ORIGINAL ARTICLE

Hot herbal compresses as therapy for reducing labor pain levels in the first stage of active phase in primigravida

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ABSTRACT

Objective: To prove the effect of providing hot herbal compresses as a therapy for reducing the level of labor pain in the first stage of the active phase of primigravida
Materials and Methods: This was a true experimental study using pretest and posttest designs with control group. There was an intervention group (n=19) which was provided with hot herbal compress therapy for 20 minutes with a temperature between 37-51.5ºC and a control group (n=19) receiving breathing exercise therapy. Respondents were selected by inclusion and exclusion criteria and randomization was carried out to determine whether the respondents were included in the intervention or control group by drawing lots.
Results: Hot herbal compress therapy reduced the level of labor pain in the first active phase at the 1st hour treatment by 49.3% (p=0.000), the 2nd hour by 50.3% (p=0.000), and the third hour by 22.4% (p=0.009).
Conclusion: Hot herbal compresses have an effect as a therapy for reducing pain levels of labor in the first stage of the active phase of primigravida.

Keywords: hot herbal compress; labor pain; maternal health

ABSTRAK

Tujuan: Membuktikan pengaruh pemberian kompres hot herbal sebagai terapi pengurangan tingkat nyeri persalinan kala I fase aktif primigravida
Bahan dan Metode: Penelitian true experiment dengan desain pretest and posttest with control group. Terdapat kelompok intervensi (n=19) yang diberikan terapi kompres hot herbal selama 20 menit dengan suhu antara 37-51,5ºC dan kelompok kontrol (n=19) yang diberikan terapi latihan napas. Penentaun responden dengan kriteria inklusi dan eksklusi serta dilakukan randomisasi untuk menentukan responden masuk kelompok intervensi atau kontrol dengan cara diundi.
Hasil: Terapi kompres hot herbal menurunkan tingkat nyeri persalinan kala I fase aktif pada perlakuan jam ke-1 sebesar 49,3% (p=0,000), jam ke-2 sebesar 50,3% (p=0,000), dan jam ke-3 sebesar 22,4 % (p=0,009).
Simpulan: Kompres hot herbal berpengaruh sebagai terapi pengurangan tingkat nyeri dan durasi persalinan kala I fase aktif primigravida.

Kata kunci: kompres hot herbal; nyeri persalinan; kesehatan ibu

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INTRODUCTION

Labor pain is one of the physiological events that occurs during labor, but this pain is reported that was the most severe degree of pain experienced by women during their lives.[1] It is reported that about 60% of primigravida and 40% multigravida women experience very severe pain levels.[2] The results of another studies showed that, in 21 primigravida respondents who experienced mild pain level were only 4.8%, the majority of 47.6% had severe pain and those with very severe pain were 47.6%.[3] In addition, other studies have shown that the average level of pain in the first stage in primigravida was 3.97, much more severe than multigravida, which was 2.69.[4] Labor pain continuously increases maternal anxiety and can stimulate the sympathetic nervous system so that the amount of catecholamines increases. Increased of catecholamines causes the decrease of blood flow to the uterus due to vasoconstriction and will interfere uterine contractions, inadequate oxygenation of the baby up to fetal distress, and also prolonged labor.[5] For several reasons, it is necessary to take action to reduce pain in labor.

Pharmacological methods such as intravenous analgesic drugs (morphine and fentanyl), inhaled analgesics, and nerve block methods can cause side effects to the mother such as the risk of aspiration, dizziness, nausea and adverse effects on the fetus, especially respiratory depression. Another pharmacological method is the use of epidural analgesia, but this method requires a large cost. In addition, the results of the study showed side effects in the form of prolonged labor, increased incidence of delivery with the help of devices such as cesarean section due to fetal distress, increased risk of hypotension, fever, and increased breastfeeding problems.[6]

Hot herbal compress is a traditional medicine from Thailand and is a non-pharmacological method that creates a feeling of warmth, analgesic and aromatherapy effects for relaxation from the herbal ingredients contained in it, namely bangle, turmeric, *temu putih*, lemongrass, kaffir lime peel, camphor, and salt. The herbs are natural ingredients that are often found in Indonesia. Previous research has proven that hot herbal compresses can reduce the intensity of breast engorgement with an average decrease in pain intensity was 5.9 compared to only warm compresses which was 3.1 (p 0.001) and there are no reports of respondents who experienced side effects.[7] In addition, hot herbal compresses can reduce myofacial pain on day 16 of the treatment compared to warm compresses and the use of topical diclofenac.[8] Another study showed that hot herbal compresses were effective in reducing the height of uteric fundus, lochia volume and intensity of afterpains in postpartum with $p < 0.05$.[9]

Until October 2020, the number of deliveries with live births in the city of Semarang, Indonesia, was 16,321, with the highest number of live births being in public health centers in the areas of Bandarharjo, Bangetayu, Tlogosari Kulon, and Srondol. Those public health centers did not use hot herbal compresses to reduce pain levels during the active phase of the first stage of labor and there was no research on this. This study aimed to identify effect of hot herbal compresses to reduce pain levels and duration of labor in the first stage of the active phase.

MATERIALS AND METHODS

This study used true experimental design with pretest and posttest and control group. The study was conducted at the Public Health Centers of Srondol, Ngesrep, Halmahera, Bangetayu, Tlogosari Kulon, PMB Hj. Thoiffah, Klinik Esti Husada and PMB Eka Tlogosari, all in Semarang, Indonesia, from March to April 2021. There were 2 groups in this study, the intervention group and the control group. The population in this study was an infinite population with criteria for primigravida mothers aged between 20-35 years with gestational age 37 - 42 weeks with normal pregnancy. The sampling technique used in this study was simple random sampling. The number of respondents in the intervention group was 19 respondents and those in the control group was also 19.

The intervention group was provided with hot herbal compress therapy and the control group only received breathing exercise therapy as standard care. Hot herbal compresses was steamed for 15 minutes to bring out the active ingredients contained in the hot herbs. The respondent's pain scale was observed with the VAS (pretest) and the time when the intervention began was recorded. After steaming for 15 minutes, the hot herbal was re-coated using a clean and dry cloth so as not to cause heat irritation to the skin and the temperature of the hot herbal was first adjusted to 51.5ºC using a thermometer. Compression was given to the respondent starting from the opening of 4-5 cm in the first stage of the active phase for 20 minutes at the point of the mother's sacrum. Then the pain scale was re-observed after the hot herbal compress (posttest) was provided. The herbal hot compress was provided again for 20 minutes after 1 hour from the previous intervention. Interventions were provided until complete opening was reached.

Table 1. Characteristics of respondents based on age, parity, anxiety, family support, and contraction scores in the intervention and control group

Characteristics	Groups						*p*
	Intervention			Control			
	n	(%)	Mean ± SD	n	(%)	Mean ± SD	
Age							
20 – 35 year	19	100	25.11 ± 2.536	19	100	23.21 ± 2.594	0.852[a]
Parity							
Primigravida	19	100	-	19	100	-	1,000[a]
Anxiety							
Mild anxiety	16	84.2	11.21 ± 5.062	13	68.4	15.05 ± 4.249	0.661[a]
Moderate anxiety	3	15.8		6	31.6		
Contraction							
Normal	15	78.9	-	4	21.1	-	1.000[a]
Abnormal	4	21.1		15	78.9		
Baby Birth Weight	-	-	3084.21 ± 177.21	-	-	3000.00 ± 200.00	0.989[a]
Family support							
Moderate	3	15.8	47.21 ± 6.696	1	5.3	47.11 ± 4.280	0.119[a]
High	16	84.2		18	94.7		

[a]: levene's test statistic

This study had been approved by the ethics commission of Sultan Agung Islamic University, Semarang, Indonesia, No. 37/II/2021/Komisi Bioetik. Respondents' data were kept confidential and informed consent was used to obtain the respondents' consent. Paired t-test and independent t-test were used for data with normal distribution, and to determine the effectiveness of the intervention (magnitude of influence) the repeated ANOVA test was used. Data were analyzed with SPSS type 22.0.

RESULTS AND DISCUSSION

Confounding variable analysis

Table 1 shows that the data on age, parity, age of pregnancy, anxiety scores, contraction strength, baby weight, and family support had a p value > 0.05 so that there was no statistically significant difference between the intervention group and the control group or, in other words, the two groups had the same data variance (homogeneous). The magnitude of the effect of the administration of hot herbal compresses in reducing labor pain in the first stage of the active phase is shown in Table 2.

Table 2. The effectiveness of herbal hot compresses on reducing labor pain levels in the active phase

Labor pain	Mean Difference	*p*[a]	Effect size (%)[b]
Pretest 1 vs. Post 1	1.956	0.000	49.3
Post 1 vs. Post 2	0.287	0.000	50.3
Post 2 vs. Post 3	0.056	0.009	22.4

[a]: Repeated Anova
[b]: Eta Squared

The results of the analysis in Table 2 shows that the level of pain from pretest 1 to posttest treatment at first hour, posttest treatment at 1st hour to posttest treatment at 2nd hours, and from posttest treatment at 2nd hours to posttest treatment at 3nd hours had a p-value <0.05 so showing that the administration of hot herbal compress therapy was effective in reducing the level of labor pain in the active phase of the first stage at pretest 1 to post 1, post 1 to post 2, and post 2 to post 3, ranging from 22.4% to 50.3%. The most remarkable effect occurred in posttest 1 to posttest 2, which was 50.3%.

Relationship of confounding variables to dependent variables

Age

A good, healthy and safe reproductive age is 20-35 years. The age of the mother determines her health status and it also relates to the maturity of the reproductive organs and psychological conditions. High risk may be present if the pregnant woman is < 20 years old or > 35 years old. A mother aged <20 years is biologically and emotionally not optimal and tends to be more unstable. In this study, the majority of the new mothers were in this age range. They had their first experience in giving birth so it caused anxiety in dealing with childbirth and resulted in more severe pain felt. Meanwhile, pregnant women aged >35 years feel anxious because they may have more risks in the process of pregnancy and childbirth. Research shows that the age factor is significantly related to labor pain with a p-value <0.05.[10,11]

Parity

Previous childbirth experience will help the mother in dealing with pain because in this case the mother's body already has a coping mechanism for pain. Mothers who have given birth for the first time will experience more anxiety and worry when facing labor because they have not experienced labor pain before. This will make the perception of pain higher in the first labor than in the second or more labor. In the second or more labor it does not mean that the mother does not feel pain, but because the mother has had previous experiences or even pleasant experiences, it will affect the perception of the mother's pain to be reduced and make the mother feel more comfortable in dealing with her delivery.

The results showed that mothers who had never had a previous birth experience or were primigravida experienced more severe pain intensity in the first stage than multigravida mothers. Of the 21 primigravida respondents, only 4.8% experienced mild pain intensity, the majority were 47.6% severe pain and 47.6% very severe pain.

Family support

The majority of the respondents, both in intervention and control groups, received high family support. Respondents between the intervention and control groups had the same or homogeneous family support data variance ($p > 0.05$). Family support, especially from the husband when giving birth will affect the mother's level of anxiety in the form of inner peace, feelings of calm, security and comfort so that the anxiety felt by the mother will be reduced. This will trigger catecholamine levels in the blood to drop to normal. This normal level of catecholamines will cause smooth muscles to relax and trigger vasodilation of blood vessels so that blood and oxygen flow increases to the uterus and the pain that the mother feels is reduced.[12,13]

Anxiety

The anxiety experienced by the majority of respondents was mild anxiety. Respondents between the intervention and control groups had the same variance or homogeneous anxiety score data ($p > 0.05$). Anxiety and fear will increase muscle tension and interfere with blood flow to the brain and muscles. Anxiety in labor will cause tension in the pelvic muscles, uterine muscle tension or uterine contractions are disrupted. Muscle tension that lasts for a long time will cause the mother to be tired and the mother's power factor will be lost during the second stage so that it will increase the perception of pain and reduce the mother's ability to control her pain.[14] Anxiety and pain can cause stress in the mother so that it triggers the release of the hormone adrenaline. This will cause vasoconstriction of blood vessels so that the blood flow that carries oxygen to the uterus is reduced and results in decreased uterine contractions and the duration of labor becomes longer.[15]

Baby birth weight

The average birth weight in the intervention group was 3084.21 grams, not much different from the control group average, which was 3000 grams. It can be seen that the birth weight variable has the same or homogeneous data variance between the intervention group and the control group ($p > 0.05$). Birth weight can affect the delivery process because the greater the birth weight of a baby, it will affect the mother's pushing power and the risk of delivery due to shoulder dystocia. Macrosomic babies will trigger labor with shoulder dystocia which is characterized by no progress in the labor process so that the labor process takes a long time.[16]

Contraction strength

The contraction strength variable had a homogeneous variance between the intervention group and the control group. The majority of respondents in the intervention group had normal contraction strength of 78.9% while in the control group it was only 21.1%. In the group that received hot herbal compresses, the majority of respondents had normal contractions because the active ingredients in the herbs used in hot herbs such as curcumin, naringenin and apigenin can play a role in reducing levels of matrix metalloproteinase-9 which causes the endometrium to contract so that it can cause its opening in the uterus, allowing the childbirth.[17]

Hot herbal compresses in reducing the level of labor pain in the active phase

The results showed that the intervention group which received hot herbal compress therapy for 20 minutes until complete dilatation experienced a decrease in pain scale more than the group given breathing exercises until complete opening ($p <0.05$). The use of hot herbal compresses was effective in reducing the level of pain in the first stage of the active phase at 1, 2, and 3 hours of treatment when compared to the control group with the magnitude of the effect between 22.4-50.3%.

Previous research has shown that herbal hot compresses can be used as alternative analgesic therapy. It can reduce the level of breast swelling pain by 5.9 while the warm compress group only experienced a decrease of 3.1.7 In addition, other studies have proven that hot

herbal compresses given for 20 minutes every day for 10 days in postpartum women can accelerate the decrease in the intensity of afterpains than the group given uterine massage. Providing hot herbal compresses is effective in reducing the intensity of afterpains on days 1 to 4 of the postpartum period with an effect size of 10%-18.7%.[9]

This study proved that breathing exercises reduced labor pain less than hot herbal compresses. This was because hot herbal compresses had advantages over breathing exercises as it contains active ingredients from the herbs used, warm effects and aromatherapy effects from essential oils which are analgesic and relaxing so that they triggerred the release of endorphins as pain impulse inhibitors.

The content of the active ingredients in hot herbal compresses will come out when heated, one of which is by steaming.[18] The content of active ingredients such as lipopolysaccharide, compound D or dimethoxyphenyl, curcumin, naringenin, apigenin, curcumenol, and steroids will act by inhibiting the action of COX-2 enzymes and substance P, where these enzymes act in synthesizing prostaglandins. Substance P and prostaglandins as pain mediators that are inhibited will interfere with the transmission of pain impulses to the brain.[17,19-23] Luteolin content acts in its analgesic activity by activating opioid receptors and inhibiting the release of inflammatory mediators.[24] Other ingredients such as eugenol which when used topically can activate Transient Receptor Potential Vaniloid 1 (TRPV 1). These receptors function as antinociceptive or inhibit pain sensors from being transmitted to C fibers.[25]

In addition to the herbal content that has an analgesic effect, herbal hot compresses also produce a warm effect. Heat stimulation received by receptors in the hypothalamus will trigger vasodilation, causing increased blood flow to tissues, especially those experiencing inflammation and pain, resulting in a decrease in pain.[26]

Research limitations

In this study, it was not possible to control the possibility of differences in the position of the mother during childbirth and the history of exercise or pregnancy exercise which could confound the duration of active phase I labor. In addition, the authors were unable to make the temperature used in hot herbal compresses to be stable at a certain desired temperature so that the decrease in the temperature of the compress was still very likely to be influenced by external factors such as room conditions and wind.

CONCLUSION

Hot herbal compresses with temperatures between 51.5-37ºC for 20 minutes applied to mother's sacrum at the 1st hour, 2nd hour, and 3rd hour treatment had an effect in reducing labor pain in the first stage of the active phase of primigravida by 49.3% at the 1st hour after treatment, 50.3% at the 2nd hour and by 22.4% at the 3rd hour. Future studies are recommended to develop hot herbal compress product to make it easier to use with a stable temperature level.

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