

# The effectiveness of heat patch on afterpain levels during the puerperium



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## ABSTRACT

**Background:** Afterpain is the perception of pain, manifested by cramps and heartburn caused by uterine contractions in the postpartum period or puerperium. Afterpain can cause the postpartum period to be less comfortable. This study aimed to evaluate the effectiveness of heat patch on afterpain levels during the puerperium at PMB Ainun Mufidah.

**Methods:** This study used an experimental design with a pre-post-test group using postpartum mothers who gave birth at PMB Ainun Mufidah. All samples that matched inclusion criteria were instructed to wear a heat patch by placing it on the abdomen for 8 hours/day and being observed for 3 consecutive days. The pain level assessment was done by a numerical rating of the pain scale before and after the treatment. The data was collected and analyzed using SPSS ver. 20.

**Results:** 24 postpartum mothers were included in this study, mostly aged 20-35 years. The highest level of afterpain reduction was found on the second postpartum day. The paired t-test showed a significant difference in afterpain levels between pre and post-treatment ( $p < 0,001$ ).

**Conclusion:** There was a significant difference in afterpain levels before and after giving heat patches to postpartum mothers.

**Keywords:** *Afterpain, heat patch, puerperium.*

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## INTRODUCTION

Puerperium is a period of recovery, starting from the completion of labor until the uterine apparatus returns to normal, similar to the pre-pregnancy state. This postpartum period usually lasts 6-8 weeks and can be divided into phases (acute, early, and late). Some physiological changes can occur during the puerperium, including increased temperature or respiratory rate, diaphoresis, and shrinkage of the uterus, a process where the uterus returns to its pre-pregnancy condition with a weight of only 60 grams. The uterus undergoes the greatest changes at the end of the third stage of labor. It weighs 1000 g and then rapidly decreases to approximately 500 g by the end of the first week of puerperium. This involution can be evaluated on abdominal examination (the uterus will no longer be palpable after the 12<sup>th</sup> day postpartum).<sup>1</sup>

Uterine involution or uterine contraction is a process by which the uterus returns to its pre-pregnancy state. The contractions can cause pain (afterpain), especially in multiparous mothers. Afterpain is the perception of

pain, manifested by cramps and heartburn caused by uterine contractions. This pain can last up to 10 days postpartum. It is commonly found in multiparity because a fully distended uterus is twice as likely to sag as a primiparous uterus; thus, it must contract more forcefully to produce adequate uterine involution. Afterpain can occur when mothers breastfeed because milk production causes the release of oxytocin, which stimulates the uterus to contract.<sup>1</sup>

Some mothers generally do not feel significant postpartum pain. However, others who may have different pain thresholds report significant pain sensations. Afterpain has been reported to affect daily activities and quality of life after delivery, especially the feeling of heartburn. Taking analgesics or sedative drugs is generally used to reduce heartburn. However, drug use can affect breast milk quality and have an adverse effect on the baby. Therefore, alternative therapies to reduce pain sensation are generally prioritized.<sup>2</sup>

Pain management can be done with pharmacological or non-pharmacological

techniques. Non-pharmacological pain management has begun to be widely used with relaxation, distraction, and massage.<sup>3,4</sup> Non-pharmacological treatments, such as warm compresses, are also very helpful in relieving pain. Thermotherapy or heat therapy is often used to reduce pain complaints. Heat therapy generally uses direct heat appliances to the skin and can be combined with other therapy modalities. Heat therapy increases circulation and blood flow to certain areas due to increased temperature. Increasing the afflicted area's temperature can soothe discomfort, increase muscle flexibility, and even improve the healing process of damaged tissue. Moreover, it also can regulate hormone changes related to pain sensation caused by postpartum contractions.<sup>5,6</sup>

Unfortunately, studies related to the use of heat therapy, such as heat patches on the puerperium, are still very limited.<sup>7,8</sup> Therefore, this study aimed to determine the effectiveness of heat patches on the afterpain level in postpartum mothers during the puerperium.

## METHODS

### Study Design

This study used an experimental design with a pre-post-test group using postpartum mothers who gave birth at PMB Ainun Mufidah. Determination of total samples was using the Federer formula, which obtained a total sample of 24 postpartum mothers who meet the inclusion criteria. The inclusion criteria were postpartum mothers aged >20 years. Exclusion criteria were women undergoing therapy or taking medication related to pain conditions. The purposive sampling method was used for data retrieval.

### Data collection procedures

All samples were divided into intervention and control groups. The independent variable of this study was heat patch treatment. The dependent variable was the pain level of postpartum women. All samples were instructed to wear a heat patch by placing it on the abdomen for 8 hours/day and being observed for 3 consecutive days. The pain level assessment was done by a numerical rating of the pain scale before and after the treatment.

### Data analysis

The data was collected and analyzed using both univariate and bivariate analysis. The difference in pain levels between pre and post-treatment was analyzed using *paired t-tests*. The accepted significance value was  $p < 0.05$ . All data were analyzed using SPSS ver.20

## RESULTS

### Baseline characteristics

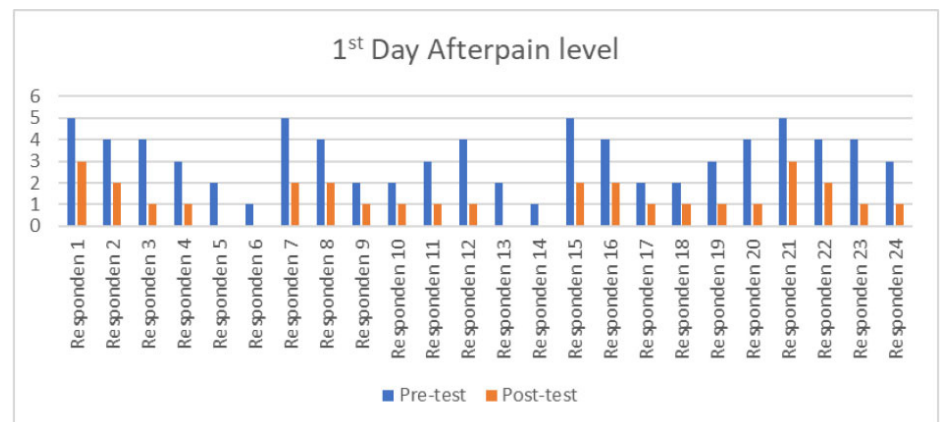
A total of 24 postpartum mothers were included in this study. Based on age, most postpartum mothers were aged 20-35 (62,5%). Based on the occupation (job), most of the postpartum mothers had work (58,3%). Moreover, based on the level of education, most of the postpartum mothers had a middle education level (70,8%). The baseline characteristics of the sample are described in [Table 1](#).

### The effectiveness of heat patch on afterpain levels

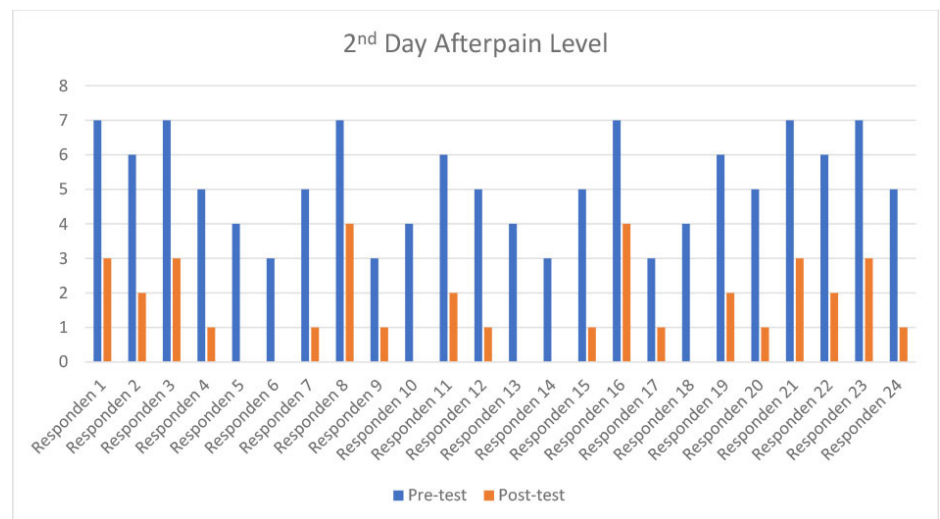
Furthermore, bivariate analysis was carried out to determine the effect of heat patch

**Table 1. Baseline characteristics**

Variable	Frequency (n)	Percentage (%)
<b>Age</b>		
<20 years	2	8,4
20 – 35 years	15	62,5
>35 years	7	29,1
<b>Job</b>		
Work	14	58,3
Not work	10	41,7
<b>Education</b>		
Basic	0	0,0
Middle	17	70,8
High	7	29,1



**Figure 1.** Afterpain level on the first day of the heat patch.



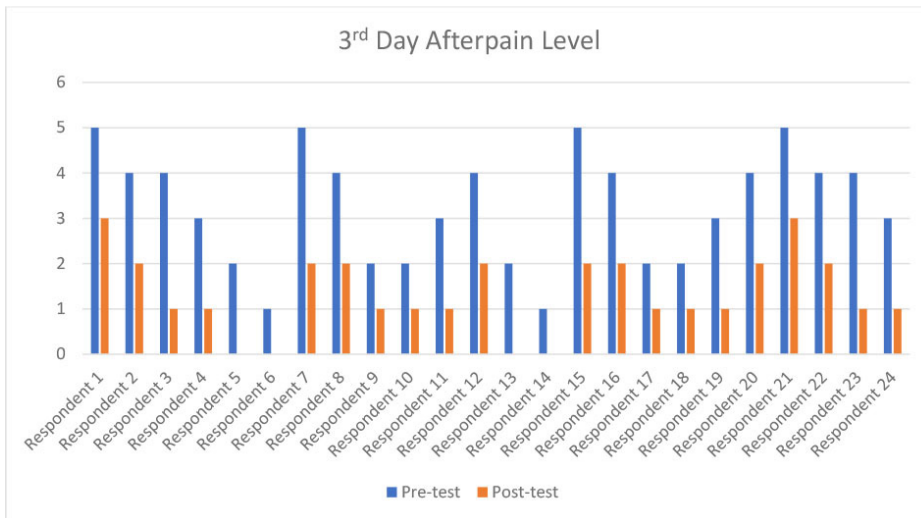
**Figure 2.** Afterpain level on the second day of the heat patch.

treatment on pain levels in postpartum mothers. The paired *t-test* result showed a significant difference in pain level between pre and post-treatment ( $p < 0.001$ ).

Based on [Figure 1](#), there was a decrease in the level of afterpain before and after being given a heat patch, with an average decrease of 2,3 on the first day; the average decrease is obtained by adding the whole

decrease and then dividing by the amount respondents.

Based on [Figure 2](#), there was a decrease in the level of afterpain before and after being given a heat patch, with an average decrease of 3.6 on the second day; the average decrease is obtained by adding the whole decrease and then dividing by the amount respondents.



**Figure 3.** Afterpain level on the third day of the heat patch.

Based on Figure 3, there is a decrease in the level of afterpain before and after being given a heat patch, with an average decrease of 1.9 on the third day; the average decrease is obtained by adding the whole decrease and then dividing by the amount respondents.

## DISCUSSION

Thermotherapy using heat patches is an alternative way to reduce pain without using analgesic drugs. Because the respondents in this study were postpartum mothers on the first day, it is necessary to reduce the consumption of drugs to avoid effects on breast milk and babies. During therapy, respondents were in a relaxed and concentrated state. No adverse side effects were found in respondents. Almost all respondents stated that their mood became calmer, more comfortable, and better sleep quality every day. Hence, all mothers did not get tired easily.<sup>6</sup> On the second day, the decrease in afterpain levels was higher than on the first and third days, which was 3.6 on average. However, pain perception is subjective and individual; thus, each respondent will feel a different level. The greater decrease on the second day can cause by the average afterpain level being the highest.<sup>9</sup>

Assistance carried out since the beginning of the postpartum period is very useful for reducing complaints in the postpartum period, one of which is postpartum pain or afterpain. Complaints of afterpain will be very unpleasant when

a postpartum mother is breastfeeding the baby because breastfeeding causes the release of the hormone oxytocin, which have the effect of inducing uterine contractions. Response pain experienced by each multiparous postpartum mother varies but needs to be treated to reduce complaints and not disturb the breastfeeding process.<sup>10,11</sup>

This study reported a significant difference in pain levels before and after giving the heat patch. This finding was similar with another study, which reported that heat application and massage could be used as a safe and effective midwifery intervention to reduce the perception of pain in pregnant women and provide comfort during labor. In addition, other studies have also reported that heat therapy, especially dry heat patches, can improve and speed up the healing process after episiotomy among primipara women. Physiologically, the heat produced by the patch is beneficial for the body in making fibrous tissue soften, which can prevent the occurrence of stiff muscles due to increased oxygenation of tissues, vasodilation, and blood flow so that the pain can be reduced. Heat therapy which provides heat through the conduction process, can cause vasodilation, thus increasing oxygen intake, nutrients, and immune cells in the tissues. A warm compress in a certain part can also increase metabolism throughout uterine tissue, thus decreasing the accumulation of metabolites that cause pain. Heat therapy could also change neuronal activation in pain pathways. Pain

stimulation can modulate antinociceptive descending pathways. In addition, tissue can also respond to heat stimulation by increasing the viscoelasticity of collagen and other extracellular matrices so as to increase tissue flexibility and wound healing.<sup>11,12</sup>

This study has limitations, such as the effect of confounding variables. Meanwhile, as a suggestion, heat therapy can be applied by external parties that are needed to assist multiparous postpartum mothers in reducing afterpain complaints by providing complementary therapies without side effects, cheap and easy to do by multiparous postpartum mothers. Midwifery lecturers with capabilities in complementary midwifery need to assist multiparous postpartum mothers in the hope that afterpain complaints can be reduced and mothers can breastfeed comfortably without any afterpain complaints.

## CONCLUSION

Based on three days' observation, there was a significant difference in afterpain levels before and after giving heat patches to postpartum mothers.

## FUNDING

The authors declare no funding in this study.

## CONFLICT OF INTEREST

The authors declare no conflict of interest in this study.

## ETHICAL STATEMENT

This research has been declared to have received an ethical certificate from the Ethical Committee of Nursing and Midwifery Faculty, Universitas Nahdlatul Ulama Surabaya, Indonesia. The research procedure has received a letter from the ethics committee of the University of Nahdlatul Ulama Surabaya No. 187/EC/KEPK/UNUSA/2022.

## AUTHOR CONTRIBUTION

All authors contributed equally to this study.

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