

The Effect of Hydrotherapy and Progressive Muscle Relaxation (PMR) on Cortisol Levels in Primigravida Pregnant Women

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Abstract.

This study aims to measure cortisol levels in pregnant women who have intervened with Hydrotherapy and Progressive Muscle Relaxation to reduce anxiety in pregnant women in facing labor. This type of research uses quantitative with a quasi-experimental design, and a pretest-posttest approach with a control group [10]. The sampling technique used was purposive sampling so that a total sample of 30 respondents was obtained. Analysis of the data collected in the study was processed analytically with the T-Paired test and the Independent Test. The results of this study showed that the hydrotherapy and Progressive Muscle Relaxation group with Paired T test results worth P Value $0.017 = 0.05$, meaning that there is no effect of hydrotherapy and Progressive Muscle Relaxation on cortisol levels. Hydrotherapy and Progressive Muscle Relaxation therapy are effective in reducing anxiety levels and cortisol levels in primigravida pregnant women in the face of childbirth.

Keywords: Hydrotherapy, Progressive Muscle Relaxation (PMR) and Cortisol.

I. INTRODUCTION

Physical and psychological changes in pregnant women cause the body to become increasingly lethargic, tired, both physically and mentally [1]. In addition, pregnancy can increase tension, fear and anxiety and exacerbate inner conflicts. The causes of anxiety and fear during pregnancy include fear of death and fear of having a baby born with defects [2] Pregnant women who suffer from stress and anxiety during the third trimester of pregnancy will experience an increase in the release of stress hormones, causing disruption of blood flow in the uterus and resulting in weak uterine muscle contractions [3], [4]. This incident causes the length of the labor process (long parturition), the risk of sectio caesarea, and delivery with tools and the incidence of preterm labor. The risk for the baby can cause congenital abnormalities in the form of failure to close the cleft palate, premature birth, giving birth to babies with low birth weight (LBW), emergency (fetal distress) and in the long term related to behavioral and emotional disorders in children [5], [6].

Stress and anxiety in pregnancy can be overcome by using non-pharmacological treatment methods that do not have side effects such as doing water therapy or hydrotherapy and light movements such as muscle exercises or Progressive Muscle Relaxation⁷. The warm feeling that directly touches the skin of the feet where there are many blood vessels and nerves, especially in the skin of the venous flexus from this series, the stimulation is transmitted to the posterior horn and then continues to the spinal cord from here it is passed on to lamina I, II, III radiks dorsalis, then to the ventro basal thalamus and enters the brain stem, precisely in the raphe area below the pons and medulla, this is where the soporific effect (want to sleep) occurs, so people who do foot soaks with warm water become more relaxed [8] [9]. Likewise, light muscle exercise can stimulate endorphins which will reduce the strength of the sympathetic nerves, causing vasodilation. Vasodilation is the widening of blood vessels which makes the body feel relaxed. Both of these complementary therapies are carried out so as to reduce the hormone cortisol

II. METHODS

This research was conducted in 2 health centers, namely Kassi-Kassi Health Center, Pattingalloang Health Center, Antang Perumnas Health Center Makassar City for the period January-December 2021. This type of research used quantitative with a quasi-experimental design, and a pretest-posttest approach with a

control group [10]. The sampling technique used was purposive sampling with inclusion criteria, namely: pregnant women in the third trimester, primigravida, and pregnant women who did not have abnormalities and were willing to be respondents, so that a total sample of 30 respondents was obtained. Analysis of the data collected in the study was processed analytically with the T-Paired test and the Independent Test.

III. RESULT AND DISCUSSION

This study was divided into 2 groups, namely the intervention group and the control group. Before being given the intervention, the subject was subjected to a pretest (O1) examination by giving the HARS questionnaire and taking 3 cc of blood from the vein from both groups and then giving an intervention (X) by administering Hydrotherapy and Progressive Muscle Relaxation (PMR), in the experimental group. After that, a posttest (O2) was carried out by taking a second blood sample from each group and distributing the HARS questionnaire again.

Table 1. Distribution of Respondent Characteristics

| Characteristics of Respondents | Intervention | | Control | | p value |
|--------------------------------|--------------|------|------------|------|--------------------|
| | n | % | n | % | |
| Age of the Student | | | | | 1,000 ^a |
| 15-25 years | 12 | 40,0 | 11 | 36,7 | |
| 26-30 years | 3 | 10,0 | 4 | 13,3 | |
| Work | | | | | 0,189 ^a |
| Student | 1 | 3,3 | 0 | 0,0 | |
| House Wife | 12 | 13,5 | 15 | 50,0 | |
| Private Employees | 2 | 6,7 | 0 | 0,0 | |
| Mother's Education | | | | | 0,648 ^a |
| Low | 4 | 13,3 | 2 | 6,7 | |
| Tall | 11 | 36,7 | 13 | 43,3 | |
| Settled Status | | | | | 1,000 ^a |
| Family Home | 11 | 36,7 | 10 | 33,3 | |
| Own Home | 4 | 13,3 | 5 | 16,7 | |
| LILA | | | | | 0,846 ^b |
| Mean ± SD | 24,57±2,39 | | 24,57±2,39 | | |
| Hemoglobin (Hb) | | | | | 1,000 ^c |
| Mean ± SD | 11,19±0,67 | | 11,16±0,95 | | |
| Total | 24 | 50,0 | 24 | 50,0 | |

Source: Primary Data, 2021

^aUji Chi Square; ^bIndependent t test; ^cMann-WhitneyTest; p < 0.05

Table 1 shows the results of statistical tests on all characteristics showing no significant difference between age, occupation, education, living status, Upper Arm Circumference (LILA) and Hb levels in the intervention group and control group (p > 0.05), which means that all the characteristics of the research sample and the intervention given are not the influence of the characteristics of the research sample.

Table 2. Changes in Anxiety After Hydrotherapy and Progressive Muscle Relaxation (PMR) in the Intervention and Control Group

| Group | N | Mean ± SD Emergency (HARS) | | p | Δ | p |
|--------------|----|----------------------------|------------|--------|------|---------|
| | | Pre | Post | | | |
| Intervention | 15 | 26,00±2,92 | 23,26±2,86 | 0,017* | 2,74 | 0,000** |
| Control | 15 | 27,26±2,52 | 28,00±3,00 | 0,529* | 0,74 | |

Source: Primary Data, 2021

*Uji T-Paired Test; p < 0,05, **T-Independent Test; p, < 0.05

Based on the data in Table 2 shows that there was a change in anxiety before and after in the intervention and control groups. In the intervention group, the mean value before administration of Hydrotherapy and Progressive Muscle Relaxation (PMR) was 26.00 and the mean value decreased to 23.26,

while in the previous control group it was 27.26 with a mean value of 28.00. Paired T test results in the intervention group obtained p value = $0.017 < 0.05$. While in the control group, the value of $p = 0.529 > 0.05$. This illustrates that there is a difference between the intervention group and the control group, so it can be concluded that there is an effect of giving Hydrotherapy and Progressive Muscle Relaxation (PMR) on maternal anxiety in the intervention group.

Comparison of anxiety between the intervention group and the control group after administration of Hydrotherapy and Progressive Muscle Relaxation (PMR) through the Independent T Test showed p value = $0.000 < 0.05$. This shows that there is an effect of Hydrotherapy and Progressive Muscle Relaxation (PMR) on decreasing anxiety levels in third trimester pregnant women.

Table 3. Changes in Cortisol Levels After Administration of Hydrotherapy and Progressive Muscle Relaxation (PMR) in the Intervention and Control Group.

| Group | N | Mean \pm SD Emergency (HARS) | | p | Δ | p |
|--------------|----|--------------------------------|-------------------|--------|----------|---------|
| | | Pre | Post | | | |
| Intervention | 15 | 91,18 \pm 8,28 | 85,30 \pm 6,34 | 0,048* | 5,88 | 0,018** |
| Control | 15 | 91,26 \pm 6,83 | 93,29 \pm 10,53 | 0,561* | 2,03 | |

Source: Primary Data, 2021

*Uji *T*-Paired Test; $p < 0,05$, ***T*-Independent Test; $p < 0.05$

Based on the data in Table 3, it shows that there was a change in cortisol levels before and after in the intervention and control groups. In the intervention group, the mean value before administration of Hydrotherapy and Progressive Muscle Relaxation (PMR) was 91.18 and the mean value decreased to 85.30, while in the control group it was previously 91.26 with an increase in the mean value of 93.29. Paired T test results in the intervention group obtained p value = $0.048 < 0.05$. While in the control group, the value of $p = 0.561 > 0.05$. This illustrates that there is a difference between the intervention group and the control group, so it can be concluded that there is an effect of giving Hydrotherapy and Progressive Muscle Relaxation (PMR) on maternal cortisol levels in the intervention group. Comparison of the hormone cortisol between the intervention group and the control group after administration of Hydrotherapy and Progressive Muscle Relaxation (PMR) through the Independent T Test showed p value = $0.018 < 0.05$. This shows that there is an effect of Hydrotherapy and Progressive Muscle Relaxation (PMR) on cortisol levels in primigravida pregnant women in the third trimester. Soaking the feet in warm and cold water for pregnant women is one method of hydrotherapy that relies on the body's response to water or called "low-tech", where this therapy uses water as the main object in treating or reducing painful conditions. Soaking the feet in warm and cold water is a type of natural therapy that aims to increase blood circulation, reduce edema, increase muscle relaxation, nourish the heart, relax muscles, relieve stress, reduce anxiety, muscle pain, relieve pain, increase permeability.

Capillaries, providing warmth to the body so it is very useful for therapy in primigravida pregnant women in the face of labor [9]. In respondents who experienced moderate or mild anxiety, before being given the action of soaking their feet in warm water, signs of anxiety were found such as feeling twitching, feeling muscle stiffness, palpitations, difficulty sleeping, unsatisfactory sleep, not enjoying hobbies, feeling worried, unable to concentrate. irritability, sweating, flushed face and increased blood pressure. Bobak describes the psychological factors that cause a woman's anxiety related to a woman's readiness for pregnancy, including physical and mental changes [11]. Respondents also experienced cardiovascular symptoms, respiratory symptoms, and gastrointestinal symptoms as symptoms indicating anxiety at both mild and moderate levels of anxiety. After being given a foot soak with warm water, the symptoms are reduced and some no longer feel it. Anxiety is also influenced by the hormones cortisol and serotonin. The hormone that regulates stress levels in a person's mind and body is called the hormone cortisol. When the body is in a state of danger or confusion, the hypothalamus will produce a number of hypothalamic regulating hormones which are sent to the pituitary gland under the hypothalamus [12]. Stress or anxiety in pregnant women can affect cortisol secretion. A dramatic increase in cortisol secretion, mediated by the central nervous system through increased activity of the corticotropin-releasing hormone (CRH)- Adrenocorticotropic hormone (ACTH)-

cortisol system, occurs in response to situations that cause stress or anxiety [13]. Corticotropin secretion is associated with anxiety, a dramatic increase in cortisol secretion, mediated by the central nervous system through increased activity of the corticotropin-releasing hormone (CRH)-Adrenocorticotropic hormone (ACTH)-cortisol system, occurs in response to situations that cause anxiety.

The increase in plasma cortisol concentration is generally proportional to the intensity of stimulation: a greater increase in cortisol level indicates a response to severe anxiety events than to simple anxiety events [14] [15]. Hypothalamic hormones will regulate the secretion of hormones produced by the anterior lobe in the pituitary gland or pituitary gland, namely adrenocorticotropic hormone (ACTH). When the pituitary gland is stimulated, ACTH is secreted into the blood to be carried to other endocrine glands, including the adrenal cortex. This gland is then stimulated to secrete specific hormones such as cortisol, which are carried by the blood to hormone receptors in or on target tissue cells. Then it enters the bloodstream, the heart beats faster, oxygen levels in the brain increase, and releases energy from body fat and glucose. Conditions are excessively stressed, the hormone cortisol will increase, and this will cause fatigue [12]. This is in line with supporting and extending findings that progressive relaxation techniques are effective in helping individuals to cope with stress and improve well-being. For example, with regard to PMR which showed that PMR can reduce cortisol levels in pregnant women, depression and anxiety in coronary heart disease and cancer patients, but also induced a state of psychological and physiological relaxation [7]. In the opinion of researchers, a person's anxiety is influenced by many things, besides hydrotherapy and progressive muscle relaxation, an important factor that can help reduce anxiety and cortisol levels is family support such as support from husbands, parents or other families. Based on this, efforts that can be made so that pregnant women are not easy to experience anxiety are necessary to carry out hydrotherapy and progressive muscle relaxation activities so that during the process of pregnancy to childbirth pregnant women do not experience difficulties and anxiety in facing childbirth is reduced.

IV. CONCLUSION

From the results of statistical tests there is a significant difference between before and after the intervention so that hydrotherapy and Progressive Muscle Relaxation therapy are effective in reducing anxiety levels and cortisol levels in primigravida pregnant women in facing labor.

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