



## Effect of warm water compress with endorphin massage on reducing labor pain intensity in the first stage active phase

Sumartila<sup>1</sup>, Adriana Palimbo<sup>1\*</sup>, Istiqamah<sup>1</sup>, Dede Mahdiyah<sup>2</sup>

<sup>1</sup>Department of Midwifery, Faculty of Health, Sari Mulia University, Banjarmasin, Indonesia

<sup>2</sup>Department of Pharmacy, Faculty of Health, Sari Mulia University, Banjarmasin, Indonesia

\*Corresponding author: [palimboadriana00@gmail.com](mailto:palimboadriana00@gmail.com)

### ARTICLE INFO

*Article history:*

Received 07 April 2024

Revised 04 Mei 2024

Accepted 10 Mei 2024

*Keywords:*

Warm water compress

Endorphine massage

Pain intensity

First stage

Active labor

### ABSTRACT

**Background:** Pain during childbirth is subjective and influenced by various factors, including psychosocial factors, habits and women's perception of the meaning of childbirth. Uncontrolled labor can harm the mother and fetus. Excessive pain increases anxiety and restlessness in pregnant women, causing increased catecholamine secretion. Non-pharmacological complementary therapy techniques will be used to reduce labor pain.

**Objective:** To determine the effect of warm water compresses with endorphin massage on reducing labor pain intensity during the first stage active phase.

**Method:** This type of quantitative research is a one-group pretest-posttest design with 15 mothers in the first stage of labor as participants, obtained using total sampling. Warm water compress and endorphin massage are performed simultaneously for 20 minutes. Labor pain data was collected using the Wong Baker Faces Scale instrument. Non-parametric statistical analysis using the Wilcoxon sign rank test.

**Results:** The characteristics of the 15 respondents included 13 people in the 20-35 age group (86.7%), 10 people in the multiparity category, 11 people (73.3%) high school graduates, and seven people (46.7%) who were entrepreneurs. The results of the Wilcoxon sign rank test showed that giving a warm water compress combined with endorphin massage had a significant effect ( $p$ -value  $<0.05$ ) on reducing the intensity of labor pain in the first active phase.

**Conclusion:** Warm water compresses combined with endorphin massage showed a positive influence in managing the intensity of the pain scale in the first stage of labor.

This is an open-access article under the [CC BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license.



## 1. Introduction

A safe and comfortable birth process is a measure of the success of women in going



through the active phase of first-stage labor, from false contractions to regular and adequate contractions (Palimbo, Anisa, Handayani, et al., 2023). The frequency and duration of contractions will increase with each additional opening of the cervix, which is often referred to as the progress of labor. Women will feel pain during contractions, starting from pain every 10 seconds to every 60 seconds of (Kholisoh et al., 2022; Türkmen & Oran, 2021). Pain during childbirth is subjective and influenced by various factors, including psychosocial factors, habits, and women's perceptions of the meaning of childbirth.

World Health Organization (WHO) estimates that 210 million pregnancies occur worldwide every year and 20 million women experience pain during childbirth (Goswami et al., 2022). And the majority of pregnant women experience pain before giving birth. According to Palimbo, Anisa, Zulliaty, et al. (2023), apart from uncontrollable pain, anxiety and stress also appear to accompany the second stage of labor. And usually, the impact of this stress will last until the postpartum period. An increase in heart rate, respiratory system, and blood pressure often occurs along with labor pain. The same thing can also cause feelings of anxiety and stress which inhibit the release of the hormone oxytocin, resulting in reduced contractions and uterus weakening, causing obstruction to cervical expansion (Goswami et al., 2022). Furthermore, based on a study by Alehagen et al. (2001), excessive pain increases anxiety and restlessness in pregnant women, causing an increase in catecholamine secretion. Catecholamines cause pelvic muscle tension, causing prenatal resistance.

Labor pain modalities basically include pharmacological and non-pharmacological interventions. Pharmacological intervention is a routine medical option for the management of labor pain but has potential side effects on the mother and fetus. The results of a study in Iran regarding pharmacological methods to reduce pain with epidural analgesia can cause fetal distress, hypotension, fever and urinary retention, and ultimately lead to caesarean section (Riani & Indrayani, 2022). So, in this study, one of the non-pharmacological treatment techniques, also known as a complementary therapy, which is useful for relieving labor pain will be studied, namely warm water compresses combined with endorphin massage. The application of warm compresses during labor can balance dilated blood vessels in the body, create homeostasis, and reduce anxiety and fear through indirect pain tolerance. Pain arises due to uterine muscle contractions, and pain due to labor can be treated using warm compresses, especially considering the effectiveness of the duration of warm compresses and



compress bottles used in managing labor pain (Koç & Başgöl, 2020; Palimbo, Anisa, Handayani, et al., 2023). Then, another method is endorphine massage. Endorphine massage is an act of touch therapy or light massage which is also effective in relaxing and adapting pain intensity (Effendy et al., 2021; Puspitasari & Astuti, 2017). Therefore, based on these reasons, this study aims to analyze the effect of warm water compresses combined with endorphin massage on reducing labor pain intensity in the first stage active phase.

## **2. Method**

### **Research design**

The research method used was quasi-experimental with a one-group pretest-posttest design. Treatment is given to the same participant, and the intensity of pain is measured before and after receiving treatment. All participants were given the same treatment in the form of warm water compresses and endorphin massage simultaneously.

### **Sample size**

Research data collection was carried out at Kerang Community Health Center, Paser, East Kalimantan, from January to February 2024. Total sampling was carried out on pregnant women who underwent normal labor during the first stage active phase, 15 participants took part in this research. Participating pregnant women have gestational age criteria of 37 – 42 weeks.

### **Data collection**

Before receiving warm water compression and endorphin massage treatment, pregnant women's pain was measured using the Wong Baker Faces Scale (WBFS) instrument. Warm water compresses are done using a cloth soaked in water at a temperature of around 50 degrees C. The cloth is then squeezed to remove excess water. Furthermore, the compression process is carried out on the mother's sacrum area for 20 minutes until the cervical dilatation reaches 4 - 5 cm. Endorphin massage is carried out simultaneously on the mother's back area to help stimulate endorphin hormones. After 20 minutes of therapy, pain was measured again with the WBFS instrument as post-test data.

### **Data analysis**

Data is presented in the form of tables and graphs to provide an overview of the characteristics of respondents and the intensity of maternal pain. The data displays the frequency and percentage distribution of the observed variables. The effect of treatment was



analyzed using a comparison test using the Statistical Package for the Social Sciences (SPSS) version 25. The comparison test used is the Wilcoxon signed ranks test because the pain data is categorical.

### Ethical consideration

This research has gone through ethical approval number 082/KEP-UNISM/II/2024 from the Research Ethics Institute of Sari Mulia University. All participants who took part in the activity received a complete explanation regarding the research that would be carried out. The treatment provided aims to provide good benefits for participants and not harm participants. Participants are given the freedom to participate or not participate in research activities. Participants can also withdraw at any time from research activities.

### 3. Results

#### Demographic of respondents

The characteristics of respondents in this study were a group of 15 respondents who were given warm water compresses combined with endorphin massage as shown in Table 1, as follows:

Table 1. Demographic of respondents

Characteristics	Frequency	Percentage (%)
Age (year)		
20 – 35	13	86.7
>20/<35	2	13.3
Parity		
Primiparity	5	33.3
Multiparity	10	66.7
Education		
Junior High School	3	20
Senior High School	11	73.3
Bachelor	1	6.7
Occupation		
Not work	2	13.3
Civil employees	6	40
Self-employed	7	46.7
Total	15	100

Based on Table 1, for results characteristic data show that the highest number of women giving birth are in the 20 - 35year category (86.7%). Number of multiparity categories is greater than primiparity (66.7%). Meanwhile, in terms of education, the highest category is senior high school (73.3%). The occupation category of respondents includes self-employed (46.7%), civil employees (40%) and women who do not work (13.3%).



### Effect of warm water compress with endorphin massage on labor pain intensity

Based on the results of the data distribution in Figure 1, a decreasing pain intensity scale was obtained on post-treatment. The initial pain scale before using warm water compress intervention with endorphin massage (Figure 1. A), the majority of cases that occur in women giving birth are severe pain (93.4%) and moderate pain (6.6%) categories. Meanwhile, in the distribution of data, after the intervention was given using a warm water compress with endorphin massage (Figure 1. B), the pain intensity scale decreased to the categories of moderate pain (73.3%) and severe pain (26.7%).

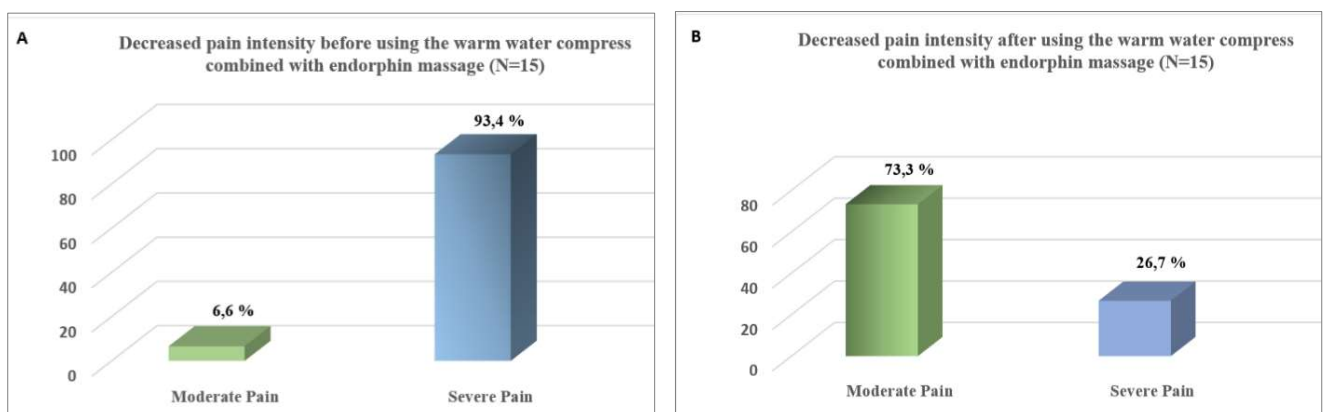


Figure 1. Pain intensity scale before intervention (A) and pain intensity scale after intervention (B)

Based on the data in Table 2, the positive rank value between the pretest and posttest pain intensity scale results is 0, both from the N value, Mean Rank and Sum of Rank, a value of 0 here indicates that there is no increase in the pain intensity scale before and after treatment for the respondent. On the other hand, the results showed a Negative Rank value between the results of the pain intensity scale before and after treatment, with as many as 13 positive data, meaning that 13 respondents experienced a decrease in the pain intensity scale from the pretest to the posttest value. The mean rank or average increase is 12.00, while the Sum of Rank or total ranking is 276.00.

The Ties value or similarity score between the pre-test and post-test is 2, which means two participants felt the same intensity of labor pain before and after receiving a warm water compress and endorphin massage. Then for the hypothesis results of the Wilcoxon signed ranks test, a p-value of 0.05 was obtained, this means that there is a difference in pain intensity scores in the pre-test and post-test or it can be interpreted that giving warm



compresses combined with endorphin massage has a significant effect on reducing the pain intensity of women giving birth in the active phase of the first stage.

Table 2. Results of analysis of two samples of pre-test and post-test data

		N	Mean Rank	Sum of Ranks	Asymp. Sig. (2-tailed)*
Post-test – Pre-test	Negative Ranks	13 <sup>a</sup>	12.00	276.00	0.000
	Positive Ranks	0 <sup>b</sup>	0.00	0.00	
	Ties	2 <sup>c</sup>			
	Total	15			

\*Wilcoxon Signed Ranks Test; <sup>a</sup> : Post-test < pre-test; <sup>b</sup> : Post-test > pre-test; <sup>c</sup> : Post-test = pre-test

#### 4. Discussions

A common phenomenon that women feel during the birthing process is labor pain. Pain begins to be felt when uterine contractions appear which are fluctuating or cyclical and appear several times during contractions and subside when relaxing. Contractions are caused by dilation cervix (Baljon et al., 2022), which is accompanied by signs and symptoms of bloody mucus discharge, often called a blood show.

In similar studies that we conducted previously (Palimbo, Anisa, Handayani, et al., 2023; Palimbo, Anisa, Zulliaty, et al., 2023), we practised pregnancy and childbirth care, where the problem of pain was a bad impression in primiparity before delivery and was also a varied experience in each multiparity. Therefore, the need for a save and comfort is suggested to reduce these obstacles. Adaptation to unavoidable pain is very important in the management of this care (Petitprez et al., 2020). According to Smith et al. (2018), pain adaptation does not mean avoiding pain. Adaptations to labor pain that are not managed properly will increase feelings of anxiety/worry and even high levels of fear, cause vasoconstriction and obstruction of blood and oxygen circulation from mother to fetus, reduce uterine contractions, and cause uterine ischemia which increases pain impulses (Gallo et al., 2018; Smith et al., 2018).

Regarding the provision of warm compress therapy, a study by Pratiwi et al. (2021) in the left tilt position, a compress was applied to the sacrum for 20 minutes. This application is useful for reducing muscle tension and anxiety in women so that they are more comfortable during the birthing process. This is also in line with the study by Ofori et al. (2020), which is given to a woman's lower back or when the fetus's head is attached to the spine. This explanation emphasizes that warm compresses are the primary application given to women giving birth. Other application combinations are also added to overcome other complaints



such as muscle tension and anxiety, so massage techniques are given as relaxation. This can also prevent vasodilation and homeostasis in blood vessels.

Referring to several studies that have been carried out by the research team at Sari Mulia University, Banjarmasin City, Indonesia, from 2022 to 2023, most are in the scope of complementary alternative childbirth care to adapt pain and reduce anxiety using warm compresses and combination of several other techniques. Anugrah et al. (2024), the majority of labor pain intensity before being given a warm compress was severe pain 93.3% and after being given a warm compress became moderate pain (83.3%), Wilcoxon signed rank test analysis obtained (p-value 0.000). According to (Palimbo, Anisa, Handayani, et al., 2023), an independent T-test showed that warm compresses combined with birthing balls were more effective in reducing anxiety levels than warm compresses only (p-value 0.030). The average anxiety score after being given a warm compress was 48.60, and the average anxiety score after being given a warm compress and birthing balls was 42.87. Anisa et al. (2023) show paired T-test results of giving warm compresses together with breathing techniques on intensity to labor pain (p-value <0.05), compared to warm compresses only (p-value 0.0965). Apart from that, the average pain scale finding of the experimental group was lower than the control group (p-value <0.05).

In managing labor pain discussed in this study, we also compare using of other non-pharmacological techniques from various complementary therapies. Several techniques that are also relevant can be given to mothers giving birth during the first active phase and receiving natural labor induction, including endorphin massage, effleurage massage, deep back massage and acupressure. For endorphin massage applications, it contains polypeptides of 30 amino acid units. Opioids, corticotrophin, cortisol, and catecholamines (non-adrenaline), hormones produced by the body, function to reduce stress and eliminate pain. It was further explained that endorphin massage is a light touch for relaxation and pain reduction, therefore endorphin massage is appropriate for severe pain to moderate pain through the touch of the hand, thereby causing a feeling of calm and relaxation which then pulsates. heart and blood pressure become normal (Khasanah & Sulistyawati, 2020).

Supliyani (2017), analysis results showed that there was an influence and difference in the mean before and after back massage (p-value 0.001) on the intensity of pain in the first stage. Massage therapy increases serotonin, reduces cortisol and depression. In addition,



serotonin has been noted to reduce leg and back pain, increase dopamine, reduce norepinephrine and anxiety (Dewi, 2023). Regarding massage and acupressure treatment to three treatment groups, namely massage only, acupressure only group, and massage combined acupressure group, these results show that the dual application of massage and acupressure is relatively more effective than therapy applied alone and massage is more effective than acupressure (p-value 0.01) (Gönenç & Terzioğlu, 2020). Yanuar Eka Pujiastutik et al., (2021) who compared endorphin massage and effleurage massage, the results of Mann Whitney test for the endorphin group and effleurage group were (p-value  $0.002 < 0.05$ ). Likewise with significance value between the endorphin group and control group (p-value  $0.000 < 0.05$ ). The endorphin group is a treatment that has the greatest effectiveness in reducing pain compared to other groups and there is a significant difference in the effectiveness of reducing pain in the three groups.

Other results from the review article showed that there was a decrease in the intensity of labor pain during one active phase after counterpressure massage. Other results from the review article also show that there is a decrease in the intensity of labor pain during one active phase after counterpressure massage. According to Antik et al., (2017), using endorphin massage on the pain intensity scale during the first active phase had a significant effect (p-value 0.000). In line with research by Fitriana & Putri, (2017), it also has a significant effect, the intensity of pain on endorphin massage before 5 minutes and after 5 minutes of endorphin massage (p-value 0.006) and the intensity of pain on endorphin massage before 15 minutes and after 15 minutes of endorphin massage (p-value 0.037).

From this description, it is emphasized that the effect felt is that women become more relaxed, comfortable, and the hormone oxytocin is released which stimulates uterine contractions. Further information is that massage during the labor phase for 20 minutes/hour will reduce pain. Here massage has a positive effect, women in labor experience pain but reduce stress hormones and low fetal activity, leg and back pain, minimizing further complications and normal fetal condition. Then, forms of touch in massage techniques such as rubbing or stroking (twisting and releasing), applying strong pressure to one point such as the pelvis, thighs, shoulders or hands can soothe and relax during pregnancy and childbirth.

## 5. Conclusion





This study concluded that the use of warm water compresses combined with endorphin massage showed a positive influence in managing the intensity of the pain scale in the first stage of labor. These results can be used as a consideration for using warm water compresses and endorphin massage as the main application to reduce pain, so that pregnant women are also more relaxed in facing the first stage of labor. From these practice implications, we suggest future research to analyze more deeply the effects of complementary therapies based on materials and modalities that are appropriate to the culture or local richness in each study area. The limitations of this study are that variations in maternal gestational age, prenatal care, and confounding factors that could influence pain were not studied in more depth. This can also be a consideration for future research.

## 6. Conflict of interest

All authors declare no conflict of interest.

## 7. References

- Alehagen, S., Wijma, K., Lundberg, U., Melin, B., & Wijma, B. (2001). Catecholamine and cortisol reaction to childbirth. *International Journal of Behavioral Medicine*, 8(1), 50–65. [https://doi.org/10.1207/S15327558IJBM0801\\_04](https://doi.org/10.1207/S15327558IJBM0801_04)
- Anisa, F. N., Palimbo, A., Maolinda, W., & Yuliyana. (2023). Effect of warm compress and breathing technique on duration of the second stage of labor. *Health Sciences International Journal*, 1(1), 16–23. <https://hsij.anandafound.com/journal/article/view/7>
- Antik, Lusiana, A., & Handayani, E. (2017). Pengaruh endorphine massage terhadap skala intensitas nyeri kala I fase aktif persalinan. *Jurnal Kebidanan*, 6(12), 1–15.
- Anugrah, N. F., Istiqamah, I., Mariana, F., & Zulliaty, Z. (2024). The effect of giving warm compresses on the intensity of labor pain in the first active phase with labor induction at Dr. H. Moch. Ansari Saleh Banjarmasin [in Indonesia]. *Proceeding Of Sari Mulia University Midwifery National Seminars*, 5(1). <https://ocs.unism.ac.id/index.php/PROBID/article/view/1168>
- Baljon, K., Romli, M. H., Ismail, A. H., Khuan, L., & Chew, B.-H. (2022). Effectiveness of Breathing Exercises, Foot Reflexology and Massage (BRM) on Maternal and Newborn Outcomes Among Primigravidae in Saudi Arabia: A Randomized Controlled Trial.



*International Journal of Women's Health*, Volume 14, 279–295.

<https://doi.org/10.2147/IJWH.S347971>

Dewi, M. K. (2023). The effect of endorphin massage on reducing the intensity of labor pain in the 1st active phase: A case study of mothers giving birth in PMB M Bekasi City [in Indonesia]. *SENTRI: Jurnal Riset Ilmiah*, 2(8), 3069–3077. <https://doi.org/10.55681/sentri.v2i8.1339>

Effendy, D. A., Utami, V. W., Maternity, D., & Sunarsih. (2021). Warm compresses effects on labor pain in the st active phase in parting women [in Indonesia]. *Midwifery Journal*, 1(4), 235–244.

Fitriana, & Putri, N. A. (2017). The Effect of Endorphin Massage on First Stage Pain Intensity in Primiparous Mothers [in Indonesia]. *Jurnal Ilmiah Keperawatan Sai Batik*, 13(1), 31–34.

Gallo, R. B. S., Santana, L. S., Marcolin, A. C., Duarte, G., & Quintana, S. M. (2018). Sequential application of non-pharmacological interventions reduces the severity of labour pain, delays use of pharmacological analgesia, and improves some obstetric outcomes: a randomised trial. *Journal of Physiotherapy*, 64(1), 33–40. <https://doi.org/10.1016/j.jphys.2017.11.014>

Gönenç, I. M., & Terzioğlu, F. (2020). Effects of Massage and Acupressure on Relieving Labor Pain, Reducing Labor Time, and Increasing Delivery Satisfaction. *Journal of Nursing Research*, 28(1), e68. <https://doi.org/10.1097/jnr.0000000000000344>

Goswami, S., Jelly, P., Sharma, S., Negi, R., & Sharma, R. (2022). The effect of heat therapy on pain intensity, duration of labor during first stage among primiparous women and Apgar scores: A systematic review and meta-analysis. *European Journal of Midwifery*, 6(November), 1–9. <https://doi.org/10.18332/ejm/156487>

Khasanah, N. A., & Sulistyawati, W. (2020). The Effect of Endorphin Massage on Pain Intensity in Birthing Women [in indonesia]. *Journal for Quality in Women's Health*, 3(1), 15–21. <https://doi.org/10.30994/jqwh.v3i1.43>

Kholisoh, I., Winarni, L. M., & Afiyanti, Y. (2022). The effect of warm compresses on the intensity of labor pain in the 1st active phase at Dinda Hospital, Tangerang [in Indonesia]. *Journal of Nursing Practice and Education*, 3(01), 1–10. <https://doi.org/10.34305/jnpe.v3i01.551>



- Koç, E., & Başgöl, Ş. (2020). Non-pharmacological techniques in labor pain management. *Samsun Sağlık Bilimleri Dergisi*, 5(1), 1–5. <https://dergipark.org.tr/tr/pub/jshs/issue/54854/707723>
- Ofori, D. A., Anjarwalla, P., Mwaura, L., Jamnadass, R., Stevenson, P. C., Smith, P., Koch, W., Kukula-Koch, W., Marzec, Z., & Kasperek, E. (2020). No Covariance structure analysis of health-related indicators for elderly people living at home with a focus on subjective sense of health. *Molecules*, 2(1), 1–12.
- Palimbo, A., Anisa, F. N., Handayani, L., & Hasanah, U. (2023). The effectiveness of using warm compresses and birthing balls on the anxiety level of the active phase of the first stage of labor. *Health Sciences International Journal*, 1(1), 1–8. <https://hsij.anandafound.com/journal/article/view/3>
- Palimbo, A., Anisa, F. N., Zulliaty, Mahdiyah, D., & Rahmah, L. (2023). Breathing techniques and warm compresses as therapy for adaptation of labor pain in the active phase of the first stage: a literature review. *Health Sciences International Journal*, 1(1), 30–38. <https://hsij.anandafound.com/journal/article/view/9>
- Petitprez, K., Guillaume, S., Mattuizzi, A., Arnal, M., Artzner, F., Bernard, C., Bonnin, M., Bouvet, L., Caron, F.-M., Chevalier, I., Daussy-Urvoy, C., Ducloy-Bouthorsc, A.-S., Garnier, J.-M., Keita-Meyer, H., Lavillonnière, J., Lejeune-Sadaa, V., Leray, C., Morandeau, A., Morau, E., ... Sentilhes, L. (2020). Accouchement normal : accompagnement de la physiologie et interventions médicales. Recommandations de la Haute Autorité de Santé (HAS) avec la collaboration du Collège National des Gynécologues Obstétriciens Français (CNGOF) et du Collège National des Sages-Femmes de France (CNSF) – Texte des recommandations (texte court). *Gynécologie Obstétrique Fertilité & Sénologie*, 48(12), 873–882. <https://doi.org/10.1016/j.gofs.2020.09.013>
- Pratiwi, D., Hadi, S. P. I., Sari, N., & Okinarum, G. Y. (2021). *Asuhan kebidanan komplementer dalam mengatasi nyeri persalinan*. Surabaya: Pustaka Aksara.
- Puspitasari, I., & Astuti, D. (2017). Back massage technique to reduce pain in the first stage of labor [in Indonesia]. *Jurnal Ilmu Keperawatan Dan Kebidanan*, 8(2), 100. <https://doi.org/10.26751/jikk.v8i2.289>



- Riani, C. G., & Indrayani, D. (2022). The effect of warm compress on the reduction of labor pain in the active phase i. *Proceeding of The 5th International Conference on Interprofessional Health Collaboration and Community Empowerment*, 24–27.
- Smith, C. A., Levett, K. M., Collins, C. T., Dahlen, H. G., Ee, C. C., & Sukanuma, M. (2018). Massage, reflexology and other manual methods for pain management in labour. *Cochrane Database of Systematic Reviews*, 2018(3).  
<https://doi.org/10.1002/14651858.CD009290.pub3>
- Supliyani, E. (2017). The effect of back massage on the intensity of labor pain in the first stage in Bogor City [in Indonesia]. *Jurnal Bidan*, III(1).
- Türkmen, H., & Oran, N. T. (2021). Massage and heat application on labor pain and comfort: A quasi-randomized controlled experimental study. *EXPLORE*, 17(5), 438–445.  
<https://doi.org/10.1016/j.explore.2020.08.002>
- Yanuar Eka Pujiastutik, Paramita Ratna Gayatri, & Ely Isnaeni. (2021). Comparison of endorphin massage and effleurage massage on primigravida first stage latent phase pain in Indonesia. *Malaysian Journal of Public Health Medicine*, 21(2), 45–51.  
<https://doi.org/10.37268/mjphm/vol.21/no.2/art.713>