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The Effectiveness of Prenatal Gentle Yoga on the Recovery of Anxiety Level and Norepinephrine Level in Pregnant Women Aged <20 and >35 Years Old

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Abstract---This study aimed to analyze the effectiveness of prenatal gentle yoga on the anxiety problem and the norepinephrine level in pregnant women aged <20 and >35 years old. The applied research design in this study was a true experiment with a posttest-only control design. Samples were selected using a purposive sample technique. Furthermore, the instrument used was the Hamilton Anxiety Rating Scale (HARS) questionnaire. Data were analyzed using the Wilcoxon test to find out the results of the HARS and hypothesis testing. Moreover, data were also analyzed using the Mann-Whitney test to compare the mean values before and after being given treatment. The results of this study indicated that prenatal gentle yoga is effective to be used based on the results of the HARS (Hamilton Anxiety Rating Scale). It was indicated by a significant p-value ($0.001 < a < 0.05$) and the results of the hypothesis test of the p-value ($0.000 < a < 0.05$). This proves that the provision of prenatal gentle yoga classes is effective in reducing the anxiety level and the norepinephrine level in pregnant women aged <20 and >35 years old.

Keywords-----HARS, norepinephrine, pregnant women, prenatal gentle yoga.

Introduction

Pregnant women often experience many changes starting from physical to psychological changes. These changes occur during pregnancy. This condition can cause discomfort to pregnant women such as fatigue, lethargy, irritability, headaches, nausea, and laziness. Furthermore, it can also cause anxiety in facing the childbirth process, especially in primigravid pregnant women (Fauziah, 2016; Kuswandi, 2013). Factors that affect anxiety in pregnant women are age, experience, parity, educational level, occupation, husband and family support, physical exercise, and environmental conditions (Alza & Ismarwati, 2017). Anxiety in pregnant women can cause disease and complications of pregnancy and childbirth, both for mother and fetus (Wulandari *et al.*, 2018). Based on the

Indonesian Demographic and Health Survey (2017), there was 1712 maternal mortality due to pregnancy complications. One of the causes is anxiety and stress that are not handled properly (Ariani *et al.*, 2018). An effective way to deal with problems related to the high mortality rate and illness in pregnant women triggered by anxiety is to do physical exercises. Physical exercises that can be taken are meditation or prenatal gentle yoga. Yoga exercises for the prenatal stage in pregnant women can help the mother to focus on regulating breath rhythms that can provide a feeling of comfort, safety, and calm during doing exercises (Apriliani, 2015). Anxiety is a normal state that occurs under various conditions, such as growth, changes, and new experiences (Apriliani, 2015). Anxiety is a feeling of fear that has no clear cause and is not supported by the existing situation (Pereira, 2015).

Anxiety can be felt by everyone if they experience pressure and deep feelings that cause psychiatric problems. Furthermore, it can be experienced over a long period (Wahyudi *et al.*, 2019). The disturbances that arise can be in the form of restlessness, dizziness, palpitations, tremors, etc. Anxiety can also disrupt daily life (Lisa Mutiara Anissa & Suryani, 2018). One of the sources of anxiety is pregnancy, especially for pregnant women who are mentally unstable (Amaral *et al.*, 2017). In general, a mother who is experiencing pregnancy for the first time will feel happy and have a higher curiosity about self-change and fetal development. However, at the same time, they also feel anxious. Furthermore, anxiety can have a negative impact on pregnant women from the beginning of pregnancy to the childbirth process. Those negative impacts can be in the form of an anxious fetus that inhibits its growth, weakens uterine muscle contractions, etc. These impacts can harm the mother and fetus (Novitasari, 2013). A study in Indonesia showed that pregnant women with high anxiety have a risk of giving birth to premature babies and even miscarriages (Nurul Rahmitha, 2017).

The advantage of doing regular prenatal gentle yoga exercises is that it helps pregnant women in maintaining health and easing the childbirth process. This is because prenatal yoga exercises can make the body flexible, especially in the muscles of the uterus (Jatnika *et al.*, 2016). Relaxation in yoga exercises can prevent pregnant women from tension and anxiety or fear related to the childbirth process and lead to optimistic feelings (Ashari Pongsibidang & Mikhrunnisai, 2019). Movement and relaxation in prenatal gentle yoga can affect the work of neurotransmitters, which function as signal carriers between neurons or convey messages between one nerve cell to target nerve cells in muscles, glands, and other parts of the body. The main neurotransmitters on anxiety disorders are the increase of norepinephrine, serotonin, Gamma Amino-butyric Acid (GABA), adrenaline, dopamine, and glutamate. This neurotransmitter plays a very important role for the brain in regulating the work of body systems through respiration, concentration, muscle movement, heart rate, and mood. Neurotransmitters are divided into three, namely neurotransmitters, inhibition, and modulator (Putra, 2019; Diferiansyah *et al.*, 2016). Excitatory neurotransmitters consist of epinephrine and norepinephrine (Putra, 2019). Norepinephrine is a response to fight or flight and the regulator for sleep, mood, and blood pressure. Several studies have shown that the release of norepinephrine plays an important role in fear and anxiety (Imaniah, 2017). Norepinephrine can cause anxiety if the concentration is not balanced. Therefore, pregnant women experiencing anxiety need to take measures to prevent further complications by regulating the work of norepinephrine using exercises such as movement and relaxation like prenatal gentle yoga. A study conducted by Untari *et al.* (2014) showed that the group of pregnant women aged 20 - 35 years old had the lowest pregnancy anxiety (with the mean score of 39.33) compared to the age group of <20 and >35 (with the mean score of 50.58). Another study conducted by Astria (2018) on 158 pregnant women indicated that more than half (52.5%) of pregnant women experience anxiety. The proportion of pregnant women who experienced anxiety was higher in the first pregnancy group (primigravida), namely 66.2%. Based on a study conducted by Agustin *et al.* (2019) on exercises and relaxations that can reduce norepinephrine, it showed that blood pressure in systole and diastole experienced a significant decrease before and after the respondents were given the finger grip and breath relaxation therapy. In this therapy, the relaxed muscles will spread a stimulus to the hypothalamus so that the soul and organs in humans feel calm and comfortable.

2 Materials and Methods

The applied research design in this study was a true experiment with a posttest-only control design. This study aimed to analyze the effectiveness of prenatal gentle yoga on the recovery of the anxiety level and the norepinephrine level in pregnant women aged <20 and >35 years old. The study was conducted Bara-Baraya, Antang, Jumpondang Baru, Mamajang, Kassi-Kassi, and Kapasa Health Centers. The employed sampling technique was purposive sampling in which it is a technique of determining the sample using certain considerations or special selection. The data collection instruments in this study were the HARS and the ELISA KIT.

3 Results and Discussions

In this section, the results of this study that have been conducted at Mamajang, Antang, Bara-Baraya, and Kapasa Health Centers were described. 24 pregnant women became respondents in this study. They experienced symptoms of mild, moderate, severe, and serious severe anxiety as measured using the HARS (Hamilton Anxiety Rating Scale). Respondents were randomly divided into two groups, namely 12 in the intervention group and 12 in the control group. Samples in the form of urine were collected using the urine tube at the time when pre-test, mid-test, and post-test prenatal gentle yoga were conducted. Those samples were then analyzed by employing the ELISA method at the Clinical Laboratory of the Hasanuddin University Teaching Hospital. The results obtained were inputted into Microsoft Excel then analyzed using SPSS v. 23.0 for Windows. The applied statistical tests were the Wilcoxon test and the Mann-Whitney test.

Table 1
Characteristics of Respondents

Variables	Intervention n (%)	Control n (%)	<i>p</i> -Value
Educational Levels			
High education			
Low education	7 (58.3%)	9 (66.7 %)	0.310
	5 (41.7%)	3 (33.3 %)	
Occupation			
Working			
Not Working	5 (41.7%)	2 (16.7%)	0.932
	7 (58.3%)	10 (83.3%)	
Body Mass Index (BMI)			
Normal			
Overweight	5 (41.7%)	3 (33.3 %)	0.392
	7 (58.3%)	9 (66.7 %)	
Religion			
Islam			
Christianity	10 (83.3%)	11 (91.6 %)	0.642
	2 (16.7%)	1 (8.3 %)	
Gestational age			
			0.323
20-23	3 (25.0%)	2 (16.7%)	
24-27	3 (25.0%)	7 (58.3%)	
28-30	6 (50.0%)	3 (25.0%)	

* *Test for the homogeneity of variance*

Table 1 showed that there is no significant difference in the characteristics of the respondents in those two groups, i.e. the intervention and the control groups based on educational level, occupation, Body Mass Index (BMI), religion, and gestational age.

In this study, there were two groups, namely the intervention group and the control group. Those two groups were given their respective assessments in which the intervention group was given treatment, while the control group was not given treatment. However, they both were assessed in the pre-test, mid-test, and post-test. This was to determine the differences before and after being given the treatment in the intervention group.

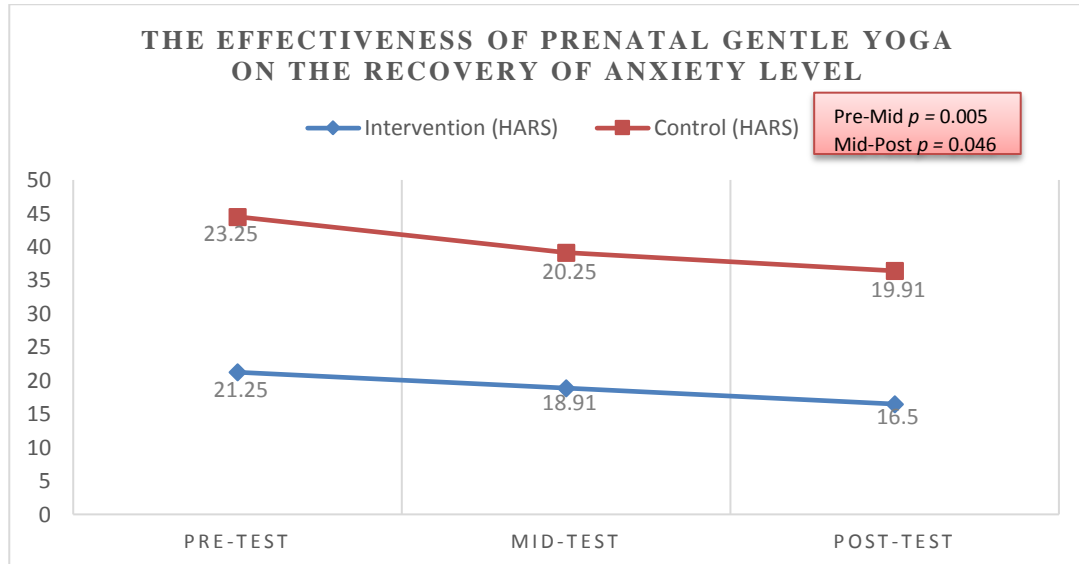


Figure 1. Comparison of the HARS (Hamilton Anxiety Rating Scale) on Pre-test, Mid-test, and Post-test for Intervention and Control Groups towards Prenatal Gentle Yoga (PGY).

The diagram showed that, in the intervention group, its mean scores were 21.25 in the pre-test, 18.91 in the mid-test, and 16.5 in the post-test. Therefore, it can be concluded that the respondents were categorized as having a moderate level of anxiety in the pre-test and a mild level of anxiety in the mid-test. Based on the statistical data, the value of Asymp. Sig. was 0.002. Because the p -value was $0.002 < 0.05$, it can be concluded that there was a difference in the pre-test to the mid-test. Meanwhile, in the mid-test to the post-test, the value of Asymp. Sig. was 0.041 (< 0.05). Therefore, it can be concluded that there was a decrease in the level of anxiety in the-mid test to the post-test.

Furthermore, the mean scores of the control group were 23.25 in the pre-test, 20.25 in the mid-test, and 19.91 in the post-test. Therefore, it can be concluded that participants experienced a moderate level of anxiety in the pre-test and mid-test and a mild level of anxiety in the post-test. Based on the statistical data, the value of Asymp. Sig. was 0.005. Because the p -value was $0.005 < 0.05$, it can be concluded that there was a difference in the pre-test to the mid-test. Meanwhile, in the mid-test to the post-test, the value of Asymp. Sig. was 0.046 (< 0.05). Therefore, it can be concluded that there was a decrease in the level of anxiety in the-mid test to the post-test.

Table 2

Comparison of the HARS (Hamilton Anxiety Rating Scale) on Pre-test, Mid-test, and Post-test for Intervention and Control Groups towards Prenatal Gentle Yoga (PGY)

HARS	Pre-test	Post-test	p-Value
Intervention	17.25(14-21)	7.75 (3-10)	*0.001
Control	15.79 (14-25)	9.21 (5-12)	*0.021
p -value	**0.005	**0.041	

From Table 2 above, in the intervention group, there was a statistically significant difference ($p = 0.001$) of the HARS (Hamilton Anxiety Rating Scale) between before and after respondents were given the prenatal gentle yoga class. Furthermore, a similar result was found out in the control group, namely, there was a statistically significant difference ($p = 0.021$). Moreover, the results of the Wilcoxon test in the table above showed a significance value of $p = 0.005$ in the intervention group and $p = 0.041$ in the control group.

Discussion

The discussion of the results of this study was carried out involving the theory and purpose of this study. It is by interpreting and discussing the results as described in the previous part. Also, we explained the limitations of this study.

In this study, it indicated that, based on the age of the pregnant women, respondents who took the prenatal gentle yoga class were 50% aged 28-30 years. In terms of educational level, they were 58.3% having a high education level and 41.7% having a low education level. The level of education will affect a person's rational thinking ability in a quick pattern for describing new problems that can trigger anxiety.

In terms of occupation, most of the respondents were not working, i.e. 58.3%. Meanwhile, those who worked were 41.7%. This illustrated that the economic status of a person. For those with a low income, they will think about themselves when they are preparing for the childbirth process so that those mothers do not focus on their health and pregnancy and have a lack of obtained information for preparing for their childbirth process which will be faced.

The purpose of this study was to determine the effectiveness of prenatal gentle yoga on the recovery of anxiety levels in pregnant women aged <20 and >35 years old. Based on the results of the Wilcoxon test on the pre-test to post-test in the intervention group, the obtained p -value was $0.005 < (0.05)$ meaning that there was a difference in the HARS in the intervention group after being given prenatal gentle yoga treatment. The provision of prenatal gentle yoga treatment for 8 times can result in the difference in the HARS in which it is highly significant in the intervention group. From this result, the researchers concluded that the provision of prenatal gentle yoga treatment was effective in reducing anxiety levels in pregnant women aged <20 and >35 years.

Based on the results of the Mann-Whitney test on the HARS between the intervention and control groups in the pre-test and post-test, it showed a statistically significant difference ($p = 0.001$) of the HARS between before and after involving in the class providing prenatal gentle yoga. Similarly, in the control group, there were also statistically significant differences ($p = 0.021$). Meanwhile, the results of the test of norepinephrine levels in the intervention group and the control group also had a statistically significant difference ($p = 0.00$) between the levels of the hormone norepinephrine before and after being given the prenatal gentle yoga class. Similarly, in the control group, there were statistically significant differences ($p = 0.011$).

Anxiety is a feeling of fear that is unclear and unsupported by the situation. Anxious individuals will feel uncomfortable or afraid, but do not know why the condition occurs. Anxiety does not have a clear and identifiable stimulus (Amaral *et al.*, 2017). Age can affect a person's psychology. The older the person is, the better the level of emotional maturity of the person, and the ability to face various problems will be (Field *et al.*, 2016). Women aged 20-35 years are physically ready to get pregnant because their reproductive organs are fully formed. Pregnant women who are old enough also have a mental readiness to take care of their pregnancy carefully. Pregnant women who are less than 20 years old have feelings of anxiety and fear because of their unprepared physical condition, while pregnant women who are more than 35 years old have a higher risk of experiencing obstetric complications and perinatal morbidity and mortality (Nurul Rahmitha, 2017).

Severe anxiety experienced by young pregnant women (<20 years) can affect their perception so that they tend to focus on it specifically and cannot think about anything else. Meanwhile, pregnant women who have sufficient age experience a mild level of anxiety related to tensions in daily life. However, it can cause an increase in their perception (Nurul Rahmitha, 2017).

According to researchers, a decrease in the anxiety level of pregnant women in facing the childbirth process before and after prenatal gentle yoga was influenced by the ability of pregnant women to control their anxiety in which was gained from regular prenatal yoga practice. It was because, in prenatal yoga, they were taught relaxation techniques in the form of positive affirmations, the use of aromatherapy, breathing techniques, and physical exercises.

An effective way to deal with problems related to anxiety and anxiety-induced pain in pregnant women is to do physical exercises such as meditation or yoga. Prenatal Gentle Yoga is a solution for pregnant women. Yoga exercises for the prenatal stage help pregnant women focus on regulating the rhythm of the breath while remaining focused on the feeling of comfort, safety, and calm. The yoga exercises that are carried out include various relaxation exercises, adjusting postures, breathing exercises, and meditating for 1 hour every day.

Prenatal gentle yoga is considered being able to improve the nervous system regulation and function of the physiological system (immunity, endocrine, neurotransmitters, and cardiovascular). It also improves mental well-being to achieve a balance between mind and body. Therefore, it can reduce complications such as hypertension in pregnancy, and premature childbirth, and reduce Sectio Caesarea (SC) birth cases (Curtis *et al.*, 2012).

Theoretically, anxiety will decrease if the individual experiences relaxation in their body (Spielberger, 1966). Prenatal gentle yoga practice is a physical treatment that has a psychological effect because it has a relaxing effect on a person's body and affects several psychological aspects. It is said that it can help to reduce anxiety (Qudsyi & Putri, 2016).

This assumption is supported by a study (Apriliani, 2015) which indicated that the positive way of thinking that is established by pregnant women related to pregnancy and childbirth process is one of the benefits that is obtained from prenatal gentle yoga at the deep relaxation stage. This reaction is expected to prevent pregnant women from fear, tension, and anxiety related to the childbirth process. It is also expected to be able to eliminate those feeling and lead to feelings of optimism and courage to go through natural processes that will be passed by every woman. There are also studies conducted in Southern America (Battle *et al.*, 2015) Southern California (Bershadsky *et al.*, 2014), and Virginia (Kinser *et al.*, 2015) in which those studies indicated that the prenatal yoga intervention is highly effective in reducing the level of anxiety in pregnant women.

4 Conclusion

- 1) There is no significant difference in the characteristics of the respondents in those two groups, i.e. the intervention and the control groups based on educational level, occupation, Body Mass Index (BMI), religion, and gestational age.
- 2) The respondents were categorized as having a moderate level of anxiety in the pre-test and a mild level of anxiety in the mid-test.
- 3) There was a difference in the pre-test to the mid-test. Meanwhile, in the mid-test to the post-test,
- 4) There was a decrease in the level of anxiety in the mid test to the post-test.

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