
The Effectiveness Of Health Education Using Leaflets On Increasing Knowledge And Hemoglobin Levels In Pregnant Women At The Independent Practice Of Midwife Salabiah, Banda Sakti District, Lhokseumawe City, In 2025

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Abstract

Anemia remains a global health problem, particularly among pregnant women. In Aceh, the prevalence reached 36.3% in 2024, while in Lhokseumawe City in 2025, there were 154 cases out of 4,253 pregnant women (3.62%), with a higher rate at BPM Bidan Salabiah (25.9%). A preliminary survey in August 2025 showed 35% of pregnant women had hemoglobin levels <11 g/dL along with low understanding of nutrition and iron supplementation. This study aimed to determine the effectiveness of health education using leaflets on pregnant women's knowledge about hemoglobin levels at BPM Bidan Salabiah, Banda Sakti District, Lhokseumawe City. The research was conducted on August 20, 2025. The study employed a quasi-experimental one group pre-test post-test design with 7 purposively selected respondents. Data were collected using a knowledge questionnaire and analyzed with the paired t-test. Results showed the average knowledge score before the intervention was 4.86 and increased to 8.29 after, with a mean difference of 3.24. Statistical analysis revealed a p-value of 0.001 (<0.05), indicating a significant effect of leaflet-based health education on knowledge improvement. In conclusion, leaflets are effective in increasing pregnant women's knowledge about hemoglobin levels as an effort to prevent anemia. It is recommended that health workers, particularly midwives, use leaflets as a simple, practical educational tool. Future studies should involve larger samples and consider additional variables such as adherence to iron tablet consumption and actual hemoglobin levels.

Keywords: Leaflet, Knowledge, Hemoglobin, Anemia, Pregnant women.

INTRODUCTION

Anemia is one of the global health problems that still frequently occurs among women, especially pregnant women. According to the World Health Organization (WHO) report in 2023, approximately 35.5% of pregnant women aged 15–49 years worldwide experience anemia, while among women of reproductive age who are not pregnant, the prevalence reaches 30.5%. The World Health Organization (WHO) has set a global target to reduce anemia among women of reproductive age by 50% by 2030; however, the world is currently not on track to achieve this target. Anemia during pregnancy has serious consequences, including an increased risk of pregnancy and childbirth complications, low birth weight, premature birth, and impaired cognitive development in infants. In addition, anemia can reduce productivity, family welfare, and the overall quality of life in society (WHO, 2025).

In 2023, the prevalence of anemia among pregnant women in Indonesia reached approximately 27%, meaning that more than 1.3 million out of 4.9 million pregnant women experienced hemoglobin deficiency. This condition has serious implications for maternal and fetal health, such as an increased risk of premature birth, low birth weight, and stunting. To address this issue, the Indonesian government, through the Ministry of Health of the Republic of Indonesia, has begun replacing iron supplementation tablets with Multiple Micronutrient Supplements (MMS) and strengthening screening and education programs through the National Movement for Anemia Prevention, in collaboration with the Indonesian Midwives Association and the e-Nutri program (Ministry of Health of the Republic of Indonesia, 2023).

Based on the 2024 performance report of the Aceh Provincial Health Office, anemia among pregnant women remains an important issue in efforts to improve maternal and child health. Although the report does not specifically mention the anemia prevalence rate for 2024, previous data recorded that the prevalence of anemia among pregnant women in Aceh reached 36.3%, indicating a relatively high rate compared to the national target. Low compliance with iron tablet consumption is also one of the

contributing factors, with the coverage of iron tablet consumption (≥ 90 tablets) reaching only 36.2% that year (Aceh Health Office, 2024).

Meanwhile, based on 2025 data from the Lhokseumawe City Health Office, the prevalence of anemia among pregnant women varies across health service facilities. Overall, out of 4,253 recorded pregnant women, there were 154 cases of anemia (Hb <11 g/dL), resulting in a prevalence of 3.62%. However, the rate is significantly higher in certain health facilities. At the Banda Sakti Community Health Center, 86 out of 240 pregnant women (36%) experienced anemia between January and May 2023. Meanwhile, at the Independent Midwife Practice of Salabiah, through the e-Nutri screening program conducted from February to June 2025, 29 cases out of 112 pregnant women (25.9%) were identified (Lhokseumawe Health Office, 2025).

The e-Nutri (electronic nutrition) program is a technology-based digital innovation developed by the Lhokseumawe City Health Office to facilitate early detection and monitoring of anemia among pregnant women in a more structured and efficient manner. Through this application, midwives can record pregnant women's hemoglobin examination results in real time, monitor adherence to iron tablet consumption, and provide nutritional education through interactive features such as infographics, short videos, and daily reminders for iron tablet intake. In addition, e-Nutri provides a dashboard for health workers to map anemia-prone areas and carry out faster follow-up on high-risk cases (Lhokseumawe Health Office, 2025).

The distribution of cases identified in this program shows that although the overall anemia rate appears relatively low, there are pockets of high prevalence indicating the need for more intensive interventions. In response to this situation, the Lhokseumawe Health Office together with the Indonesian Midwives Association (IBI) has initiated nutrition education programs, iron tablet supplementation, and digital monitoring through e-Nutri as efforts to prevent anemia among pregnant women in a more targeted and equitable manner (IBI & Lhokseumawe Health Office, 2025). Therefore, health education using leaflet media is considered an additional strategy that is expected to improve pregnant women's knowledge and awareness regarding the importance of maintaining hemoglobin levels during pregnancy, while also supporting the effectiveness of technology-based programs such as e-Nutri in reducing anemia cases, particularly in the Banda Sakti District.

Several previous studies have shown that health education using leaflet media is effective in improving hemoglobin (Hb) levels among pregnant women. Sudarmi et al. (2022) found that the combination of leaflets and SMS reminders significantly improved adherence to iron tablet consumption and hemoglobin levels compared to the use of leaflets alone. Another study by Sela et al. (2024) also demonstrated that counseling using leaflets increased adherence to iron consumption from 54.65% to 76.50%. In addition, a combined intervention consisting of leaflets, group discussions, and monitoring cards conducted by Agustini et al. (2022) successfully increased average hemoglobin levels by 0.75 g/dL and significantly reduced the prevalence of anemia.

Anemia among pregnant women can be caused by various factors, such as insufficient iron intake in daily diets, low adherence to iron tablet consumption, short birth spacing, worm infections, and limited knowledge about anemia prevention. The side effects of iron tablets, such as nausea, are also frequently cited as reasons why pregnant women do not consume them regularly. Therefore, health education using leaflet media—especially when combined with other educational strategies—is considered effective in improving knowledge, adherence, and the nutritional status of pregnant women, particularly in efforts to prevent anemia.

Based on a preliminary survey conducted at the Independent Practice of Midwife Salabiah in Banda Sakti District, Lhokseumawe City, in August 2025, a total of 114 pregnant women were recorded as actively attending routine antenatal care visits. Among them, approximately 35% (around 40 pregnant women) were found to have hemoglobin levels below normal (<11 g/dL) based on routine examinations conducted by the midwife, indicating mild to moderate anemia. Meanwhile, 65% (around 74 pregnant women) had normal hemoglobin levels (≥ 11 g/dL). Informal interviews with several pregnant women also revealed that most of them still had limited understanding of the importance of nutrition during

pregnancy, the benefits of iron tablet consumption, and ways to prevent anemia. This condition indicates the need for educational interventions using simple and easy-to-understand media, such as leaflets, as an effort to effectively improve pregnant women’s knowledge and hemoglobin levels.

The researcher is interested in conducting this study because anemia among pregnant women remains a significant health problem in Indonesia, including within the service area of independent midwife practices. Anemia can have serious consequences for both the mother and the fetus, ranging from fatigue and impaired fetal development to an increased risk of bleeding during childbirth. Based on field observations, many pregnant women still lack understanding of the importance of regularly consuming iron tablets. Therefore, this study aims to determine whether health education using leaflet media, which is simple and easy to understand, can be an effective solution to improve pregnant women’s knowledge and hemoglobin levels. It is expected that this research will contribute to efforts in preventing anemia and improving the quality of maternal health services, particularly in independent midwife practices.

RESEARCH METHODS

This study used a quasi-experimental research design with a one group pretest–posttest approach to determine the effectiveness of health education using leaflets on increasing knowledge and hemoglobin levels among pregnant women. The research was conducted at the Independent Practice of Midwife Salabiah, Banda Sakti District, Lhokseumawe City, in 2025. The population in this study consisted of all pregnant women who visited the practice during the research period, totaling 22 pregnant women. The sample was selected using an accidental sampling technique, resulting in 7 respondents who met the inclusion criteria. Data were collected using a knowledge questionnaire consisting of 10 questions and hemoglobin measurements using a digital Hb analyzer. Data collection was carried out in two stages, namely pretest (before the intervention) and posttest (after the intervention). The intervention provided was health education using leaflets explaining anemia, the importance of hemoglobin levels, and iron consumption during pregnancy. Data analysis was performed using univariate analysis to describe respondent characteristics and knowledge levels, and bivariate analysis using the paired t-test to determine the effect of the intervention on changes in knowledge scores. The significance level used in this study was $\alpha = 0.05$.

RESULTS AND DISCUSSION

1) Respondent Characteristics

Table 1
 Frequency Distribution Of Respondent Characteristics In The Independent Midwife Practice Of Salabiah In Banda Sakti District Lhokseumawe City

No	Age	Frequency	Percentage (%)
1	22-25 years	2	28,6
	26-34 years	5	71,4
Total		7	100
No	Education	Frequency	Percentage (%)
2	SMP	1	14,3
	SMA	4	57,1
	D III/S1	2	28,6
Total		7	100
No	Work	Frequency	Percentage (%)
3	Private employees	1	14,3
	Housewife	6	85,7

	Total	7	100
No	Gestational Age	Frequency	Percentage (%)
4	27-32 week	5	71,4
	33-34 week	2	28,6
	Total	7	100
No	Parity	Frequency	Percentage (%)
5	Primipara (1)	2	28,6
	Multipara (2-4)	5	71,4
	Total	7	100

Source: Primary Data (Processed in 2025)

Based on Table 5.1, it can be seen that of the 7 respondents, the majority were aged 26-34 (5 respondents) (71.4%), 4 respondents (57.1%) had a high school education, 6 respondents (85.7%), 5 respondents (71.4%) were housewives, 5 respondents (71.4%) were between 27-32 weeks of gestation, and 5 respondents (71.4%) were multiparous.

2) Univariate Analysis

a) Knowledge of Pregnant Women Before Health Education

Table 2

Frequency Distribution Of Respondents Based On Knowledge Of Pregnant Women Before Health Counseling Using Leaflets. In The Independent Practice Of Midwife Salabiah In Banda Sakti District Lhokseumawe City

No	Knowledge	Frequency	Percentage (%)
1	Enough	3	42,9
2	Not enough	4	57,1
	Total	7	100

Source: Primary Data, (processed in 2025)

Table 5.2 shows that of the seven respondents, before receiving health education using leaflets, the majority (4 respondents, 57.1%) had insufficient knowledge, while 3 respondents (42.9%) had sufficient knowledge.

b) Knowledge of Pregnant Women After Health Education

Table 3

Frequency Distribution Of Respondents Based On Knowledge Of Pregnant Women After Health Education Using Leaflets At The Independent Practice Of Midwife Salabiah In Banda Sakti District, Lhokseumawe City

No	Knowledge	Frequency	Percentage (%)
1	Good	5	71,4
2	Enough	2	28,6
	Jumlah	7	100

Source: Primary Data, (processed in 2025)

Based on Table 5.3, it can be seen that after receiving health education using leaflets, the majority of the 7 respondents (5 respondents) had good knowledge (71.4%), while 2 respondents (28.6%) had fair knowledge.

2) Bivariate Analysis

a) Data Normality Test Results

Table 4

Normality Test Results (Shapiro-Wilk Test)

Group	Shapiro-Wilk		ρ value
	Statistics	Df	

Pretest	0,913	7	0,420
Posttest	0,935	7	0,591

Source: Primary Data (Processed in 2025)

Based on Table 5.4, the data normality test results show a normal distribution, with a pretest p-value of 0.420 and a posttest p-value of 0.591, both greater than 0.05. Therefore, the statistical test used was a paired t-test.

b) Effectiveness of Health Education on Knowledge

Table 5

Effectiveness Of Health Education Using Questions On Pregnant Women's Knowledge Of Hemoglobin Levels In The Independent Practice Of Salabiah Midwives In Banda Sakti District, Lhokseumawe City

Pregnancy exercise	Knowledge		ρ value
	Mean	Mean Difference	
Before	4,86	3,24	0,001
After	8,29		

Source: Primary Data (Processed in 2025)

Based on table 5.5, it can be seen that before being given health education using leaflets, the average knowledge of pregnant women about hemoglobin levels was 4.86, while after being given health education, the average knowledge of mothers increased to 8.29 with an increase value of 3.24. Based on the paired t test, the ρ value was 0.001, meaning that health education was effective in increasing the knowledge of pregnant women about hemoglobin levels.

Discussion

1. Knowledge of Hemoglobin Levels Among Pregnant Women Before Health Education

The results of the study showed that out of the 7 respondents, before receiving health education using leaflets, the majority had knowledge in the low category, with 4 respondents (57.1%), while 3 respondents (42.9%) had knowledge in the moderate category.

This finding indicates that before receiving education through leaflets, pregnant women's knowledge regarding hemoglobin levels was still limited. This low level of knowledge may be influenced by several factors, such as educational background, previous pregnancy experience, and limited access to accurate health information regarding anemia during pregnancy.

The researchers assume that the lack of exposure to formal health information sources (such as health education provided in health facilities) causes pregnant women to rely more on information from their surrounding environment or personal experiences, which may not always be medically accurate. This condition is consistent with the theory proposed by Notoatmodjo (2022), which states that knowledge is a cognitive domain influenced by factors such as education, experience, and access to information.

These findings are also consistent with previous studies indicating that many pregnant women have limited knowledge about hemoglobin levels and the risk of anemia, particularly among those who have not received regular health education.

2. Knowledge of Hemoglobin Levels Among Pregnant Women After Health Education

After receiving health education using educational leaflets, most respondents showed knowledge in the good category, with 5 respondents (71.4%), while 2 respondents (28.6%) had knowledge in the moderate category.

This improvement indicates that health education using leaflet media is effective in increasing pregnant women's understanding of hemoglobin levels, signs of anemia, maternal nutrition, and tips

for maintaining health during pregnancy. Leaflets, as visual and written media, allow pregnant women to receive information in a clearer and more memorable way and enable them to review the material again after the educational session.

The researchers assume that the effectiveness of leaflets in improving knowledge is due to their characteristics, which are simple, practical, supported by illustrations, and can be used as reference material by respondents. This is in line with the statement from the Indonesian Ministry of Health (2021) that printed health promotion media, such as leaflets, are effective tools for delivering information because they can be reviewed repeatedly and help strengthen the audience's understanding.

The findings of this study are also consistent with previous research indicating that printed media such as leaflets can significantly improve pregnant women's health knowledge, especially when combined with direct explanations from health workers.

3. Effectiveness of Health Education Using Leaflet Media on Increasing Knowledge of Hemoglobin Levels

The results of the study showed that before receiving health education using leaflets, the average knowledge score of pregnant women regarding hemoglobin levels was 4.86. After receiving the health education intervention, the average knowledge score increased to 8.29, with a mean increase of 3.24. Based on the paired t-test, the obtained p-value was 0.001, indicating that health education using leaflets was effective in improving pregnant women's knowledge about hemoglobin levels.

The researchers assume that this increase in knowledge represents an important initial step toward behavioral changes in pregnant women's health practices in preventing and managing anemia. This finding is consistent with the statement of the World Health Organization (WHO, 2020), which emphasizes that improving pregnant women's knowledge about nutrition and anemia is a key strategy in preventing pregnancy complications.

In addition, according to the Indonesian Ministry of Health (2021), health promotion media such as leaflets can increase pregnant women's awareness and motivation to maintain nutritional status and maternal health during pregnancy.

Thus, health education using leaflets has proven to be an effective strategy for improving pregnant women's knowledge about hemoglobin levels, which is an important initial step in supporting maternal and fetal health during pregnancy.

CONCLUSION

Based on the results of the research and discussion, several conclusions can be drawn:

1. Before receiving health education using leaflets, most respondents had knowledge in the low category, with 4 respondents (57.1%).
2. After receiving health education using leaflets, most respondents had knowledge in the good category, with 5 respondents (71.4%).
3. Before receiving health education using leaflets, the average knowledge score of pregnant women regarding hemoglobin levels was 4.86, while after the intervention it increased to 8.29, with an increase of 3.24. Based on the paired t-test, the p-value was 0.001, indicating that health education using leaflets is effective in improving pregnant women's knowledge about hemoglobin levels.

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