.00, Sum of Ranks = 2016.00). No respondents experienced a decrease in their scores (Negative Ranks = 0) or remained the same (Ties = 13). Therefore, it can be concluded that there was a significant increase in posttest scores compared to the pretest, indicating that the intervention or learning provided had a positive impact on improving respondents' knowledge.

DISCUSSION

The Wilcoxon Signed Ranks Test was used to analyze the statistical significance of the knowledge improvement. The test produced an Asymp. Sig. (2-tailed) value of 0.000 ($p < 0.05$), indicating a statistically significant difference between pre-test and post-test scores. The analysis showed that 64 pregnant women experienced an increase in their scores (positive ranks), 13 women showed no change (ties), and none experienced a decrease. This finding strongly supports the conclusion that the educational activity was effective in improving pregnant women's knowledge about anemia. The results of this evaluation imply that audiovisual media are an effective strategy to convey complex health information in a simplified and engaging manner. Additionally, printed leaflets served as reinforcement tools, allowing pregnant women to review the information at home or with family members, potentially extending the impact beyond the initial session.

These results are consistent with previous research that indicates a significant association between maternal knowledge and the incidence of anemia; the better the knowledge of pregnant women, the less likely they are to experience anemia during their pregnancy (Siregar et al., 2024). Pregnant women with insufficient knowledge about anemia will engage in negative behaviors, while those with sufficient knowledge will engage in positive behaviors to prevent or treat anemia (Hariati et al., 2019). Health education on nutrition, adherence to iron tablets, and regular antenatal care (ANC) for pregnant women has been shown to reduce the incidence of anemia during pregnancy (Kartika et al., 2020). Routine ANC involves not only distributing iron tablets or prenatal check-ups to health care providers but also emphasizing the importance of counseling, information, and education, so it's not only outreach but also direct interaction, which can influence mothers' knowledge about the importance of taking iron tablets during pregnancy (Hariati et al., 2019).

Previous research has shown that increased awareness and understanding are associated with better compliance, thus reducing the risk of anemia (Kolantung et al., 2021) by consuming 90 iron-folic acid tablets for protection against iron deficiency anemia (Rohimah et al., 2023). Strengthening maternal knowledge and reinforcing consistent consumption of iron tablets are essential components of effective anemia prevention strategies, particularly in regions with high prevalence rates such as Central Kalimantan. The WHO recommends that pregnant women receive a minimum of 90 iron-folic acid tablets throughout the course of pregnancy to ensure adequate protection against iron-deficiency anemia (Chandra et al., 2019). However, achieving this target

requires not only the availability of supplements but also consistent and correct consumption by pregnant women (Ramadhan, 2023). Strengthening maternal knowledge and reinforcing consistent consumption of iron tablets are therefore essential components of effective anemia prevention strategies, particularly in regions with high prevalence rates such as Central Kalimantan. Additionally, improving the quality of ANC services, including routine screening for anemia, individualized counseling, and follow-up on adherence, can further enhance the effectiveness of these interventions (Adriana, 2022).

The limitation of this study is that there are still many factors related to anemia in pregnant women, but the researcher only discussed the relationship between mothers' knowledge about anemia in pregnant women and the application of animated videos and leaflets in increasing knowledge. Moving forward, sustainability and scalability should be key considerations. Recommendations include integrating educational videos into routine antenatal care services, training more health cadres in effective health communication, and developing mobile-based platforms for continuous learning (Rohmatika et al., 2023). Moreover, long-term evaluations are needed to determine whether increased knowledge translates into sustained behavior change and improvement in maternal anemia prevalence, especially when providing education using videos has been proven to be effective in increasing knowledge (Zuleha et al., 2025).

From a broader perspective, addressing anemia in pregnancy also necessitates a multisectoral approach that includes improving dietary diversity, fortifying staple foods with iron, and addressing underlying social determinants such as poverty, gender inequality, and limited access to healthcare. Collaborative efforts between government agencies, healthcare providers, and community organizations are critical to ensure sustainable progress. Health promotion campaigns should be culturally sensitive and tailored to the specific needs of local communities, considering regional dietary patterns, traditional beliefs, and literacy levels (Aprilia & Puspitasari, 2024).

CONCLUSION

Evaluation results using pretest and posttests showed a significant increase in knowledge scores, as evidenced by the post-test results that found 63 (81.8%) participants in the good category. The Wilcoxon Signed Rank Test also showed a p-value <0.05. Based on the results, there is a relationship between education by animated videos and leaflets with mothers' knowledge about anemia in pregnant women at the Kereng Bangkirai Community Health Center in 2025. The better the knowledge of pregnant women, the less likely they are to experience anemia during their pregnancy. This is important in maternal health services at community health centers to reduce the rate of anemia and improve the quality of maternal health during pregnancy with educational activities implemented using interactive media such as animated videos, leaflets, and Q&A sessions have been proven to significantly improve pregnant women's understanding.

RECOMMENDATIONS

Based on this study, several recommendations are proposed like strengthening regular education in Antenatal classes, improving distribution and compliance with iron tablet supplementation, improve communication and counseling skills of health workers to effectively deliver key information on anemia prevention pregnant women, collaboration with community health cadres and local leaders, development of culturally appropriate digital educational media and periodic evaluation of intervention impact especially at UPTD Kereng Bangkirai Community Health Center.

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