

# The Effectiveness of Fe and Folic Acid Tablet Intake Towards Changes in Hemoglobin Value in the Blood of Anemia Pregnant Women

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## ABSTRACT

Lack of hemoglobin in the blood (anemia) is a nutritional problem that is often experienced during pregnancy, which consequently causes growth disorders, development and complications during pregnancy and childbirth, which have an impact on maternal and infant mortality. In Indonesia, 5 out of 10 pregnant women experience anemia. The parameter used to detect anemia in the blood is hemoglobin. The aim of the study was to see the effectiveness of consuming Fe tablets and folic acid tablets on changes in hemoglobin values of anemic pregnant women.

The study used a comparative analytic, Repeated Measures Experiment design on 35 anemic pregnant women from the Alai Health Center in Padang City, who were chosen by purposive sampling. The tool utilized was a hematology analyzer, and the study's results were recorded on an observation sheet using the repeated measures ANOVA test.

The average hemoglobin value of anemic pregnant women before the supplementation intervention was 9.64 g%, and it was 10.43 g% after the supplementation intervention, according to the study's findings. Statistical tests showed the effectiveness of supplementation of Fe and folic acid tablets on changes in hemoglobin values of anemic pregnant women with a significance value of 0.000 ( $\alpha < 0.05$ ). Supplementation of Fe and folic acid tablets has a positive effect on the hemoglobin value of anemic pregnant women. This therapy is hoped to be applied in the management of health services, particularly for anemic pregnant women.

**Keywords:** Anemia, iron tablet, folic acid

## 1. INTRODUCTION

Anemia is a body condition where the hemoglobin concentration value in red blood cells is lower than the standard it should be. Pregnant women are said to be anemic if the hemoglobin level is <11 g% in the blood [1]. Pregnant women are susceptible to anemia because their nutritional needs are doubled from before pregnancy, therefore pregnant women need additional intake during pregnancy. The incidence of anemia in pregnant women in Indonesia was 48.9% in 2018, which increased from 37.1% in 2013 [2].

Iron deficiency, vitamin B12 deficiency, folic acid insufficiency, hereditary causes, infections, and bleeding illnesses can all cause anemia during pregnancy. Anemia in pregnancy is

one of the factors that causes maternal morbidity and mortality in Indonesia and even the world. Anemia in pregnant women can impact the fetus's/growth baby's and development during the pregnancy.

According to the World Health Organization (WHO), starting as early as possible during pregnancy, every pregnant woman should take Fe and folic acid tablets. Hemoglobin levels can be raised by taking 60 mg Fe pills with 400 mg folic acid [3]. Iron and folic acid requirements can be reached not just through food, but also through iron and folic acid supplements. Consuming iron supplements helps accelerate the increase in hemoglobin levels compared to consuming only iron intake from food sources. Folic acid supplementation intake has a significant effect on

erythrocyte levels compared to consuming folic acid extract contained in food [4].

Taking folic acid is important before and during pregnancy. Folic acid has an effect on the production of erythrocytes in the blood. Deficiency of folic acid results in disruption of the maturation of the erythrocyte nucleus, so that the shape and size of erythrocytes become abnormal. Disruption of the processing and absorption of folic acid results in the process of cell decomposition in the body being disrupted, resulting in inhibition of cell work in the body's system, including the reduction and absorption of iron content.

Fe tablets and folic acid supplements during pregnancy can assist to minimize the risk of anemia in the mother [5]. Other studies have found a relationship between appropriate iron and folic acid consumption and enhanced newborn and infant survival. [6]

Based on the foregoing, research into the effects of Fe and folic acid supplementation on changes in hemoglobin levels is required.

## 2. MATERIALS AND METHODS

### 2.1. Study Design and Research Sample

This type of comparative analytic research with Repeated Measures Experiment design. The research was conducted in Alai Health Center, Padang City. Purposive sampling was used to select a total of 35 pregnant women with anemia. Respondents' inclusion criteria were pregnant women with anemia in trimesters I – II with a hemoglobin level range of 8 – 10.9 g% without any psychological disorders and had no history of chronic disease, pregnancy complications and were willing to supplement with blood and folic acid tablets for 10 days according to standard operating procedures.

### 2.2. Research Procedure

The data collection technique was to collect research samples according to inclusion criteria, explain all research procedures and respondents filled out the informed consent.

Respondent data were obtained by using observation sheets which were filled in by the researcher. The observation sheet consists of 2

parts, namely the part regarding the identity of the respondent (name, age, last education, occupation and parity) and the second part regarding the results of the respondent's hemoglobin measurement before and after the intervention of supplementation with Fe and folic acid tablets.

Measurement of maternal hemoglobin levels was examined four times on the same subject. The first measurement of hemoglobin levels was carried out before the intervention of Fe and folic acid tablet supplementation (P0), the second measurement was carried out on the third day of supplementation (P1), the third examination was carried out on the seventh day (P2) and the fourth examination was carried out on the tenth day (P3). Hematology analyzer is used as a measurement tool.

### 2.3. Data Analysis

All analyzes were performed using SPSS version 15 software. The description of the sample characteristics in the form of a frequency distribution. The results of univariate analysis are provided as mean, standard deviation, and lowest and maximum values. Repeated Measures Anova bivariate analysis for comparative statistical test with *p*value < 0.05 [7]

## 3. RESULTS

The following are the findings of the study:

### 3.1 Characteristics of Sample

**Table 1** Overview Characteristics of Sample

Variable	Rata-rata (SD)	n (%)
(Age (year	27,8 (5,04)	-
< 21	-	2 (5,7)
21- 35	-	29 (82,9)
> 35	-	4 (11,4)
Educational Level	-	-
SMP	-	8 (22,9)
SMA/SMK	-	21 (60)

College		6 (17,1)
Job	-	-
Work	-	5 (14,3)
Does not work	-	30 (85,7)
Parity	-	-
Primigravida	-	14 (40)
Multigravida	-	21 (60)
Pregnancy Trimester	-	-
I	-	3 (8,6)
II	-	22 (62,9)
III	-	10 (28,6)
LILA (cm)	27,8 (3,08)	-
< 23,5	-	2 (5,7)
≥ 23,5	-	33 (94,3)

From the 45 anemic pregnant women who were obtained during the study, 10 respondents were excluded because they were not routinely consuming the tablets added with blood and folic acid that had been given.

The respondents' average age was  $27.8 \pm 5.04$  (age range 20 to 37 years). A majority of (60%) of respondents have high school/vocational education and do not work (85.7%). More than half of the respondents (60%) were parity multigravida and were in the second trimester of pregnancy (62.9%).

### 3.2 Univariate Analysis

**Table 2** Distribution of hemoglobin values in pregnant women with anemia before intervention, after 3 days, after 7 days and after 10 days of supplementation

Variable	n	Min	Max	Mean	SD
Hemoglobin Level before Intervention	35	8,50	10,3	9,6	,530

Hemoglobin level on 3 days	35	8,50		9,80	,549
Hemoglobin level on 7 days	35	8,70	10,6	10,1	,569
Hemoglobin level on 10 days	35	8,90	11,0	10,4	,657

Table 2 shows that before the intervention of Fe and folic acid supplementation tablets, all respondents had hemoglobin concentrations in the blood <11 gr %. The lowest hemoglobin value of respondents was 8.50 gr % and the highest was 10.30 gr % with an average of 9.6 gr %.

The results showed an increase in maternal hemoglobin levels after supplementation with Fe and Folic acid tablets which were carried out routinely for 10 days with an average of 10.43 g%. The lowest hemoglobin value is 8.9 g% and the highest is 11.40 g%.

**Table 3** The Effects of Fe and Folic Acid Supplementation Interventions on the Incidence of Anemia

	Incidence of Anemia	
	Yes n (%)	No n (%)
Before Intervention	35 (100)	0 (100)
After Intervention	25 (71,4)	10 (28,6)

Based on table 3 shows an increase in the number of pregnant women who do not experience anemia after being given the intervention of Fe tablets and folic acid supplementation by 28.6%.

### 3.3 Bivariate Analysis

The effectiveness of Fe tablets and folic acid supplementation on changes in hemoglobin values of anemic pregnant women.

**Table 4** The Effectiveness of Supplementation of Fe and Folic Acid Tablets on Changes in Hemoglobin Value Pregnant Women Anemia

	Score F	dF	Greenhouse-Greiser sig	Significance $\alpha \leq 0,05$
Supplementation of Fe and Folic Acid Tablets	67,79	1,581	0,000	significant

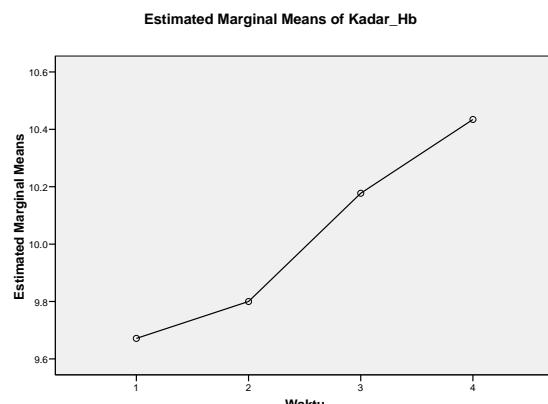
Based on table 4, the Greenhouse Greiseer sig value is  $0.000 < (0.05)$ , which means that there is an effectiveness of Fe and folic acid supplementation with changes in hemoglobin value against maternal hemoglobin values measured from time to time.

### 3.4 Changes in Hemoglobin Levels for Each Measurement Time to Time

Measurement of hemoglobin levels of pregnant women was measured 4 times, namely pre intervention ( $P_0$ ), 3 days after intervention ( $P_1$ ), 7 days after intervention ( $P_2$ ) and 10 days after intervention ( $P_3$ ).

**Table 5** Changes in Hemoglobin Levels For Each Measurement Time to Time

		Mean Difference	Sig <sup>a</sup>	Significance
$P_0$	$P_1$	0,129	0,001	Significant
	$P_2$	0,506	0,000	Significant
	$P_3$	0,763	0,000	Significant
$P_1$	$P_2$	0,377	0,000	Significant
	$P_3$	0,634	0,000	Significant
$P_2$	$P_3$	0,257	0,000	Significant



**Figure 1.** Plot of Average Acuity Changes in Hemoglobin Level

Based on table 5 and figure 1, the average change in hemoglobin levels is obtained for each time measurement. It was concluded that the regular intake of iron tablets and folic acid supplementation for anemic pregnant women can increase the hemoglobin value in the blood by 0.129 g% in the first administration. A very significant increase in hemoglobin levels occurred after administration of Fe and folic acid tablets after 10 days of regular consumption with an average increase of 0.763 g%.

## 4. DISCUSSION

The results showed that the intake of Fe and folic acid supplementation had an effect on changes in the hemoglobin value of anemic pregnant women. The increase in hemoglobin values took place on the tenth day of supplementation with an average increase of  $10.43 \pm 0.657$  gr% with a statistical test value of  $0.000 (\alpha < 0.05)$ , it can be concluded that there is a significant effectiveness between Fe tablets and folic acid supplementation on hemoglobin values, anemic pregnant women.

Another study found that Pregnant women who take iron folic acid as directed have a decreased chance of getting anemia than pregnant women who do not take iron folic acid [5] [8]. In meeting the iron needs of pregnant women require the intake of supplementation that comes from other than food to increase the rate of increase in hemoglobin levels in the blood [9].

## 5. CONCLUSION

Supplementation of Fe and folic acid tablets regularly for 10 days can increase the hemoglobin concentration in the blood of anemic pregnant women. This supplementation therapy can be implemented in providing comprehensive health services to pregnant women.

## AUTHORS' CONTRIBUTION

SZ, IYD, MI contributes to the conception, design, data analysis and research implementation.

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