

Pregnancy exercise with breathing exercise on changes in hemoglobin levels in anemic pregnant women



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ABSTRACT

Low hemoglobin levels in pregnant women will cause various complications for the mother and fetus. Pregnancy exercise is an exercise that prepares pregnant women physically and mentally for labor. The purpose study was to see the difference between pregnancy exercise to the combination of pregnancy exercise and breathing exercise to the change in hemoglobin levels in anemic pregnant women. This study was a quasi-experimental study with a nonrandomized design pretest and posttest with control group design aimed at analyzing the effect of pregnancy exercise on hemoglobin levels of pregnant women. The location of the study was conducted at Putri Ayu Public Health Center, Jambi, Indonesia in 2018. Samples were taken by purposive sampling technique as many as 30 people were divided into control and treatment groups. The independent t-test showed that there was increasing level of hemoglobin level of pregnant women who exercise with breathing techniques ($t=0.288$; $df=28$; $p\text{-value}=0.776$; $mean=0.0667$; $SE=0.23161$; $95\%CI= (-4077)-0.54110$) and exercises without breathing techniques ($t=0.288$; $df=19.422$; $p\text{-value}=0.777$; $mean=0.0667$; $SE=0.23161$; $95\%CI= (-4174)-0.55073$). The dependent t-test shows that pregnancy exercise with breathing exercise was increasing hemoglobin level more than pregnancy exercise without breathing exercise ($p\text{-value}=0.010$). Pregnancy exercise with breathing exercise was more effective to increase the hemoglobin level in anemic pregnant women.

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INTRODUCTION

Maternal and infant mortality rates reflect a country's level of health development and the quality of life of its people. This figure is used to monitor and evaluate population and health policies and programs. Indonesia's health program has focused on reducing child mortality rates which are quite high. The reduction in infant and maternal mortality has been the main goal to achieve 4 and 5 of the Millennium Development Goals (MDGs)¹

Riskesdas data in 2013, showed the number of anemia pregnant women in Indonesia was 37.1% with the proportion in rural areas (36.4%) and in cities (37.8%). Low levels of hemoglobin in pregnant women must be addressed immediately so as not to continue to decrease, because this condition will cause various complications that can endanger the situation of the mother and fetus. Anemia in pregnancy makes the mother



more susceptible to infection, fetal hypoxia, LBW, birth defects, bleeding and even death of the mother and fetus. Pregnant women with low HB levels are 3.7 times more at risk of dying than those who have normal HB levels²

The pregnancy period consists of three trimesters and there are anatomic and hormonal changes in many organ systems, one of which is a hematological change in the cardiovascular and cardiovascular systems. In pregnant women progressive changes in the amount of blood volume, especially weeks 6 and 8 and reach a maximum point in pregnancy approaching 32-34 weeks, consisting of changes in plasma, red blood cells (erythrocytes) and white blood cells (leukocytes). Plasma volume increases 40-50%, but red blood cells increase by only 15-20% which causes physiological anemia (normal conditions 12 hg gr / dl and hematocrit 35%), the presence of hemodilution processes, blood viscosity also decreases by approximately 20% . The exact mechanism of this increase in blood volume is unknown but some hormones such as rennin angiotensin-aldosterone, atrial natriuretic peptide, estrogen and progesterone also play a role in this mechanism. Measurement of hemoglobin levels in pregnant women tends to decrease the amount of hemoglobin in the blood. Many pregnant women worry that if they have anemia, especially before delivery can cause bleeding because of decreased HB levels effect in causing bleeding during labor³

Pregnant women need to have a healthy and fit body through efforts to eat regularly, get enough rest and exercise according to the dose. With a fit and healthy body pregnant women can still carry out their daily routine tasks, reduce stress due to anxiety faced before labor. The type of exercise that is most suitable for pregnant women is pregnancy exercise. Pregnancy gymnastic movements are adjusted to the number of physical changes such as genital organs, enlarged abdomen and others. By following pregnancy exercises regularly and intensively pregnant women can maintain a healthy body and the fetus that is conceived optimally⁴.

Exercise and physical activity are recommended for pregnant women, namely pregnancy exercise, because it provides many benefits. The recommended exercise is exercise that is safe for pregnancy. One of them is gymnastics and physical activity for pregnant women⁵

Pregnancy exercises are exercises that aim to prepare pregnant women physically and mentally in the face of childbirth. Movement in pregnancy can make blood circulation increase and oxygen is transported to the muscles and body tissues to multiply. Movement in pregnancy can increase blood pressure and cause changes in intramuscular osmotic pressure so that it can push water from the vascular compartment into the interstitial space and make the plasma volume fall and automatically increase hemoglobin levels⁶

Nida's research at the Kasih Ibu Hospital in Surakarta showed that there was an effect of pregnancy exercise on changes in hemoglobin levels in third trimester pregnant women. The handling of anemia in pregnant women has been treated with Fe tablets. Fe tablets were given 90 days in a row with a dose of 1 tablet a day. It aims to increase hemoglobin levels The use of pregnancy exercises as a step to help increase HB levels is still unknown, both by health workers and pregnant women themselves⁷

Based on data from the Jambi City Health Office it is known that the number of pregnant women is 14,593 people as many as 1338 people (9.17%) pregnant women have anemia (HB<11 gr/dl). Pregnancy exercise activities have been carried out in all Community Health Care in Jambi City, but the effect is not yet known to the hemoglobin levels of pregnant women, especially pregnant women with anemia⁸

METHOD

This research is a quasi-experimental study using a nonrandomized pretest and posttest with control group design aimed at analyzing the effect of pregnancy exercise on hemoglobin levels in anemic pregnant women. The location of the study was conducted at

the Puskesmas Putri Ayu Jambi City in April to August 2018. The population in this study was pregnant women TR II and III who received 859 people. Samples were taken with a purposive sampling technique of 30 people consisting of treatment groups namely pregnant women who carried out exercises using breathing techniques as many as 10 mothers and a control group that is pregnant women who exercised without using breathing techniques as many as 10 pregnant women. The treatment group was given an intervention in the form of following pregnancy exercise using breathing techniques then hemoglobin levels were examined after the intervention. While the control group of 10 people followed the pregnancy exercise without breathing techniques and examined the hemoglobin level after the intervention. Examination of hemoglobin levels was carried out using digital HB assays. Pregnancy gymnastics is performed at the Putri Ayu Health Center with trained gymnastic instructors. Data analysis was performed univariately to determine the frequency distribution and then bivariate analysis using t-test dependent test to see differences in hemoglobin levels before and after the intervention in the treatment and control groups.

RESULTS AND DISCUSSION

Based on the results of the study, the distribution of respondents based on the characteristics of respondents and can be seen in the following table 1:

Table 1. Characteristics of Pregnant Gymnastics Respondents at Putri Ayu

No	Characteristics	N	
		f	%
1	Age		
	<20 years	0	
	20-35 years	29	96,67
	> 35 years	1	3,33
2	Education		
	<High school	2	6,67
	≥ High school	28	93,33
3	Profession		
	Government employees	1	3,33
	Private employees	5	16,67
	LABOR / Trader	6	20
	Housewife	18	60
4	Pregnancies		
	1	12	40
	2-3	15	50
	>3	3	10

Based on table 1 it is known that some respondents were in the age range of 20-35 years as many as 29 (96.67%) people, the majority had education ≥ High School as many as 28 (93.33%) people, the most work was housewives as many as 18 (60 %) people, while based on gravida most are 2-3 pregnancies, 15 (50%) people.

Table 2. Hemoglobin levels in 2 groups of Pregnant Gymnastics in Putri Ayu Health Care

Hemoglobin Levels	Pregnant Exercise with Respiratory Exercise		Pregnant Exercise without Respiratory Exercise		Total	%
	f	%	f	%		
Anemia	13	86,67	13	86,67	26	86,67
No Anemia	2	13,33	2	13,33	4	13,33
Total	15	100	15	100	30	100

Based on table 2, it is known that the majority of respondents had anemia, namely 26 (86.67%) people.

Table 3. Increased HB before and after pregnancy exercise at Putri Ayu

Hemoglobin Levels		Group I		Group II	
		Before	After	Before	After
Lowest Levels	Hemoglobin	8 gr/dl	8.3 gr/dl	9.8 gr/dl	10 gr/dl
Highest Levels	Hemoglobin	11 gr/dl	11.2 gr/dl	11 gr/dl	11 gr/dl

Table 3 shows that in group I the lowest Hb level was 8 gr / dl, and the highest was 11 gr / dl, then in group II the lowest Hb level was 9.8 gr / dl and the highest HB was 11 gr / dl, after pregnancy exercise the HB levels increased in both groups.

Table 4. HB levels in the Pregnancy Exercise group with Respiratory Exercise

Hemoglobin Levels	N	Mean	SD	Std Error Mean
Pregnancy Exercise With Breathing	15	10.0400	0.81836	0.21130
Pregnancy Exercise	15	9.9733	0.3336736	0.09485

Based on the Independent Samples Test, it is known that there are differences in hemoglobin levels of pregnant women who exercise with breathing techniques and exercises without breathing techniques can be seen in the following table:

Table 5. Differences in HB Levels in the Two Pregnancy Exercise Groups

Hemoglobin Levels	Levene's Test for Equality of Var			t-test for equality of Means					
	F	Sig	t	df	Sig	Mean	SE	95 % CI	
								lower	Upper
pregnancy exercise with breathing exercises	7.615	0.010	0.28	28	0.77	0.0666	0.2316	- 4077	0.5411
Pregnancy Exercises			0.28	19.42	0.77	0.0666	0.2316	- 4174	0.5507
			8	2	7	7	1		3

Based on table 5 it is known that there are differences in Hb levels in the pregnant gymnastic group with breathing exercises with a control group with 0.010 ($<\alpha$ 0.05) meaning there is an influence on hemoglobin levels in women who do pregnancy exercise with breathing exercises.

DISCUSSION

The results showed that there were differences in hemoglobin levels of pregnant women before and after pregnancy exercise. In the group of pregnant exercise using breathing exercises, the average HB level increased 0.81 gr / dl, while the group of pregnant exercise without breathing exercise experienced an increase in average HB level of 0.36 gr/dl. According to Wagey research pregnancy exercise is a useful form of physical activity because movement in pregnancy causes blood circulation in the body to increase and oxygen transported to the muscles and body tissue increases causing changes in intramuscular osmotic pressure thereby pushing water from the vascular compartment to the space interstitial so that plasma volume falls automatically raising hemoglobin levels. The advantage of pregnancy exercise for pregnancy is a decrease in heart rate abnormalities, umbilical cord and meconium, decreased energy use, reduced pain, and improve APGAR and psychomotor fetus. A natural and smooth delivery can be achieved if the muscles can continue to contract properly, rhythmically and strongly. Regular pregnancy exercises will strengthen the abdominal wall muscles, pelvic floor muscles and surrounding areas⁹

Mardianti's research on the effect of pregnancy exercise on pregnant women's hemoglobin levels in the working area of the Rengasdengklok Health Center in Karawang showed an average increase in maternal Hb levels before and after pregnancy exercise with (P value: 0.00). The results showed that pregnancy exercise influenced 5.4% of the increase in hemoglobin levels¹⁰

Wahyuni's research shows that pregnancy exercise influences the duration of sleep for third trimester pregnant women with a pvalue: 0.004. This is because pregnancy exercise will provide a relaxing effect on pregnant women which can affect the increase in sleep duration for pregnant women¹¹

Ulum research shows that there is an effect of the addition of Breathing Exercise on pregnancy exercise to increase the lung vital capacity of pregnant women with the results of hypothesis testing I and II using Paired samples t-test in group A $p = 0,000$ and group B $p = 0,000$, this shows that both interventions have an effect on increasing vital lung capacity in pregnant women in each group. Factors that affect the decrease in lung vital capacity due to changes that occur in pregnant women such as an increase in body weight, an enlarged uterus about a thousand times larger than normal size. This uterus will push the diaphragm so that it will disrupt the respiratory system, besides that there are also hormonal changes including the increase of the hormones estrogen, progesterone, relaxin and insulin¹²

Bingan Research (2018) T test results showed that the p-value was 0,000 (<0.05) and the average fetal heart rate in the group of pregnant women who participated in pregnancy exercise was 144.94 and the average fetal heart rate at the group of pregnant women who did not participate in pregnancy exercises that is 157.56, it can be concluded that there is a relationship between pregnancy exercises with fetal heart rates in pregnant women who do pregnancy exercises. There are differences in fetal heart rate in pregnant women who follow pregnancy exercises and pregnant women who do not follow pregnancy exercises¹³

Natalina Pratama research (2017) there was an increase in the average Hb levels in the group of pregnancy exercise by 0.300 ± 0.43 , an increase in the average Hb levels in the education group about anemia by 0.122 ± 0.20 , an increase in the average Hb levels in the group pregnancy exercise and education about anemia by 0.70 ± 0.48 , but there was

no increase in the average Hb level in the non-pregnancy and non-exercise (control) group, there was a decrease in the average hb level in the control group by $0.255 \pm 0,94$. Different test results using the ANOVA formula obtained p value 0.013 (<0.05) so that it can be concluded that there are significant differences in the blood hemoglobin levels of pregnant women in the sample group¹⁴

The study of Widyawati & syahrul (2013) regarding the relationship between gestational age and vital lung capacity is started in pregnant women who have entered gestational age > 20 weeks with consideration at the gestational age that the fetus and placenta are fully formed and viable fetuses live outside the uterus. Besides that as the gestational age increases, the weight of the pregnant woman will change, pelvic bone position weakens, coordination usually decreases and the mother begins to feel discomfort towards changes in her body, pregnant women breathe deeper than usual as compensation to meet the oxygen demand due to diaphragmatic pressure due to uterine push which is enlarged¹⁵

CONCLUSION

There is the influence of pregnancy exercises with breathing exercises on changes in hemoglobin levels in the Putri Ayu Health Center in Jambi City

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