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THE EFFECTIVENESS OF BIA (BOOKLET IBU ANEMIA) ON IRON–FOLIC ACID (IFA) TABLET CONSUMPTION IN INCREASING HEMOGLOBIN LEVELS IN ANEMIC PREGNANT WOMEN

Efektivitas BIA (Booklet Ibu Anemia) terhadap Konsumsi Tablet Tambah Darah dalam Peningkatan Kadar Hemoglobin Ibu Hamil Anemia

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ABSTRAK

Kejadian anemia pada ibu hamil di Indonesia tahun 2019 masih tinggi, yaitu 48,9% yang mendekati masalah kesehatan berat (severe health problem) dengan prevalensi anemia lebih dari 40%. Kondisi ini menunjukkan perlunya media edukasi yang dapat meningkatkan pengetahuan dan kepatuhan ibu hamil dalam mengonsumsi tablet tambah darah. Salah satu media yang dapat digunakan adalah Booklet Ibu Anemia (BIA), yang dalam penelitian ini dikaji pengaruhnya terhadap peningkatan kadar hemoglobin. Penelitian ini bertujuan menganalisis pengaruh BIA pada ibu hamil anemia yang mengonsumsi tablet tambah darah terhadap peningkatan kadar hemoglobin. Desain penelitian kuantitatif dengan quasi eksperimen rancangan pretest-posttest group design. Lokasi penelitian di Puskesmas Nusa Indah, Puskesmas Muara Bangkahulu, Puskesmas Telaga Dewa dan Puskesmas Lempuing Kota Bengkulu pada bulan Juli-Agustus 2024. Sampel adalah ibu hamil sebanyak 60 responden menggunakan teknik purposive sampling dengan pertimbangan tertentu yang memerlukan kriteria khusus. Kelompok intervensi berjumlah 30 responden diberikan BIA dan tablet tambah darah selama 30 hari dengan dosis pemberian sehari sebanyak 1 tablet (60 mg tablet tambah darah dan 0,25 mg asam folat). Analisis data menggunakan uji t dan Mann-Whitney. Pada kelompok intervensi, kadar hemoglobin meningkat dari 9,9 gr%/dL menjadi 10,85 gr%/dL dengan rata-rata kenaikan 0,95 gr%/dL. Pada kelompok kontrol, kadar hemoglobin meningkat dari 9,86 gr%/dL menjadi 11,75 gr%/dL dengan rata-rata kenaikan 1,95 gr%/dL. Analisis menunjukkan perbedaan bermakna antara kedua kelompok (p=0,000). Temuan ini mengindikasikan bahwa BIA berkontribusi terhadap perubahan perilaku konsumsi tablet tambah darah, meskipun peningkatan kadar hemoglobin lebih tinggi pada kelompok kontrol menunjukkan bahwa faktor lain di luar intervensi kemungkinan turut memengaruhi hasil.

***Kata kunci**: booklet ibu anemia, hemoglobin, ibu hamil, kepatuhan, tablet tambah darah*

ABSTRACT

The prevalence of anemia among pregnant women in Indonesia in 2019 was 48.9%, nearing the threshold of a severe health problem, as prevalence above 40% is considered critical. This highlights the importance of educational media to improve knowledge and adherence to iron supplement consumption. One potential media is the Booklet Ibu Anemia (BIA), evaluated in this study for its effect on hemoglobin levels. This research aimed to analyze the impact of BIA on anemic pregnant women consuming iron supplements. A quantitative quasi-experimental design with a pretest–posttest group approach was employed at Nusa Indah, Muara Bangkahulu, Telaga Dewa, and Lempuing Public Health Centers in Bengkulu City from July to August 2024. A total of 60 pregnant women were recruited using purposive sampling with specific inclusion criteria. The intervention group (30 respondents) received BIA and iron–folic acid (IFA) tablet for 30 days at a dosage of one tablet daily (60 mg iron and 0.25 mg folic acid). Data were analyzed using the t-test and Mann–Whitney test. Hemoglobin levels in the intervention

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group increased from 9.9 g/dL to 10.85 g/dL (average rise: 0.95 g/dL), while in the control group, levels rose from 9.86 g/dL to 11.75 g/dL (average rise: 1.95 g/dL). Statistical analysis revealed a significant difference between groups (p=0.000). These results indicate that BIA supports better adherence to iron–folic acid (IFA) tablet intake, although the higher increase in the control group suggests that external factors beyond the intervention may also influence hemoglobin improvement.

Keywords: booklet Ibu anemia, compliance, hemoglobin, Iron–folic acid (IFA) tablets, pregnant women

INTRODUCTION

Anemia is a condition in which the number of red blood cells or the amount of hemoglobin contained is less than 11 mmHg. Anemia can occur in women and children [1]. Common symptoms of anemia include weakness, fatigue, and dizziness, which often interfere with activities and reduce the quality of life of sufferers [2]. Anemia can increase the risk of death and disrupt the function of vital organs, including the heart and brain [3]. Anemia in pregnancy increases the risk of low birth weight (LBW), premature birth, and the occurrence of AKI and IMR [4]. Insufficient hemoglobin levels in the body to transport oxygen to organs and tissues can increase the risk of anemia [5].

Anemia in pregnancy is one of the risk factors that contributes to bleeding in mothers giving birth[6]. Anemia, which is characterized by low hemoglobin levels, can severely limit the mother's body's ability to tolerate blood loss[7]. Anemia can increase the risk of bleeding and worsen the consequences, making them more widespread. Pregnant women with anemia are at high risk of hypovolemic shock during bleeding, which can lead to death and requires immediate treatment[8].

The nutritional and energy needs of pregnant women increase during pregnancy to support physiological changes in the body and fetal growth.[9]Insufficient nutrition during pregnancy will have a negative impact on the health of the pregnant mother and the survival of the fetus in the womb[10]. Based on data on the coverage of iron supplementation tablets in 2018, 73.2% of pregnant women in Indonesia received iron supplementation tablets, while 24% received 90 or more tablets, and 38.1% of pregnant women consumed 90 or more tablets, while 61.9% of mothers consumed less than 90 iron supplementation tablets during pregnancy[11].

The government has made various interventions to reduce the prevalence of anemia during pregnancy, such as giving 90 blood supplement tablets in the third trimester. However, the incidence of anemia is still high because the level of compliance with taking iron tablets is 25.5%[12]. This research addresses the issue of anemia in pregnant women, a government focus through a program to provide 90 iron supplements. Anemia is one of the Sustainable Development Goals (SDGs) 2 and 3, which aim to reduce malnutrition and ensure a healthy life for people of all ages by 2030[13].

Sa'adah Research,et al. in 2025 developed an iron tablet reminder application that functions as an alarm to increase compliance with iron tablet consumption, but it has not been equipped with educational media information about anemia in pregnant women[14]. Previous research has also developed an application to remind pregnant women to take iron tablets, but compliance with iron tablets is still low due to limited internet access and is influenced by the knowledge and support of the mother's family regarding iron tablets[15].

Based on the research results of Anisah and Sahiratmadja [16], the majority of respondents, namely 27 people (68%) had poor compliance in taking iron tablets, and 29 people (73%) had sufficient awareness of anemia. Therefore, it is necessary to develop a BIA (Booklet for Anemic Mothers) approach to monitor and assess the compliance of pregnant women in taking iron tablets, as well as providing education and facilitating their use. Pregnant women with anemia will benefit from BIA education and

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support, which will raise awareness of the impact of the condition and encourage them to take iron tablets.

Pregnant women are advised to take iron tablets to increase their blood. Increasing hemoglobin levels and consuming healthy foods, accompanied by the use of the BIA approach. For pregnant women with anemia, motivation can increase compliance in taking iron–folic acid (IFA) tablet[17]. The maternal monitoring card for daily iron–folic acid (IFA) tablet consumption is included in the BIA. This study aims to analyze the effect of BIA on anemic pregnant women consuming IFA tablets in relation to the increase in hemoglobin levels.

METHODS

The research type was quantitative with a quasi-experimental pretest and posttest with a control group design to determine whether there are changes in hemoglobin levels and behavior before and after the intervention of the booklet for pregnant women with anemia. The booklet for pregnant women with anemia is a mentoring method using a booklet containing educational materials about anemia during pregnancy and how to consume iron tablets. The design of the BIA begins with identifying the problem analysis and material needs for the booklet's content. Then, the material is compiled into a booklet. After the BIA is compiled, the researcher conducts a validation test by booklet material experts and language experts on the booklet's content. The booklet for pregnant women with anemia can be seen in the image below.

Figure 1. Booklet Ibu Anemia (BIA)

The research was conducted at Nusa Indah Community Health Center, Muara Bangkahulu Community Health Center, Telaga Dewa Community Health Center, and Lempuing Community Health Center, Bengkulu City, in July-August 2024. The research has received ethical approval on June 21, 2024, with the Number: No.KEPK.BKL/533/06/2024 from the Health Research Ethics Commission of the Ministry of Health Polytechnic of Bengkulu, Indonesia.

The sample was all pregnant women in Bengkulu with inclusion criteria and met the minimum sample size of 60 samples (30 controls and 30 interventions). Respondents were divided into two groups: the intervention group and the control group. Inclusion criteria were pregnant women with anemia in their third trimester (28-32 weeks), mothers who were willing to have their blood drawn for repeated hemoglobin level checks, and willing to sign the provided informed consent form. Exclusion criteria were pregnant women with a history of autoimmune disorders and pregnant women with a history of obstetric disorders. Sampling technique with purposive sampling.

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The variables in this study consisted of the independent variable (the anemia mother booklet), the mediating variable (knowledge), the dependent variable (hemoglobin increase), and confounding variables (age, parity, pregnancy interval, education level, and gestational age). The research instrument used was a knowledge questionnaire, administered before hemoglobin measurement during the pretest and posttest. The questionnaire included maternal identity data (age, parity, pregnancy interval, education level, and gestational age) and 12 items related to the definition and benefits of iron–folic acid (IFA) tablets, anemia, and factors affecting IFA absorption. The knowledge questionnaire employed a scoring system, modified and tested for validity and reliability, with a total r-value > 0.308. The behavior questionnaire consisted of eight yes/no questions on maternal compliance with medication consumption, and had been tested for validity and reliability with a total r-value > 0.624.

The research data were analyzed descriptively and analytically. For descriptive purposes, statistical measures such as numbers and percentages were presented for categorical data, while for numerical data, the average, standard deviation, median, and range were presented. The analysis used statistical tests: For numerical data, the Shapiro-Wilk test was used before analysis. To compare the differences in average Hb levels between the two groups, the Mann-Whitney test was used.

In the initial phase of the study, anemia screening was conducted for pregnant women through prenatal classes at the Nusa Indah Community Health Center, Muara Bangkahulu Community Health Center, Telaga Dewa Community Health Center, and Lempuing Community Health Center in Bengkulu City. Respondents with Hb levels between 7 and 10.9%/dL were then grouped into the study sample.

The researcher conducted an informed consent process and asked respondents to sign a consent form stating their willingness to participate. Respondents were then asked to complete a knowledge questionnaire. Afterward, the researcher provided education on the signs and symptoms of anemia, the dangers of anemia, and how to prevent and treat anemia during pregnancy using the Pregnant Women with Anemia Booklet (BIA). The education was conducted using a 15-minute lecture method during the pretest. The education was repeated during the posttest. Respondents' hemoglobin levels were checked using a digital Hb meter.

After the initial treatment, for 30 days, the intervention group was asked to complete an observation sheet found on the back of the booklet. The observation sheet was useful for monitoring the mothers' regular consumption of IFA tablets. In addition to providing guidance, respondents were given IFA tablets, each consisting of 60 mg iron supplements and 0.25 mg folic acid, to be taken for 30 days. The intervention group received monitoring of IFA tablets consumption via WhatsApp in the form of short messages, while the control group received no intensive guidance. After 30 days of the study, respondents in the intervention group received education and had their hemoglobin levels remeasured, then completed a posttest questionnaire. The control group only completed a posttest questionnaire. The study flow is shown in Figure 2.

The research was analyzed descriptively and analytically. The presentation of statistical measures of numbers and percentages for categorical data, while for numerical data, the average, standard deviation, median, and range were presented. To analyze the relationship between the two categorical data variables, a chi-square test was used. To analyze the effect of mentoring on increasing Hb levels, a 2x2 table was used, then the Relative Risk (RR) and 95% confidence interval were calculated. The significance of the test results was determined based on a p-value <0.05. All data processing and analysis work used the SPSS program version 26.

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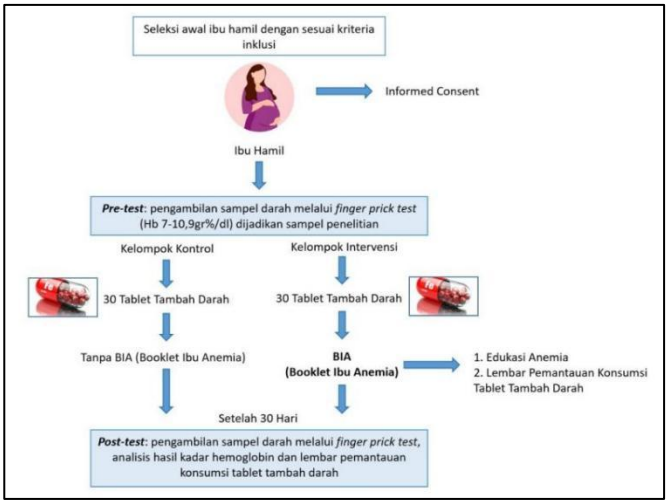

Figure 2. Research Flow

The research data were analyzed descriptively and analytically. For descriptive purposes, statistical measures of number and percentage were presented for categorical data, while for numerical data, the mean, standard deviation, median, and range were presented. For numerical data, a Shapiro-Wilk test was used before analysis. To compare the difference in average Hb levels in both groups before and after mentoring, the Mann-Whitney test was used. Meanwhile, to compare the difference in average Hb levels before and after mentoring, the t-test was used because the data were normally distributed.

RESULT

Table 1. Characteristics of Research Subjects

Variables	Group			
	Treatment		Control	
	n(30)	%	n(30)	%
Age (years):				
At risk (<20 or >35)	4	13	3	10
No risk (20-35)	26	87	27	90
Level of education :				
Elementary School	5	17	8	27
Secondary (Junior High School & Senior High School)	10	33	13	43
Higher Education	15	50	9	30
Occupation:				
Employed	18	60	23	77
Unemployed	12	40	7	23

*Chi-Square

Based on Table 1 above, which presents the characteristics of the subjects in the intervention and control groups, the age characteristics of both research groups show that the majority of respondents were not at risk, namely 26 respondents in the treatment group and 27 in the control group. The majority of respondents in the treatment group, namely 15 people, had higher education, and the majority in the control group, namely secondary education. The majority were unemployed in the treatment and control groups, namely 18 people and 23 people, respectively.

Based on Table 2 above, it appears that knowledge in the data before and after treatment, and the Hb levels before treatment, the results of the data normality test with a p value <0.05, the data is not normally distributed, so for further analysis purposes, a non-parametric statistical test will be used.

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Table 2. Descriptive Statistics of Various Variables Studied

Variables	Group	Statistical measures			Data normality test (p* value)
		Average	Min	Max	
Pre data:					
Knowledge	Treatment	8.20	7.95	8.45	0,000
	Control	8.60	8.28	8.92	0.002
Hb levels	Treatment	9.92	9.61	10.22	0.012
	Control	9.82	9.53	10.11	0.027
Post data:					
Knowledge	Treatment	11.20	10.90	11.50	0,000
	Control	10.00	9.72	10.28	0,000
Hb levels	Treatment	10.85	10.51	11.17	0.863
	Control	11.74	11.44	12.05	0.138

*Shapiro-Wilk test; data is normally distributed if the p-value>0.05.

Table 3 below presents the results of the analysis of the influence of the BIA method on changes in knowledge of anemia in pregnant women.

Table 3. Comparison of Knowledge Scores About IFA tablets in the Two Groups Before and After Being Given the Anemia Mothers Booklet

Knowledge score (scale of 100)	Group		*p-value
	Treatment (n = 30)	Control (n = 30)	
Pre-data:			
Average (SD)	8.20 (0.66)	8.60 (0.85)	*0.054
Range	7–9	7-10	
Post data:			
Average (SD)	11.20 (0.81)	10.00 (0.74)	*0,000
Range	9-12	9-11	
Increase:			
Knowledge score (Median)	3.00	1.00	*0,000

* Mann-Whitney test

Table 3 shows that the knowledge scores of the treatment and control groups did not differ significantly before treatment (p>0.05). However, after treatment, the knowledge scores of the two groups differed significantly (p<0.05). The knowledge score after treatment increased by 3.00, while the control group increased by 1.00. Therefore, the knowledge score in the treatment group was significantly different from the control group (p<0.001). Table 4 below presents a comparison of hemoglobin levels after 30 days of BIA treatment in the treatment group and the control group without BIA.

Table 4. Comparison of Hb Levels in the Two Groups

Hb level (g%/dL)	Group		p-value
	Treatment (n = 30)	Control (n = 30)	
Pre data:			
Average (SD)	9.9 (0.80)	9.8 (0.77)	
Median	10	9.9	*0.500
Range	8.4 – 10.9	8.3-10.9	
Post data:			
Average (SD)	10.85 (0.88)	11.75 (0.89)	
Median	10.85	11.8	**0,000
Range	10.52 – 11.17	11.45-12.05	
Increase:			
Hb level (average)	0.95	1.95	**0,000

* Mann-Whitney test; ** t test

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Comparison of hemoglobin levels before and after the treatment group (BIA Method) and the control group (without BIA) can be seen in Table 4, with the results that in the treatment group, the average Hemoglobin level before treatment was 9.9gr%/dL and after treatment 10.85gr%/dL, an increase of 0.95gr%/dL. In the control group, the average before treatment was 9.86gr%/dL and after treatment 11.75gr%/dL, an increase of 1.95gr%/dL. Thus, the Hb level after treatment increased with a value of p = 0.000 (p <0.001).

In the treatment group, almost all respondents (87%) were of a non-risk age, thus not indicating that those at risk are more likely to experience anemia and be non-compliant with iron supplementation. Mothers under 20 and over 35 are at risk of anemia due to physical and psychological factors. Pregnant women under 20 are at risk of anemia and are susceptible to malnutrition.

DISCUSSION

The results of this study are in line with the research of Shofiana et al. (2018)[18] showed no relationship between maternal age and the behavior of pregnant women in consuming iron supplements. The results of this study indicate that the majority of respondents (50%) had completed higher education, 33% had completed secondary education (junior high school and high school), and 17% had completed primary education. This is in line with research by Fertimah et al. in 2021.[19]namely 1.67% graduated from elementary school, 36.67% graduated from junior high school/high school, 61% graduated from an academy/university.

Based on the research results, the majority of anemic respondents (60%) were in the treatment group, and 77% in the control group, namely the unemployed group. Income and employment are interrelated because employment has a significant impact on people's eating and nutritional habits. People with low incomes find it difficult to buy food and consume nutrient-rich foods. The family's economic condition influences the type and amount of food they consume [21].

Education influences knowledge and awareness of health issues, such as anemia, and adequate understanding. Therefore, pregnant women should be informed about the benefits of IFA tablets, their significance, and the risks that will arise if it is not consumed according to the prescription [20]. Knowledge of pregnant women is one of the things that influences their health-related behavior [22]. Pregnant women who know the negative impacts of anemia and how to prevent it tend to adopt healthy lifestyle habits and reduce the risk of various diseases or anemia during pregnancy [23]. The risk of anemia in pregnant women can decrease due to this behavior [24]. Based on the results of the study, awareness of pregnant women regarding the consumption of iron-fortified tablets changed after receiving BIA intervention (p<0.001). This is in accordance with the study of Shofiana et al. in 2018 at the Maron Health Center, Probolinggo Regency, which found a strong relationship between knowledge of pregnant women and the use of iron-fortified tablets (p=0.026)[25]. Setiawati's 2018 study at the Meninting Health Center, Mataram, showed a correlation between compliance with iron-fortified tablets and health education about iron-fortified tablets in pregnant women's classes (p=0.000) [18]. Malnutrition, low iron supplement consumption, malabsorption, excessive blood loss during childbirth or previous menstrual cycles, and chronic diseases such as malaria, worms, and pulmonary tuberculosis are causes of anemia. Pregnancy anemia can be caused by taking iron supplements with coffee or tea, which bind to the iron supplements and prevent the body from absorbing them [26],[27].

The Effect of the BIA Method on Changes in the Behavior of Pregnant Women in Bengkulu City

Lack of knowledge about anemia affects health behavior, especially for pregnant women. Pregnant women who lack knowledge about anemia may consume less iron-

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rich foods during pregnancy due to their lack of knowledge[28]. Pregnant women who have good knowledge about iron-boosting tablets will tend to be compliant in taking them.iron suplementary tablet[29]. A person's actions are shaped by knowledge. Several studies and experiences show that behavior based on knowledge has a longer memory than behavior based on ignorance[30].

Based on the findings, BIA was shown to influence behavioral changes in iron tablet consumption among third-trimester pregnant women ($p < 0.001$). This result is consistent with the study conducted by Ikrawanty, which demonstrated a significant association between knowledge level and the incidence of anemia ($p < 0.05$). The study also concluded that knowledge level is one of the key factors influencing the occurrence of anemia[31].

The health behavior of pregnant women plays an important role in determining compliance with IFA tablets. Pregnant women who adhere to IFA tablet consumption are less likely to experience anemia [32]. A study conducted at the Bogor Tengah Community Health Center in 2016 by Purnamasari G. et al. reported that 50.9% of pregnant women consumed IFA tablets as recommended [33Similarly, research conducted at the Sikijang Community Health Center, Pelalawan Regency, in 2015 by Juwita R. found a strong correlation ($p = 0.000$) between anemia incidence in pregnant women and their compliance with IFA tablet consumption[34].

The Effect of the BIA Method on Changes in the Anemia Status of Pregnant Women in Bengkulu City

The results showed a p-value of 0.018 <0.05; that is, BIA assistance had an effect with RR = 2.80 and 95% CI between 1.12–7.02. In the BIA group, of the 30 respondents who consumed IFA tablets for 30 days, the average consumption was 29.76. The results of complete blood tests in 5 respondents who were still anemic, 3 respondents had IFA tablets consumption compliance of <30 days. In the group without BIA, of the 30 respondents who consumed IFA tablets for 30 days, the average IFA tablets consumption was 17.92. The results of complete blood tests in 12 respondents who were still anemic, iron tablet consumption compliance was <30 days with an average of 19.08. Compliance with IFA tablet consumption was measured based on maternal behavior in taking the tablets, awareness of the appropriate time to consume them, and continued adherence despite experiencing side effects such as constipation and nausea[35].

The most common reasons pregnant women fail to consume iron–folic acid (IFA) tablets are forgetfulness, lack of motivation, and limited understanding of their benefits[36]. In addition to knowledge-related factors, low adherence is also influenced by other variables, such as forgetfulness, fear of delivering a large baby, and insufficient information about the importance of IFA supplementation and the risk of anemia if not consumed. The BIA method serves as an educational and motivational tool for pregnant women, thereby improving adherence to IFA tablet consumption, which ultimately has a positive impact on anemia status.

The Effect of the BIA Method on Changes in Hemoglobin Levels of Pregnant Women in Bengkulu City

In the intervention group, hemoglobin levels increased from 9.9 g/dL to 10.85 g/dL, with an average rise of 0.95 g/dL. In the control group, hemoglobin levels increased from 9.86 g/dL to 11.75 g/dL, with a higher average rise of 1.95 g/dL. Statistical analysis indicated a significant difference between the two groups ($p = 0.000$). The results showed that the increase in hemoglobin levels in the control group was greater than in the intervention group. This difference may be influenced by factors other than the intervention, such as dietary variations, initial nutritional status, and support from family and healthcare professionals. These factors may contribute to the increase in hemoglobin levels, although they were not directly measured in this study. In addition, the potential for the Hawthorne effect should be considered, namely changes in

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respondent behavior due to their awareness of being observed. This condition may have encouraged increased adherence to IFA tablet consumption in both groups, thereby reducing the expected differences [37][38].

Thus, although the Anemia Mothers Booklet (BIA) proved effective in improving knowledge and compliance, its effect on hemoglobin levels was influenced by various external factors. These results indicate the need for further research with stricter controls for confounding factors and equal monitoring of consumption in both groups to more optimally assess the effects of BIA. The findings of this study align with those of Susilawati et al., 2021, who found that booklets increase hemoglobin levels in pregnant women and improve adherence to IFA tablets consumption. Health workers and midwives are encouraged to use booklets to improve adherence to iron supplementation. The number of iron supplements taken daily, accuracy of consumption, and frequency of use are factors used to assess adherence in pregnant women to iron supplementation [39]. Furthermore, this study aligns with Khairunnisa's 2021 study, which found that adherence is a factor associated with anemia (p-value = 0.000 < 0.05) [40].

The use of booklets to determine the increase in hemoglobin levels in pregnant women aligns with research by Elsharkawy (2022) that found that the average post-education knowledge score, compliance level, and hemoglobin level significantly increased. The health information package program, with regular follow-up using the WhatsApp platform, provides educational interventions for pregnant women with anemia.[26]. Individual education should be provided to women with symptoms of anemia during pregnancy to improve adherence to IFA tablets consumption [41].

The findings of this study provide scientific support for the possibility that hemoglobin levels in pregnant women can increase due to adherence to dietary intake, as the p-value is lower than in previous studies, at 0.000 (<0.05). The increase in hemoglobin suggests that pamphlets for anemia-promoting mothers can encourage mothers to consume IFA tablets, which directly benefits the health of pregnant women. Because this study did not examine the causes of anemia, further research is expected to identify the causes of anemia in pregnant women using a complete blood count (CBC).

This study has several limitations that should be considered when interpreting the results. Monitoring of iron supplement tablet consumption was not completely equivalent between the intervention and control groups. In the intervention group, monitoring was conducted through an observation sheet included in the BIA, while the control group simply followed standard community health center service procedures without intensive support. This difference in supervision has the potential to impact respondent compliance, which could influence hemoglobin levels.

CONCLUSION

This study demonstrates that BIA significantly influenced behavioral changes related to the consumption of iron supplements among third-trimester pregnant women (p < 0.001). Changes in anemia status also showed a significant effect, with a p-value of 0.018 (< 0.05), indicating that BIA assistance had an impact (RR = 2.80; 95% CI). In the intervention group, mean hemoglobin levels increased from 9.9 g/dL to 10.85 g/dL, with an average rise of 0.95 g/dL. In the control group, hemoglobin levels increased from 9.86 g/dL to 11.75 g/dL, with a greater average increase of 1.95 g/dL. Statistical analysis revealed a significant difference between the two groups (p = 0.000). Interestingly, the control group experienced a larger increase in hemoglobin levels compared to the intervention group, suggesting that factors beyond the intervention may have contributed to the outcomes. While BIA proved effective as an educational tool supporting behavioral change, its role in improving hemoglobin levels requires further investigation with closer monitoring and consideration of other influencing factors.

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