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THE EFFECTIVENESS OF WARM COMPRESS AND COLD COMPRESS TOWARD THE INTENSITY OF LABOR PAIN ON PRIMIPARA WOMEN

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ABSTRACT

Background: Labor pain is one of the most severe forms of pain women experience, therefore the efficient management of labor pain is the primary objective of maternity services. Non-pharmacological pain treatments are recommended because they are cheaper, safer, and can be done by family members. Objective: To assess the effectiveness of warm and cold compresses against the intensity of pain on primipara women.
Research method: The research was a Quasy-experiment with two groups of pretest-posttest design. A total of 34 primipara mothers were selected by purposive sampling meeting the inclusion criteria of the research. The sample was divided into two groups, a warm compress group and a cold compress group. The research was conducted at BPM Huraida and BPM Harti Candra from February to August 2023. SPSS software was used to analyze data through paired t-tests and independent sample t-tests.
Result: The average labor pain score before a hot compression intervention was 6,941 ± 1,029, and after a warm compression intervention, was 4,647 ± 1,169 with a p-value of 0,000. The average labor pain score before a cold compression was 6,882 ± 1,317, and after a cold compression is 5,471 1,374, with a p-value of 0.000. The independent sample t-test showed that there was a significant difference between the warm compress group and the cold compressed group with an average difference of 0,882, with the p-value 0,020.
Conclusion: A warm compress and a cold compress are equally effective in reducing the intensity of maternal pain when the first phase is active. There is a significant difference in pain intensity between mothers who are given a warm compress and a cold compress. The warm compress group has a greater average reduction in pain than the cold compress group.
Keywords: labor pain, warm compress, cold compress

INTRODUCTION

Pain during labor is described as one of the most severe pains that most women experience in their lives[1]. Childbirth is a physiological process that allows a series of major changes in the mother to be able to give birth to her fetus through the birth canal. Labor begins when the uterus contracts and causes changes in the cervix (opening and thinning) and ends with the complete birth of the placenta. Consistently, painful labor contractions occur with decreased dilation and/or effacement of the cervix[2]. Stretching mechanisms and hormones may work together to initiate contractions in normal labor, although the exact cause of uterine contractions is unknown[3,4]. Stretching (distension) is a contractile stimulus to smooth muscle. Estrogen, progesterone, prostaglandins, and oxytocin are the main hormones involved in uterine contractions[5,6].

According to the hospital association data center in Indonesia, 15% of mothers giving birth in Indonesia experienced birth complications, 21% stated that their birth was painful because they felt a lot of pain, and 64% did not receive information about the preparation and planning that must be done to reduce pain during childbirth [7,8] .

One of the main goals of labor care is the management of labor pain. The general goal of pain management is to reduce pain intensity with nonpharmacological treatment. The non-pharmacological approach is a cheap and easy strategy to reduce labor pain that can be used as additional therapy because it can reduce physical pain while strengthening the mother's mental strength to stop the discomfort [9].

Non-pharmacological methods in labor pain management include warm compress and cold compress therapy, which have been identified as effective methods of treating labor pain. Apart from being a medium for reducing labor pain, warm compresses and cold compresses also help speed up the process of cervical dilatation, thereby avoiding prolonged labor [10].

Warm compresses work by widening blood vessels. Blood vessels that dilate due to warm temperatures can make it easier to remove heat from the body. Besides that, wide blood vessels can facilitate blood flow and oxygen supply to the painful area, thereby helping relax muscles, reduce stiffness, and increase the range of motion of the painful body part. Meanwhile, cold compresses work by narrowing

the diameter of blood vessels so that blood flows to the injury site becomes slow. In addition, cold temperatures which cause a decrease in blood flow have the effect of reducing the amount of inflammation-stimulating substances moving to the injury site; thereby it reduces swelling and pain.

This research aims to identify the effect of warm c
ompress and cold compress as a medium for managing labor pain.

MATERIALS AND METHODS

This type of research is a Quasy-experiment with two groups of pretest-posttest design, to determine the effectiveness of warm compresses and cold compresses in reducing maternal pain intensity in the first active phase. In this study, the pain intensity of the mother's active phase was measured first. The next step in the treatment given is non-pharmacological therapy (warm compresses and cold compresses). It reduced labor pain in each group for 30 minutes. After completion of therapy, the rest of the time was given for approximately 5 minutes and then the intensity of the pain was measured again.This research was conducted at BPM Zuraida and BPM Harti Candra from February to August 2023, the population in this study was mothers in the first stage of the active phase, with inclusion criteria: 1) single pregnancy 2) baby presentation behind the head, 3) age between 20- 35 years old, with a gestational age of 37-40 weeks 4) birth weight of the baby 2500-4000 grams, 5) primiparous mother, entering the active phase (dilation ≥ 4 cm) up to the maximum dilation phase (dilation 9 cm) and 6) accompanied by her husband. The sample selection method used purposive sampling, and anyone who met the inclusion criteria was included in the study which was 34 respondents with the details of 17 respondents with warm compresses and 17 respondents with cold compresses. Data were collected using a demographic questionnaire, clinical characteristics questionnaire, and Visual Analog Scale (VAS). The normality of the data was tested using the Shapiro-Wilk test which showed the normal distribution of the data. Therefore, paired sample t-tests and independent sample t-tests were used. Data were analyzed using SPSS software at a significance level of <0.05.

RESULTS

Respondent Characteristics

Table 1Respondent Characteristics

Characteristics	Group , n (%) atau Mean ± SD		homogeneity test
	Warm Compress	Cold Compress	
Mother Education			
Senior High School	7 (41,2)	6 (35,3)	-
Diploma	5 (29,4)	4 (23,5)	-
Bachelor	5 (29,4)	7 (41,2)	-
Work			
Work	12 (70,6)	9 (52,9)	-
Doesn't Work	5 (29,4)	8 (47,1)	-
Gestational Age (Week)	37,82 ± 0,73	37,88 ± 0,93	0,069
Mother's Age (Year)	25,71 ± 2,37	25,06 ± 2,11	0,917
Pre-intervention Pain	6,94 ± 1,03	6,88 ± 1,32	0,207

Table 1 shows the characteristics of respondents in the warm compress and cold compress groups, as follows: in the warm compress group, the majority (41.2%) has a high school education with a working status of 70.6%, in the cold compress group; the majority (41.2%) has a bachelor's degree, with working status of 52.9%. The average gestational age for the warm compress group is 37.82 ± 0.73, and for the cold compress group is 37.88 ± 0.93. It uses homogeneity test by the Levene method with the significance of the gestational age variable of 0.069. The mean age of respondents in the warm compress group is 25.71 ± 2.37, the cold compress group is 25.06 ± 2.11, and the significance of the homogeneity test is 0.917. The mean pre-intervention labor pain score in the warm compress and cold compress groups is 6.94 ± 1.03 and 6.88 ± 1.32 with a significance homogeneity test of 0.207.

Table 2.Frequency Distribution of Labor Pain Before and After Giving Warm Compress and Cold Compress Intervention

	Warm Compress		Cold Compress	
	Pre (%)	Post (%)	Pre (%)	Post (%)
Severe Pain	11(64,7)	1 (5,9)	10 (58,8)	4 (23,5)
Moderate Pain	6 (35,5)	13 (76,5)	7 (41,2)	12 (70,6)
Mild Pain	0 (0)	3 (17,6)	0 (0)	1 (5,9)

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Table 2 shows the results of the study. The highest level of pain before the warm compress and cold compress intervention is given in the severe pain group: 64.7% (warm compress) and 58.8% (cold compress). After intervention with warm compresses and cold compresses, the highest level of pain is in the moderate pain group, 76.5% (warm compress), and 70.6% (cold compress).

Univariate Analysis

Table 3. Average Labor Pain Before and After Applying Warm Compresses

Warm Compress	Mean	Standard Deviation	Min – Max
Before	6,941	1,029	5 - 9
After	4,647	1,169	3 – 7

Table 3 shows the research results of the average labor pain score before the warm compress intervention, namely 6.941 ± 1.029, with the lowest score of 5 and the highest of 9. The average labor pain score after the warm compress intervention is 4.647 ± 1.169, with the lowest score of 3 and the highest of 7.

Table 4. Average Labor Pain Before and After Applying Cold Compress

Cold Compress	Mean	Standard Deviation	Min – Max
After	6,882	1,317	5 – 9
Before	5,471	1,374	3 – 8

Table 4 shows the research results of the average labor pain score before the cold compress intervention, namely 6.882 ± 1.317, with the lowest score of 5 and the highest of 9. The average labor pain score after the cold compress intervention is 5.471 ± 1.374, with the lowest score of 3 and the highest of 8.

Table 5. The Data of Normality Test Result (Uji *Shapiro Wilk*)

Group	statistic	Df	Sig.
Pre-test Warm Compress Group	0,927	17	0,193
Pre-test Cold Compress Group	0,920	17	0,150
Post-test Warm Compress Group	0,925	17	0,181
Post-test Cold Compress Group	0,946	17	0,394

Table 5 shows the significance value of all variables from the results of the normality test using the Shapiro Wilk Test is > 0.05, meaning the data in this study is normally distributed. Because the data is normally distributed, parametric tests are then carried out with dependent t-tests and independent t-tests.

Bivariate Analysis

Table 6. The Effectiveness of Warm Compresses and Cold Compresses on Labor Pain (*Uji paired t-test*)

Variable	Mean	SD	95% CI of the difference		*Sign*
			Lower	Upper	
Pretest-postetst Cold Compress Group	1,411	0,618	1,093	1,729	0,000
Pretest-postetst Cold Compress Group	2,294	1,311	1,619	2,969	0,000

Table 6 shows the results of the study that the group given cold compresses has a pre-post intervention mean of 1.411 ± 0.618 with a significance value of 0.000. The warm compress group has a pre-post intervention mean of 2.294 ± 1.311 with a significance value of 0.000. The results of this study show that warm compresses and cold compresses are effective in treating labor pain in mothers giving birth during the first active phase.

Table 7. Differences in Giving Warm Compresses and Cold Compresses for Labor Pain (*The independent sample t-test*)

Variable	Mean difference	Standard error difference	95% CI of the difference		*Sig*
			Lower	Upper	
The Difference between Cold and Warm Compresses	0,882	0,352	0,154	1,61	0,020

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Table 7 shows the difference between warm compresses and cold compresses with a mean difference of 0.882 ± 0.352, with a significance value of 0.020. It indicates that there is a difference in pain scores between the group given the warm compress and the group given the cold compress.

DISCUSSION

The effectiveness of warm compresses on labor pain

The research results showed that the average labor pain score before the warm compress intervention was given was 6.941 ± 1.029, after the warm compress intervention was given the average pain score was 4.647 ± 1.169. The pre-post intervention mean was 2.294 ± 1.311 with a significance value of 0.000 (p-value < 0.05), meaning that warm compresses were effective in reducing labor pain in mothers giving birth during the 1st active phase.

Sujata Goswami et al (2022) reported that warm therapy is useful for reducing pain in mothers giving birth. Several literature studies state that warm therapy tends to be carried out to stimulate deeper tissues, to reduce the pain experienced by the mother during the birthing process. The application of warm compresses increases the elasticity of collagen tissues, which helps increasing tissue flexibility and reduces the severity of pain[11].

This research is in line with a research carried out by Dian Hastuning Fitri et al (2023), warm compresses are effective in reducing the intensity of labor pain in the 1st active phase with significant values before intervention. Warm compresses are effective in reducing the intensity of labor pain in the 1st active phase with significant values before intervention[12].

Warm compresses cause blood vessels to dilate, thereby increasing blood supply and temporarily stopping pain signals to the brain. Apart from that, warm therapy works by releasing endorphins to reduce pain.

The effectiveness of cold compresses on labor pain

The research results showed that the average labor pain score before the cold compress intervention was 6.882 ± 1.317 and after the cold compress intervention given the average pain score was 5.471 ± 1.374. The pre-post intervention mean was 1.411 ± 0.618 with a significance value of 0.000 (p-value < 0.05), meaning that cold compresses were effective in reducing labor pain on mothers giving birth during the 1st active phase.

Mahnaz Didefar et al (2022), stated that cold therapy is effective in significantly reducing the intensity of labor pain on primiparous mothers. Cold compresses activate the thick alphabet of nerve fibers, which are mostly found on the surface of the body thereby preventing the transmission of pain to the brain [13].

Cold compresses can drastically reduce blood flow, as well as inhibit nerve conduction and pain transmission. Furthermore, according to the pain gate control hypothesis, cold compresses close the gates of pain signal transmission, preventing pain transmission to the brain and reducing pain perception.

Different of Warm Compresses and Cold Compresses on Labor Pain

The results of the study showed that there was a difference between warm compresses and cold compresses with a mean difference of 0.882 ± 0.352, with a significance value of 0.020.

Isye et al 2018, explained that there was a difference in the average intensity of labor pain in mothers who were given warm compresses and cold compresses with a p-value of 0.023. There were variations in pain intensity between the warm and cold compress groups due to different physiological responses in each respondent[14]. Warm compresses are also recommended by Haryanti (2016), the results of her research found that the use of warm compresses is more effective than cold compresses in reducing labor pain[15].

Warm compresses increase pain threshold and circulation and relax muscles. The use of warm compresses increases blood circulation and vascularization, resulting in muscle relaxation, which leads to reduced muscle spasms and discomfort[16]. Warm compresses can increase blood flow to an area and reduce edema, providing an analgesic effect by reducing the speed of nerve transmission, so that fewer pain signals reach the brain and reduce pain perception[17] .

Warm compresses used in the early stages of labor can reduce fatigue, soothe muscle spasms, increase comfort, and reduce anxiety[18]. The hot compress process is identical to that described by gate control theory. Warm compresses cause spinal cord reflexes that close the entrance to the distal pain location. The pain threshold will increase when the gate is closed[19].

Cold compresses work by narrowing the diameter of blood vessels so that blood flow to the injury site becomes slow. In addition, cold temperatures which cause a decrease in blood flow have the effect of reducing the amount of inflammation-stimulating substances that move to the injury site; thus, it reduces swelling and pain. Cold compresses numb the area of intervention; therefore, it slows down the transmission of pain, which lasts longer than hot compresses. Cold compresses using ice cubes stimulate the release of endorphins which are useful for blocking the conduction of painful stimuli and it can provide a feeling of comfort when experiencing pain and shift the focus of attention to the stimulus provided[20].

CONCLUSIONS AND SUGGESTIONS

1. Warm compresses and cold compresses are both effective in reducing the intensity of labor pain for primiparous women during the first active phase. There is a significant difference in pain intensity between mothers who are given warm compresses and cold compresses. The warm compress

group has a greater average reduction in pain than the cold compress group.

Midwives can utilize warm compresses or cold compresses to control labor pain and improve the birth experience because they are easy to apply and affordable.

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