**Abstract**

There are several of non-pharmacological therapies to be used as caring practice to mother with labor pain. This study aimed to observe the effectiveness of both single and combination therapy of warm compresses and counter pressure massage (CPM) for the management of labor pain during the first active phase through medical records. This is a pilot study that used a cohort prospective design. The total number of respondents was 90 respondents, divided into 3 groups based on the non-pharmacological therapy that was given by the midwives or nurses. Pain level was measured with NRS 11. The study was conducted at PKU Muhammadiyah Gamping Hospital from May 2020 to September 2020. A comparative hypothesis analysis was done to compare the Pretest-Posttest of pain level between groups using the Wilcoxon, Kruskal-Wallis, and Post hoc Mann-Whitney tests with a significance of p < 0.05. There was a reduction of 1.53 pain level of subject who received CPM, 1.16 by received warm compress and 1.67 for those who received combination therapy. It was found there was a significant difference between three groups with p=0.020. It was found that CPM was compared to Warm compress obtained p=0.017, CPM compared to Combination therapy obtained p=0.019, warm compress compared to combination therapy obtained p = 0.396. Combination therapy showed the highest reduction effect toward pain level of First Phase of Active Labor Pain. However, the CPM therapy showed to achieve effectiveness compared to warm compress and combination therapy.

**Key words:** Labor, Phase 1 active, Pain, Counter Pressure Massage, Warm compress

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**Introduction**

Childbirth (labor) is a physiological process that begins with the appearance of regular uterine contractions, which will result in the opening of the birth canal, until the birth of the fetus and placenta. Uterine contractions and opening of the birth canal will usually result in discomfort and pain. The intensity of labor pain felt by mothers varies widely because the response to pain stimuli is interpreted by the mother very individually. This depends on the patient's emotional, motivational, and supportive, social, and cultural conditions.1-3

In addition, high pain in labor can cause anxiety, especially in primigravida mothers. There are 85.5% of primigravida mothers who have not received action to reduce pain. The presence of pain during labor
increases anxiety in the mother which can increase the risk of prolonged labor.⁴

Currently, there are several techniques that are often used to manage labor pain, including pharmacological and non-pharmacological techniques. Pharmacological techniques include inhaled analgesics, opioid analgesics, spinal anesthetics, and epidural analgesics are more effective than non-pharmacological methods, but pharmacology is more expensive, and has the potential to have adverse effects.⁵

The development of new methods, especially non-pharmacological techniques, should continue to be developed in the world of midwifery. With the aim of providing comfort or a relaxing effect, it is hoped that it can reduce the rate of anxiety and maternal mortality. The use of relaxation techniques and pain relief strategies in preparation for labor and delivery has even been regulated in the Regulation of the Minister of Health (PMK) RI Number 369 / MENKES / SK / III / 2007 concerning professional standards for midwives.⁶

In addition, the development of combined non-pharmacological therapies based on theoretical and proven interventions that are proven to reduce pain and anxiety in labor patients is currently very important.⁷ Midwives also need to think about reducing the psychological impact caused by the economic pressure of pharmacological therapy that will be given to patients. The impact of toxicity on patients receiving pharmacological therapy for the management of anxiety over labor and reducing pain also needs further consideration. No less important, the new combination therapy that will become a world leader in midwifery and nursing and its application, including suggestions on the implementation of midwifery cares that have been outlined in government regulations, need to be further studied.

Therefore, two techniques that are often used in the midwifery and nursing, Counter Pressure Massage (CPM) and Warm Compress, need to be continuously refined in to become a superior and inexpensive therapeutic standard for midwives to apply. This pilot study aimed to observe the effectiveness of both single and combination therapy of warm compresses and counter pressure massage for the management of labor pain during the first active phase.

**Method**

This study was a cohort prospective study. The comparative analysis will be done to compare the effectiveness of both single and combination therapy of warm compresses and counter pressure massage, that has been using by the nurses or midwives at the study site, for the management of labor pain during the first active phase. The study population was patients who were undergone normal or sectio-caesarian labor at PKU Gamping Hospital, Sleman, Yogyakarta. The study involved 90 respondents, each of which amounted to 30 respondents for each study group. The sample size calculation followed the recommendations of previous studies, which were also conducted by researchers by using *purposive sampling* approach.⁸ The Inclusion criteria were pregnant women aged 20-35 years old on the day of inpatient registration, first pregnancy status (Primipara), undergone preparatory care for delivery at PKU Muhammadiyah Gamping Hospital and having completed data of pain assessment in medical record. Meanwhile, the exclusion criteria were hospitalization with a history of premature rupture of membranes due to infection, being pregnant with twins (Gemelli), taking all types of pain-reducing drugs (analgesics) that had been prescribed by a referring doctor or midwife.

Data was collected from Medical Record. Based on the Standard Operating and Procedure (SOP) of the hospital, the pain level was measured by Numeric Rating Scale (NRS) 11 for Pain Level Assessment which was adopted from National Institutes of Health – Warren Grant Magnuson Clinical Center July 2003. In this study, pain was defined as the scale of pain experienced by the mother during childbirth due to contractions before and after a warm compress during the first stage of the active phase. Respondents were divided into three groups based on the non-pharmacological therapy that was given by the midwives or nurses.

Warm compress therapy using an elastic bag (buli-buli) for 20 minutes on the back of the mother giving birth, namely in the 1-5 lumbar. This warm compress was given to primiparous and multiparous childbirth mothers who will be carried out by the researchers themselves and assisted by research assistants or their families until the completion of the 1st stage of the active phase. Meanwhile, Counter pressure massage therapy was a massage or massage in the back area to reduce pain that that was done in the sacral area by pressing in a circular manner using a soft fist which was done for 30 minutes while contracting. Those activities, both CPM or warm compress was conducted by the midwives following the Standard Operating Procedure of the Hospital.

Data of the study was obtained from the Medical Record. The research was conducted at PKU Muhammadiyah Gamping Hospital from May 2020-September 2020. Comparative hypothesis analysis
was done to compare the Pretest-Posttest of pain level between groups using the Wilcoxon, Kruskal-Wallis, and Post hoc Mann-Whitney tests with a significance of p <0.05. The statistics application used was IBM Statistics Version 25. The effectiveness of CPM, warm compress or combination was collected from the medical records then to compare the Delta (Δ) mean of Pain Level of each Group. The observation toward the treatment both single and combination said to be effective to reduce pain, if the comparative analysis of Delta (Δ) mean of Pain Level between two treatment be found p<0.05. This study was received Ethical Approval from National Health Research Ethics Committee (No. 1597/KEP-UNISA/IV/2020). Hence, the Institution approval was also obtained priorly as legal basis to get the study started.

**Result**

Table 1 presents data on the characteristics of respondents based on parity, occupation, and labor plan. Based on the results of the comparative analysis between the 3 research groups, it was found that with the Kruskal Wallis test, the number p> 0.05 was obtained, which means that there was no significant difference in the characteristics of the respondents between groups based on parity, occupation, and labor plans.

Table 2 presents data on the characteristics of respondents based on age, gestational age, and body weight. Based on the results of the comparative analysis between the 3 research groups, it was found that with the Kruskal Wallis test the number p> 0.05 was obtained, which means that there were no significant differences in the characteristics of the respondents between groups based on age, gestational age, and body weight.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Group</th>
<th>Mean ±S.D</th>
<th>Median</th>
<th>Modus</th>
<th>Minimum</th>
<th>Maximum</th>
<th>*p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>CPM</td>
<td>28.13±4.92</td>
<td>28</td>
<td>28</td>
<td>19</td>
<td>37</td>
<td>0.740</td>
</tr>
<tr>
<td></td>
<td>Warm Compress</td>
<td>27.53±4.64</td>
<td>28</td>
<td>20</td>
<td>20</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Combination</td>
<td>27.37±4.11</td>
<td>28</td>
<td>28</td>
<td>20</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>Gestational Age</td>
<td>CPM</td>
<td>38.53±1.31</td>
<td>39</td>
<td>39</td>
<td>36</td>
<td>41</td>
<td>0.793</td>
</tr>
<tr>
<td></td>
<td>Warm Compress</td>
<td>38.47±1.41</td>
<td>39</td>
<td>39</td>
<td>36</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Combination</td>
<td>38.7±1.29</td>
<td>39</td>
<td>39</td>
<td>36</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>Body Weight</td>
<td>CPM</td>
<td>59.62±9.4</td>
<td>61.2</td>
<td>53.2</td>
<td>44.2</td>
<td>77.2</td>
<td>0.199</td>
</tr>
<tr>
<td></td>
<td>Warm Compress</td>
<td>58.98±9.87</td>
<td>59.9</td>
<td>51.9</td>
<td>42.9</td>
<td>76</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Combination</td>
<td>62.78±10.6</td>
<td>62.25</td>
<td>54.0</td>
<td>45</td>
<td>85</td>
<td></td>
</tr>
</tbody>
</table>

*Comparative hypothesis analysis was performed using the Kruskal Wallis test with a significance of p <0.05.

Table 3 shows the pain levels and comparative analysis results between groups.

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean ±S.D</th>
<th>Δ</th>
<th>Median</th>
<th>Modus</th>
<th>Minimum</th>
<th>Maximum</th>
<th>*p</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPM</td>
<td>Pretest</td>
<td>6.53±1.7</td>
<td>-1.53</td>
<td>7</td>
<td>7</td>
<td>3</td>
<td>9</td>
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<tr>
<td></td>
<td>Posttest</td>
<td>5.1±1.51</td>
<td></td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>Warm Compress</td>
<td>Pretest</td>
<td>7.03±1</td>
<td>-1.16</td>
<td>7</td>
<td>7</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>5.87±1.33</td>
<td></td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Combination</td>
<td>Pretest</td>
<td>7.4±1.99</td>
<td>-1.67</td>
<td>8</td>
<td>9</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>5.73±1.91</td>
<td></td>
<td>6</td>
<td>6</td>
<td>2</td>
<td>9</td>
</tr>
</tbody>
</table>

*Comparative analysis using the Wilcoxon test with a significance of p <0.05

**p** 0.020

*Comparative analysis using the Wilcoxon test with a significance of p <0.05. Post Hoc analysis of the pain variable was carried out using the Mann-Whitney test, it was found that Group 1 (CPM) was compared to Group 2 (Warm compress) obtained p = 0.017, Group 1 (CPM) compared to Group 3 (Combination) obtained p = 0.019, and Group 2 (Warm compress) compared to Group 3 (Combination) obtained p = 0.396.
Table 3 shown that all the three groups shown a significant difference between before and after the treatment was given (p<0.05 respectively). On the group 1, the mean differences of pain level were 1.53 followed by 1.16 on the group 2 and 1.67 on the group 3. Furthermore, the biggest differences of pain level were recorded on the Group 3 (1.67; 7.4±1.99 Pretest and 5.73±1.91 posttest).

Discussion

Each study group was conducted with a comparison test on the level of first stage labor pain at pretest and posttest. In Group 1, patients who received the Counter Pressure Massage (CPM) obtained p value = 0.001 which means that there was a significant difference between pain levels at pre and post treatment. In addition, the group 1 showed a mean reduction in pain of 1.53 at pretest compared to posttest Then in Group 2, patients who received Warm Compress obtained p value = 0.001 which means that there was a significant difference between the pain level at pretest and posttest with a decrease in the mean pain level of 1.16. In Group 3, patients who received the Combined Warm Compress with CPM showed p <0.001 which means that there was a significant difference between the pain level at pretest and posttest with a decrease in the mean pain level of 1.67. Based on the comparative analysis above, it is known that the group of mothers who received a combination of CPM and Warm Compress showed a higher mean reduction in pain levels than the other two groups.

CPM technique is a massage technique for low back pain in labor using a non-pharmacological (traditional) method, namely by pressing the nerves in the low back pain area of the mother in labor, using a fist to the mother’s waist for 20 minutes in a sitting position. Emphasis is applied when the respondent experiences uterine contractions (which cause low back pain) during the first stage of the active phase. Then, a warm compress is an action by providing a warm compress that aims to meet the needs of comfort, relax or relieve pain, reduce or prevent muscle spasms and provide a feeling of warmth. Combined therapy between CPM and warm compresses uses the principle of a warm sensation and a relaxation inducer which has been shown to reduce pain during the 1st stage of labor.

Warm that is applied to the lower back of women in the area where the fetal head presses on the spine will have a pain-reducing effect, warm will increase circulation to the area so that tissue anoxia caused by pressure can be resolved. Pain due to muscle spasm responds well to warm because it dilates blood vessels and increases local blood flow and relieves pain by eliminating inflammatory products, such as bradykinin, histamine and prostaglandins that will cause local pain. Warmth also stimulates nerve fibers that close the pain gate so that the transmission of pain impulses to the spinal cord and brain can be inhibited. Meanwhile, according to Susilongtyas et al. (2019), warm compresses on the tissues stimulate circulation and increase the localization of purulent materials.

In addition, the stimulation of hot or warm compresses can elicit different physiological responses. In general, hot, or warm compresses are useful for treatment, increasing blood flow to the injured area. More specifically, some of the benefits of warm compresses, namely the physiological response to vasodilation due to warm compresses can provide benefits, namely, to increase blood flow to the injured body, increase nutrient delivery and waste disposal, and reduce venous congestion in injured tissue. In addition, warm compresses can trigger a decrease in blood viscosity, thereby increasing the delivery of leukocytes to the injured area. Finally, muscle tension will decrease, leading to increased muscle relaxation and reduced pain due to spasm or stiffness followed by increased tissue metabolism. This physiologically will cause increased blood flow and provide a local feeling of warmth. In addition, capillary permeability increases and leads to increased movement of waste products and nutrients.

Slightly different from CPM therapy, the principle or goal of CPM itself is to provide a block to the pain area so that pain can be reduced. The correct implementation of massage can reduce pain and reduce muscle tension and individuals can perceive massage as a stimulus to relax which can trigger a relaxation response so as to reduce the level of pain in stage 1 labor. In addition, this massage process can be done during the first stage of labor or according to the patient’s wishes and comfort. Massage can be done by a midwife or family who accompanies the delivery process. Hence, giving massage with CPM is described as able to close the gate of pain messages that will be delivered to the spinal cord and brain. In addition, strong pressure when applying this technique will be able to activate the endorphins that are in the synapses of the spinal cord and brain cells, so that the transmission of pain messages can be inhibited and cause the pain sensation to decrease.

Therefore, it seems clear that labor pain has decreased because applying warm compresses and
CPM to the back skin can increase the local temperature of the skin thereby increasing circulation in the tissues for metabolic processes. This combination technique can reduce muscle spasm and reduce pain as well as provide comfort and calm to the first stage of labor. The combination therapy causes closed pain transmission so that the cerebral cortex cannot receive signals because the pain has been blocked by warm stimulation so that the pain changes with warm stimulation that reaches the brain is first followed by the release of endorphins which can promote relaxation.28-30 The combination of CPM and warm compresses during labor is a non-pharmaceutical pain reduction technique that can provide benefits such as providing peace to the mother in labor during uncomfortable and painful conditions. However, this study is suggested to have higher the number of sample size since the potency for influencing the regulation for pain reduction method is very promising.

Conclusion

Combination therapy showed the highest reduction effect toward pain level of First Phase of Active Labor Pain. However, the CPM therapy showed to achieve effectiveness compared to warm compress and combination therapy. The further study was suggested to have deeper analysis on the effect of non-pharmacological treatment toward the clinical manifestation. However, this observational study needs to be elaborated more, particularly strict protocol on every non-pharmacological therapy that will be given to the patient.

Reference

20 Widiaustutti W, Peristiwati Y, Farida S. Effect of Large Compress Aroma Lavender Therapy to Intensity Scale and Old Labor of I there are Active Phase Until Second Stage in