



## Model for the control of back pain in pregnant women using gymnastic yoga

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### ABSTRACT

#### Background

Back pain is a complaint during pregnancy and, if not treated properly, can affect the condition of both the mother and fetus, leading to complications. Exercise during pregnancy is an effective, non-pharmacological method for dealing with back pain during pregnancy. Gymnastic yoga is one management option for reducing back pain in pregnant women.

#### Objective

To analyze the effects of yoga exercises on the intensity of back pain levels in pregnant women.

#### Method

This study used a quasi-experimental control group design with pre- and post-intervention tests. A total of 40 participants were divided evenly into 2 groups, for 20 respondents per group. Group 1 received a gymnastic yoga intervention, while group 2 was the control group. The differences in back pain levels was assessed using the Mann-Whitney U-test.

#### Results

The average reported back pain level with the NRS measurement scale after treatment was  $2.35 \pm 0.67$  (mild pain), while the control group was  $4.1 \pm 0.78$  (moderate pain). While the average reported back pain level with VAS measurement scale after treatment was  $23.5 \pm 6.70$  (mild pain), while the control group was  $41 \pm 7.88$  (moderate pain). The results of different back pain tests using the Mann-Whitney test obtained p value = 0,000.

#### Conclusion

Gymnastic yoga effectively reduced back pain in pregnant women.

**Keywords:** Pregnancy, Pregnancy Gymnastics, Yoga, Back Pain.

## INTRODUCTION

Pregnancy is a happy process, but many physical and psychological changes occur during pregnancy, and many discomforts are experienced by pregnant women. Back pain is a commonly reported discomfort in pregnant women. Globally,

more than 50% of pregnant women complain of back pain. [1] In Indonesia, 20–80% of pregnant women complain of back pain. [2] Back pain during pregnancy often results in the decreased ability to perform daily functional activities. Pregnant women with back pain report symptoms of pain, muscle spasms, and impaired functions

during their daily activities. If back pain is not handled properly, it can result in reduced quality of life for pregnant women. Back pain can also result in relapsing injuries and often gets worse during the course of gestation. [3] Managing back pain during pregnancy is necessary to reduce feelings of discomfort. The pharmacological management of low back pain is associated with increased risks of pregnancy complications. Therefore, non-pharmacological therapy is required to reduce the back pain experienced by pregnant women. Some government efforts to respond to this problem include teaching a class for pregnant women on exercise during pregnancy; however, the activity during these classes typically last only 15-20 minutes. [4] Gymnastic yoga is a non-pharmacological therapy option that can reduce pain. Yoga exercises engage the body physically, mentally and spiritually through physical exercise, breathing exercises, relaxation exercises, and meditation. Yoga has been shown to have physical and psychological benefits, such as reducing back pain, insomnia, depression, anxiety, and stress and relieving muscle tension and pain.<sup>1</sup> Previous studies have shown that prenatal yoga can be useful for reducing anxiety during pregnancy. [5] Therefore, this study aimed to analyze the discomfort of pregnant women, based on reported back pain beta-endorphin levels, following a gymnastic yoga intervention for pregnant women at the Ngesrep Health Center in Semarang.

## METHODS

This experimental study was performed using the quasi-experimental method, consisting of a control group design with pre-and post-intervention tests. A total of 40 pregnant women in their third trimester were divided evenly into 2 groups, with 20 pregnant women in the treatment group and 20 pregnant women in the control group. The treatment group received pregnancy exercise and yoga exercises for 2 times a week for 4 weeks. While the control group received pregnancy exercise treatment for 2 times a week for 4 weeks.

Back pain was reported using the Numeric Rating Scale (NRS) and Visual Analog Scale (VAS). Differences between the 2 groups were assessed using the Mann-Whitney U-test. Ethics approval was obtained from the Ethics Committee for Health Research at Sultan Agung University, Semarang No. 035/B.1-KEPK/SA-FKG/III/2019.

## RESULTS AND DISCUSSION

The characteristics of respondents included the characteristics of age, occupation, parity, weight, stress level in the intervention group and the control group can be seen through the following table:

**Table 1 Characteristics of Respondents in the Intervention Group and Control Group.**

Karakteristik	Kelompok		<i>p value*</i>	
			Intervensi	Kontrol
	n	%	n	%
<b>Usia</b>				0,351
<20 tahun	3	15	2	10
21-35 tahun	17	85	18	90
>35 tahun	0	0	0	0
<b>Pekerjaan</b>				0,463
Bekerja	5	25	4	20
Tidak Bekerja	15	75	16	18
<b>Paritas</b>				0,493
Primigravida	5	25	6	30
Multigravida	15	75	14	70
<b>BB</b>				0,916
Kenaikan BB <1 Kg	3	15	3	15
Kenaikan BB ±1Kg	15	75	14	75
Kenaikan BB >1 Kg	2	10	3	15
<b>Tingkat Stres</b>				

Karakteristik	Kelompok				p value*
	Intervensi		Kontrol		
	n	%	n	%	
Tidak stress	15	75	13	65	0,187
Ringan	5	25	7	35	
Sedang	0	0	0	0	
Berat	0	0	0	0	

\*levene's test

Table 1 illustrates that the majority of respondents, both in the intervention group and the control group in this study, average age 21-35 years, the average does not work, the average multiparity, the weight gain in the third trimester is on average 1 kg on average respondents did not experience stress. From the results of the homogeneity test, the p value of all variables > 0.05 means that there is no significant difference between the intervention group and the control group.

### Effectiveness of yoga exercises on the reduction of back pain in pregnant women.

Using the NRS, both the control and intervention groups reported that the intensity of back pain reduced significantly after the intervention compared with before the intervention

(p < 0.05). The average reduction in back pain intensity reported by the intervention group was  $-4.75 \pm 0.44$ , which was a significantly larger reduction (p=0.000) than average reduction of  $-2.75 \pm 0.44$  reported for the control group.

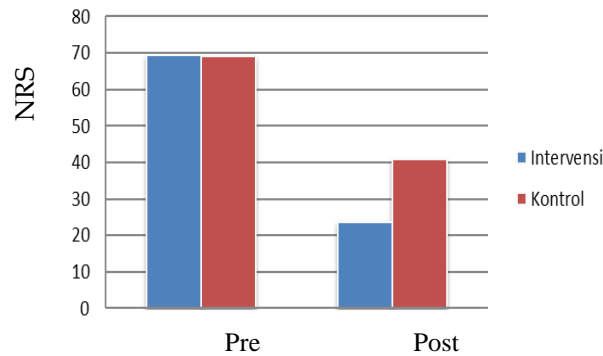
Using the VAS, both the control and intervention groups reported that the intensity of back pain reduced significantly after the intervention compared with before the intervention (p<0,05). The average reduction in back pain intensity reported by the intervention group was  $-46 \pm 6,80$ , which was a significantly larger reduction (p=0,000) than average reduction of  $-30,88 \pm 6,15$  reported for the control group.

These results indicate that gymnastic yoga was effective for reducing back pain in pregnant women.

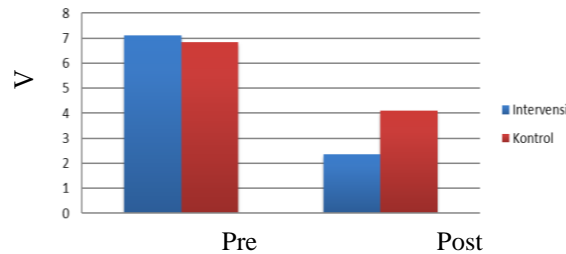
**Table 2 Effectiveness of Gymnastic Yoga for Reducing Back Pain Intensity in Pregnant Women**

Variable	Pre Mean±SD	Post Mean±SD	p-value
<b>NRS</b>			
Intervention	7.1±0,64	2.35±0.67	0.000 <sup>a</sup>
Control	6.85±0.67	4.1±0.78	0.000 <sup>a</sup>
<b>p value (n=40)</b>	<b>0.230<sup>b</sup></b>	<b>0.000<sup>b</sup></b>	
	<b>Intervention Mean±SD</b>	<b>Control Mean±SD</b>	
$\Delta$	-4.75±0.44	-2.75±0.44	0.000 <sup>b</sup>
<b>VAS</b>			
Intervention	69.5±5.10	23.5±6.70	0.000 <sup>a</sup>
Control	69±6.4	41±7.88	0.000 <sup>a</sup>
<b>p value (n=40)</b>	<b>0.756<sup>b</sup></b>	<b>0.000<sup>b</sup></b>	
	<b>Intervention Mean±SD</b>	<b>Control Mean±SD</b>	
$\Delta$	-46±6.80	30.88±6.15	0.000 <sup>b</sup>

<sup>b</sup> Mann-Whitney test<sup>a</sup> Wilcoxon test



**Graph 1 Average Pain Intensity Using NRS**



**Graph 2 Average Pain Intensity Using VAS**

Yoga strives to connect physical, mental and spiritual factors to achieve overall health. [6] During pregnancy, yoga can increase strength and stamina, facilitate blood circulation, and reduce back and waist pain. [6] In this study, the gymnastic yoga used aims to extend and relax the body muscles that have been tightened due to the growing size of the mother's abdomen and bad posture.

The yoga asana movement can stimulate interactions between endogenous analgesic systems in response to pain signals. Pain signals are sent to the posterior horns of the spinal cord, which initiates a complex reaction to raise awareness of the pain-inducing conditions, allowing the body to change and control the perception of pain so that pain will not reduce the motion of joints and muscles.

Yoga asanas are well-adapted to treat back pain in pregnant women because yoga asanas prioritize the repair and improvement of the body structure. [7] Regular yoga exercises can result in the abilities to stand better, walk longer, and run faster, without experiencing pain. The function and efficacy of yoga allow those who perform yoga to overcome problems related to anatomical functions of the body.

By performing several stretching poses the muscles in the back are stretched and flexed,

facilitating blood circulation, which can block the occurrence of pain and increase the awareness of pain so that the body can more easily respond to the occurrence of pain. Smooth blood flow can stimulate the brain to release natural pain-relieving chemicals.

In this study, yoga was able to significantly reduce the level of lower back pain ( $p=0.000$ ) when performed 2 times a week for 4 weeks. Previous research on complementary and alternative medicinal approaches for reducing low back pain in pregnancy reported that massage (61.4%), acupuncture (44.6%), yoga (40.6%) and chiropractic (36.6%) therapies were effective. [6]

Exercise is often recommended to relieve back pain in pregnant women. Yoga is one form of exercise that can be performed by pregnant women, and yoga can increase flexibility and comfort, in addition to supporting blood circulation and reducing back pain, aches, and swelling.

Regular yoga practice can cause slight painful sensations in some parts of the body but also increases awareness and the ability to control the body. [7] To maintain a healthy pregnancy, the regular practice of yoga, 1-2 times a week, is strongly recommended. The frequency of yoga practice will also affect the decrease in back pain for pregnant women. In this study, yoga was performed twice a week for 4 weeks.

Stress can trigger the sympathetic and parasympathetic nervous systems, which can further increase the intensity of back pain in pregnant women. The physical condition of the mother can also influence the intensity of back pain, and correct spinal structure is necessary to support the growing belly; therefore, back pain tends to increase as pregnant women get heavier.

Back pain felt by pregnant women tends to increase with increasing gestational age. Back pain is considered to be one of the most uncomfortable and disruptive symptoms during pregnancy. Back pain in pregnant women must be treated effectively and, if not resolved, can affect the condition of both the mother and the fetus. Non-pharmacological pain management options can reduce back pain in pregnant women. Gymnastic yoga is one pain management technique for increasing the comfort of the mother during pregnancy.

Gymnastic yoga can close the pain message gate that sends pain signals to the spinal cord and brain, and relaxation during yoga exercises can also activate the release of endorphin compounds into the synapses of spinal nerve cells and the brain, which can inhibit the transmission of pain signals and cause decreased pain sensation.

Gymnastic yoga contributes to improving maternal self-efficacy during pregnancy and

provides benefits that are very important for the comfort and psychology of women during pregnancy. Yoga exercises can reduce back pain, allowing women to enjoy a relaxed, comfortable and enjoyable pregnancy. The application of yoga exercises can stimulate postural reflexes, maintain muscles, and stimulate pelvic receptors to respond to pain by secreting beta-endorphins that can block the transmission of pain stimuli and reduce pain levels and stress. [13]

## CONCLUSION

Yoga is an effective model for reducing back pain levels in pregnant women during the third trimester. Pregnant women require good health during pregnancy.

## SUGGESTIONS

Subsequent research should examine other variables to perform a more comprehensive assessment of the effects of yoga during pregnancy, such as including pregnant women during their first or second trimesters, to control for other factors that may interfere with the effectiveness of the intervention.

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