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# THE EFFECT OF PRENATAL YOGA EXERCISE COMBINATION AND LAVENDER AROMATHERAPY ON BLOOD PRESSURE CHANGES IN PREGNANT WOMEN

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**Abstract**
Pregnancy is a process that every woman experiences, changes will begin to occur, namely the physical, mental and social aspects. The health problem that pregnant women will experience is high blood pressure. This research aims to determine the effect of a combination of prenatal yoga exercises and lavender aroma therapy on changes in blood pressure in pregnant women at the Janti Health Center, Malang City. Pre-experiment design method with a one group pre and post-test approach. The research population consisted of 182 respondents with a sample of 20 pregnant women. The sampling technique uses purposive sampling. The analysis used was univariate analysis to determine the characteristics of the respondents and bivariate analysis using the Wilcoxon test to compare the results of blood pressure measurements before and after being given the combined intervention of prenatal yoga and lavender aromatherapy. Research results before the combination of prenatal yoga exercise and lavender aroma therapy intervention were carried out, the mean result was 121/80 mmHg, after the intervention was carried out the combination of prenatal yoga exercise and lavender aroma therapy, the mean result was 114/74 mmHg, there was an influence of the combination of prenatal yoga exercise and lavender aroma therapy on changes in blood pressure (p-value = 0.00 < 0.05). Providing a combination of prenatal yoga exercises and lavender aroma therapy is a non-pharmacological therapy that can be applied to pregnant women because it has an influence on changes in blood pressure.

**Keywords:** prenatal yoga exercises; lavender aromatherapy; blood pressure of pregnant women

## INTRODUCTION

Pregnancy is a process experienced by every woman, changes will begin to occur, namely physical, mental and social aspects. Apart from the changes mentioned earlier, there will also be difficulties or health problems that are generally often experienced by pregnant women, namely high blood pressure (Destyanti, 2022). High blood pressure in pregnant women can occur due to the emergence of risk factors , where the risk factors are age, parity, obesity, history of hypertension and lack of physical activity in pregnant women. If one of these risk factors is not avoided, it will continue to cause high blood pressure or known as hypertension. During pregnancy, hypertension is one of the complications of pregnancy, more than 10% in the world (Rodiani et al., 2019). According to data obtained in 2018 through WHO ( *World Health Organization)* in developed countries 1.3% -6% while in developing countries 1.8% -18% is data on pregnant women who

experience preeclampsia. According to Riskesdas in Lapangan et al (2023), the prevalence of preeclampsia in pregnant women in Indonesia is 2.7%. In 2018 in East Java, preeclampsia or eclampsia occurred as much as 31% (Susanti et al., 2023).

According to data from the Malang City Health Office in 2021, the number of maternal deaths was 41 cases. The most maternal deaths were caused by Covid-19 with 31 cases, while Preeclampsia or Eclampsia were 4 cases and other causes included pneumonia, bleeding, heart disease and tuberculosis. Data from the Malang City Health Office in 2021 was 3,927 pregnant women, of which 11,214 were at high risk. In 2022 until June, there were 6 cases of maternal deaths, so special attention is needed for pregnant women with high risk to prevent complications that can endanger the condition of the mother and baby (Dinkes, 2022). Based on the results of a research study at the Janti Health Center in 2023 from January to December, the number of pregnant women with hypertension was 12.

Hypertension in pregnancy can be prevented with pharmacological and non-pharmacological treatment. Non-pharmacologically, it is possible to do physical exercise and a combination of lavender aromatherapy (Rini, 2020). According to *The American College of Obstetricians and Gynecologists* (ACOG) exercises safe physical moment pregnant namely prenatal yoga gymnastics ( Rodiani et al., 2019). Effects from prenatal yoga gymnastics namely reduce painful back , anxiety , up to disturbance psychological Mother pregnant , action This proven because prenatal yoga exercises can increase 4-5 times receptors in hypothalamus and system limbic will catch more lots of b- endorphins in blood along with improvement b- endorphin secretion . System limbic to play role important in arrange emotions ( Indriayani et al., 2023). In addition to physical exercise of prenatal yoga gymnastics, there is also lavender aromatherapy which has the effect of lowering blood pressure in pregnant women with hypertension . Inhaling aromatherapy itself can have a calming effect. Lavender aromatherapy can provide tryptophan action and can help the relaxation response which can improve blood pressure, pulse and respiration rate (Rini, 2020). According to the results of the study (Rosita, 2022) which stated that there was an effect of giving lavender aromatherapy inhalation with deep breathing relaxation which was effective in reducing hypertension in pregnant women at the Samata Health Center, the intervention was given 9 times for ± 30 minutes.

Based on the background that has been presented, the author has an interest in conducting research on the effect of the combination of prenatal yoga and lavender aromatherapy on changes in blood pressure in pregnant women at the Janti Health Center, Malang City.

## RESEARCH METHODS

This study used a quantitative research method with a *pre-experimental design approach* , using a one group pre and post test design. The study population consisted of 182 respondents with a sample of 20 pregnant women. The sampling technique used purposive sampling. Data collection used an instrument in the

form of an observation sheet to control the effect of the intervention of a combination of prenatal yoga gymnastics and lavender aromatherapy. The analysis used, univariate analysis to determine the characteristics of respondents and bivariate analysis using the Wilcoxon test to compare the results of blood pressure measurements before and after being given a combination of prenatal yoga gymnastics and lavender aromatherapy intervention **.**

## RESEARCH RESULTS AND DISCUSSION

### RESEARCH RESULT

1. Analysis Results Univariate :

Table 1Frequency Distribution of Respondent Characteristics Based on Parity, Age and Obesity (n=20) at Janti Health Center for the Period 22 April-13 May 2024

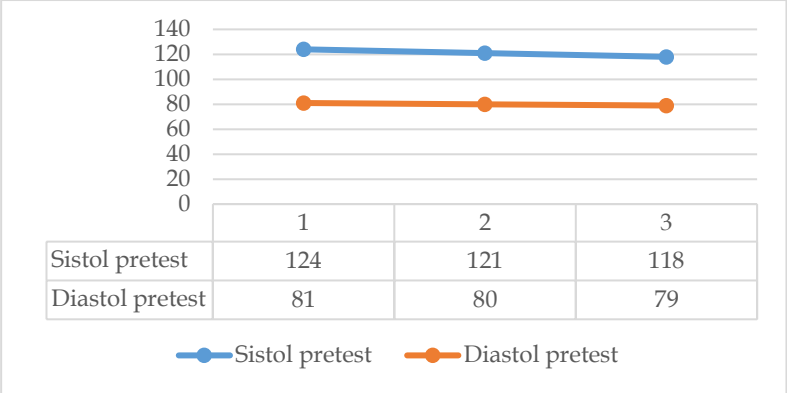
| No | Characteristics | Frequency | (%) |
|---|---|---|---|
| 1 | Parity | | |
| | At risk (1 child or > 3 children ) | 6 | 30% |
| | No risk (2-3 children ) | 14 | 70% |
| 2 | Age | | |
| | At risk < 20 or > 35 years | 8 | 40% |
| | No risk 20-35 years | 12 | 60% |
| 3 | Obesity | | |
| | At risk (BMI 25-29.9) | 11 | 55 % |
| | Not at risk (BMI 18.5-24.9) | 9 | 45% |

Based on Table 4.1, the results of the analysis above show that in terms of parity, not at risk is more dominant with a total of 14 respondents (70%). While in terms of age, the respondents are more dominant in the not at risk age group (20-35 years), namely 12 respondents (60%) and in terms of obesity, it shows that respondents who are at risk of obesity are more dominant, as many as 11 respondents (55%).

2. Bivariate Analysis Results

**a. Blood Pressure of Pregnant Women Before Given Combination Intervention of Prenatal Yoga Exercise and Lavender Aromatherapy**

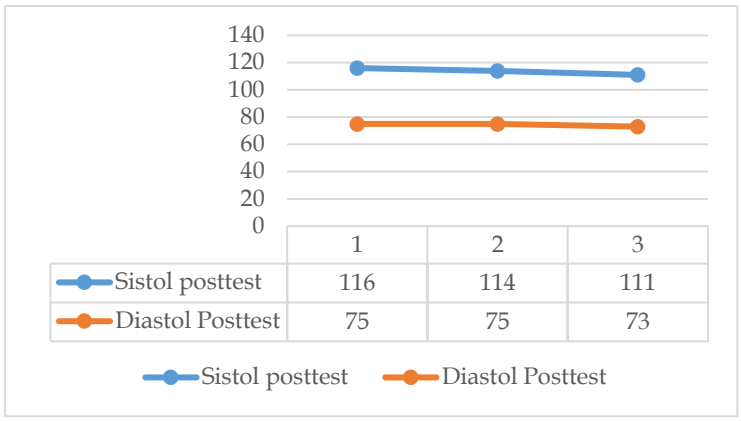
Graph 1Blood pressure before the Combination Intervention of Prenatal Yoga Exercise and Lavender Aromatherapy at each meeting (n=20) at Janti Health Center Period 22 April-13 May 2024




Graph 4.1 shows blood pressure before the prenatal yoga and lavender aromatherapy intervention was carried out for 3 meetings, with a mean blood pressure of 121/80 mmHg.

**b. Blood Pressure of Pregnant Women After Given Combination Intervention of Prenatal Yoga Exercise and Lavender Aromatherapy**

Graph 4.2 Blood pressure after the Combination Intervention of Prenatal Yoga Exercise and Lavender Aromatherapy at Each Meeting (n=20) at the Janti Health Center for the Period 22 April-13 May 2024




Graph 4.2 shows blood pressure after prenatal yoga and lavender aromatherapy interventions were carried out for 3 meetings, with a mean blood pressure of 114/74 mmHg.

**c. Average Blood Pressure Before and After Given a Combination of Prenatal Yoga Exercise and Lavender Aromatherapy**

Table 4.2 Differences between Pre and Post Intervention of Combination of Prenatal Yoga and Lavender Aromatherapy on Changes in Blood Pressure (n=20)

| Systolic BP | Difference | Diastolic BP | Difference |
|---|---|---|---|

| Pre | Post | | Pre | Post | |
|---|---|---|---|---|---|
| 121 | 114 | 7 | 80 | 74 | 6 |

Based on table 4.2, the data shows the average systolic and diastolic blood pressure at Janti Health Center, with a systolic value of 7.23 and a diastolic value of 5.3. These data indicate changes in blood pressure before and after the intervention of a combination of prenatal yoga and lavender aromatherapy, carried out within a time span of ± 30 minutes for 3 meetings.

Table 2Results of the Wilcoxon Test Pre and Post Intervention Combination of Prenatal Yoga Exercise and Lavender Aromatherapy on Changes in Blood Pressure

| TD | Median (mmHg) | Minimum-Maximum (mmHg) | P-values |
|---|---|---|---|
| Pre-test systole | 120 | 114-137 | 0,000 |
| Post-test systole | 114 | 105-127 | |
| Pre-test diastole | 80 | 75-90 | 0,000 |
| Post-test diastole | 75 | 70-82 | |

In table 4.3, it is known that the systolic p-value is 0.000 and for the diastolic p-value is 0.000, it can be concluded that 0.000 <0.05 so that H1 is accepted or it can be stated that there is an influence on blood pressure between systolic and diastolic.

## DISCUSSION

### a. Blood Pressure of Pregnant Women before given Intervention Combination of Prenatal Yoga and Lavender Aromatherapy

The results of the analysis shown in graph 4.1 show that pressure blood before given intervention with average result of 121/80 mmHg. Based on the results before the intervention, it showed a risk of hypertension in pregnant women before the intervention. The blood pressure of pregnant women was measured every time the intervention was carried out. The normal blood pressure range in pregnant women is between 110/80 mmHg to 120/80 mmHg.

Age, parity, obesity, and history of hypertension are risk factors for high blood pressure (Destyanti, 2022) . The variables studied in the respondents in this study included age, number of children ever born (parity), and obesity status. According to the researcher's assumption, there is a correlation between maternal age and the incidence of hypertension risk. Of the 20 respondents , there were 8 respondents who were at risk hypertension with age over 35 years . This is show decline capacity reproduction in mothers pregnant . In line with

research conducted (Annisa, 2022) explain that development of reproductive organs related with age mother . Range age reproduction is considered healthy and safe is between 20 to 35 years old . If pregnant at the age of under 20 years old or between 20 to 35 years , pregnancy can at risk Because ability reproduction decreases and stamina also decreases .

According to the researcher's assumption, the relationship between parity and the risk of pregnant women experiencing hypertension is that if the pregnant woman is having her first child, many of them feel afraid or anxious about their first pregnancy, which results in stress and increases blood pressure in pregnant women. Meanwhile, with the number of children (parity) >3, it can cause pregnancy complications, namely high blood pressure, because each pregnancy that occurs will experience flexibility in the uterus so that it is feared that complications will occur during pregnancy or childbirth due to the uterus becoming weaker. In line with the research of Yurianti et al (2020), parity can also affect blood pressure in pregnant women, especially for mothers who are experiencing their first pregnancy and have no previous experience. They tend easy feel nervous and anxious , which can cause improvement pressure blood . Mechanism base from development anxiety is when somebody feel anxious , material chemistry like adrenals are released to in blood . This is cause various changes , including improvement flow blood , which contributes to increased pressure blood .

The third risk factor associated with increased blood pressure is obesity. According to the researcher's assumption, body weight greatly affects the risk of hypertension. Of the 20 pregnant women, 11 respondents were at risk of hypertension. Weight gain or obesity is the result of a long-term energy imbalance , so that the amount of energy consumed is greater than that expended. Weight gain is not only due to poor diet, but there are other factors that can influence it, namely genetics, metabolism, behavior, and the environment. In line with the results of the study (Dewie, Pont and Purwanti, 2020) that obesity is related to the results of a long-term energy imbalance and consuming high-fat foods that can increase blood pressure. The greater a person's body mass, the more blood is needed to circulate oxygen and nutrients throughout the body's tissues. This results in increased pressure on the artery walls and causes increased blood pressure. In addition , excess weight also increases Work heart .

**b. Blood Pressure of Pregnant Women After Given Combination Intervention of Prenatal Yoga Exercise and Lavender Aromatherapy**

The results of the analysis shown in graph 4.2 show that blood pressure after intervention with an average result of 114/74 mmHg, shows a decrease in blood pressure after the application of a combination of prenatal yoga gymnastics and lavender aromatherapy **.** Based on the results of Indriayani's research (2023), the statistical results revealed that there was a change in blood pressure in the pretest systolic measurement with a mean of 126.30 and a posttest systolic measurement mean of 120.22, a pretest diastolic measurement

with a mean of 83.26 and a posttest diastolic mean of 79.78 with a p-value of 0.00 (p <0.05) so that it can be concluded that providing prenatal yoga gymnastics intervention can affect changes in blood pressure in pregnant women.

Based on the results of the study (Rosita, 2022) , statistical data showed a difference in the average decrease in systolic and diastolic blood pressure, with an average decrease of 3.94 for systolic blood pressure and 3.06 for diastolic blood pressure. In addition, the Wilcoxon test results showed a p-value of 0.001, which is lower than the set significance level (0.05), so it can be concluded that deep breathing relaxation therapy with lavender aromatherapy is effective in changing blood pressure.

According to the researcher's assumption, there is a change in blood pressure where the value of 121/80 mmHg decreased to 114/74 mmHg after the implementation of prenatal yoga exercises accompanied by lavender aromatherapy. This non-pharmacological therapy, if done regularly, is believed to be able to control blood pressure, make the soul calm and relaxed, and allow the mother to communicate with the fetus during meditation, which has the potential to have a positive impact on the development of the mother and the fetus' brain.

**c. The Effect of Combination of Prenatal Yoga and Lavender Aromatherapy on Changes in Blood Pressure in Pregnant Women at the Janti Health Center, Malang City.**

After analysis using the Wilcoxon test, a significant difference was seen with a p value for systolic and diastolic blood pressure of 0.00 each. The results of the data analysis showed a difference in blood pressure after the implementation of a combination of prenatal yoga and lavender aromatherapy interventions. Thus, it can be concluded that the intervention has an impact on systolic and diastolic blood pressure in pregnant women.

According to (Aliyah, 2017) , when practicing prenatal yoga, the hypothalamus will affect the autonomic nervous system, namely by reducing sympathetic nerve activity and increasing parasympathetic nerve activity. Decreased heart rate, breathing patterns, blood pressure, muscle tension, metabolic rate, and synthesis of hormones that produce anxiety or stress are consequences of signals from the sympathetic nerves that regulate the release of catecholamines.

In line with Adela's research (2022) regarding lavender aromatherapy which can influence changes in blood pressure, where this lavender aromatherapy works based on inhalation or inhalation and then affects the limbic system. When we inhale the aroma, the aroma will enter the nasal cavity, which contains the olfactory epithelium or olfactory cells. These olfactory cells have an important role in detecting aromas. After that, the receptors in the olfactory cells will send signals to the olfactory nerve, and the chemical components of the aroma will reach the olfactory bulb before finally reaching the brain's limbic system. The limbic system as the center of pain,

pleasure, anger, fear, anxiety, depression and emotions. The hypothalamus is responsible for issuing and conveying messages to the brain. The messages received can create a calm or relaxed mood, smooth blood flow, and reduce heart work.

The researcher's assumption that the importance of doing physical activities such as prenatal yoga combined with aromatherapy during pregnancy to maintain normal or stable blood pressure provides additional benefits for pregnant women, such as calming the mind and providing comfort. This can help smooth pregnancy, improve sleep quality, reduce back pain, and overcome anxiety when facing childbirth and prevent preeclampsia., this is because prenatal yoga includes postures, breathing, and meditation that can reduce the activity of the sympathetic nervous system can interfere with the adrenal medulla signal to produce catecholamines such as epinephrine and norepinephrine. The decrease in catecholamine levels causes enlargement of blood vessels in the kidneys and other internal organs, thereby reducing blood pressure and increasing blood flow per minute. Meanwhile, lavender aromatherapy has a calming effect that can affect the body, mind, and emotions. The scent of lavender that is inhaled is interpreted by the nasal cilia which converts it into electrical impulses, which are then sent to the brain through the olfactory system. All impulses reach the limbic system, the limbic system as the center of pain, emotion, anxiety, happiness, and anger, then the hypothalamus captures and reacts. The hypothalamus is responsible for issuing and delivering messages to the brain. The messages received are able to create a calm (relaxed) mood, improve blood flow and reduce heart rate .

## CONCLUSION

Based on the results of research related to the effect of a combination of prenatal yoga and lavender aromatherapy on changes in blood pressure in pregnant women at the Janti Health Center, Malang City, as follows:

Before the intervention of the combination of prenatal yoga and lavender aromatherapy, blood pressure was obtained with a mean of 121/80 mmHg, after the intervention of the combination of prenatal yoga and lavender aromatherapy, blood pressure was obtained with a mean of 114/74 mmHg and there was an effect of the combination of prenatal yoga and lavender aromatherapy on changes in blood pressure in pregnant women at the Janti Health Center, Malang City. The suggestion for pregnant women is that pregnant women are expected to continue to routinely follow the combination of prenatal yoga and lavender aromatherapy on changes in blood pressure, especially pregnant women who are entering ≥20 weeks of pregnancy.

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