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Effectiveness of Ice Pack and Warm Water on the Pain Intensity of Perineum Wound: A Randomized Clinical Trial

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Abstract

This study aims to compare the effectiveness of using ice packs and warm compresses to reduce perineal wound pain in postpartum mothers. This type of research is a quasi-experimental study using a two-group pretest-posttest design. The sample selection technique in this study was accidental sampling, with a total sample of 70 respondents consisting of 36 postpartum mothers at Putri Ayu Public Health Center and 34 postpartum mothers at Pakuan Baru Public Health Center. The statistical test used the Wilcoxon and Mann Whitney test at a significance level of 95%. The intensity of perineal wound pain was chosen at intervals of 7-9 for both groups (ice pack and warm compress). The Wilcoxon statistical test results found the effect of giving ice packs in reducing the intensity of perineal wound pain (0.000), while warm compresses did not affect (0.102). The results of the Mann-Whitney test found that ice pack interventions were more effective in reducing perineal wound pain. It was concluded that ice packs could be used to treat perineal wound pain in postpartum mothers.

Keywords: Perineal pain; Post-partum; Ice pack; Warm compress.

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1. Introduction

The incidence of maternal perineal laceration cases around the world in 2009 was 2.7 million. This incidence is expected to increase by 6.3 million by 2050 [1]. The prevalence of maternal who experience a perineal rupture in Indonesia in the age group of 25-30 years is 24% and at the age of 32-39 years is 62% [2]. The occurrence of perineal rupture or injury can result from vaginal delivery or spontaneous delivery [3] and cause postpartum pain [4, 5, 6]. Mothers, who undergo spontaneous delivery in most cases experience perineal pain [7] and Incontinence [8] and have even reported 91% of spontaneous deliveries experiencing perineal rupture [9] which has unpleasant impacts such as pain and fear of moving so that many mothers with perineal injuries rarely want to move after childbirth [10]. In the postpartum mothers, experience pain because of perineal lacerations cause unpleasant effects such as pain and fear to move, so it can cause many problems, including sub involution of the uterus, lochea expenditure which is not smooth, and postpartum haemorrhage [11]. Perineal pain affects many women around the world. In Brazil, between 18.5% and 92.3% of mothers reported perineal pain in the early postnatal period [12]. In Australia, approximately 90% of women report perineal pain within 72 hours of vaginal birth [13], in the U.K., perineal pain occurs in 96.7% of women immediately after delivery, 43.9% at six weeks and 17.8% at one year [14]. In the United States, a survey conducted with 2,400 women found that among 1,656 mothers who had a vaginal birth, 40% of them reported perineal pain in the first two months after delivery. In the first six months after delivery, perineal pain is reported as a persistent problem, making it difficult to carry out activities of daily living [15]. Research on various interventions in reducing the intensity of perineal wound pain in postpartum mothers has been widely carried out, such as Rahmawati [16] doing perineal wound therapy with cold compresses. Susilawati and his colleagues [17] conducted perineal wound therapy by consuming snakehead fish, Navvabi and his colleagues [18] performed perineal wound therapy with cooling gel pads and ice packs. The research database on the management of perineal pain is limited to the use of cold compresses, ice packs, or warm compresses, but no studies have compared the effectiveness of the two therapies. Therefore, this study is deemed necessary to determine the difference in the effectiveness of the two therapies (ice packs and warm compresses) to reduce perineal pain in postpartum.

2. Materials and Methods

2.1 Research Design

This type of research is a Quasi-experimental design using a two-group pretest-posttest design. Initial observation (pretest) will be carried out in both groups before the intervention. Afterwards, the final observation (postest) is made to see the possibility of changes after the intervention. The treatment group was given Ice Pack therapy intervention in the episiotomy wound area for 20 minutes, and the control group was given warm compress therapy intervention in the episiotomy wound area for 20 minutes. This research was carried out at the Putri Ayu and Pakuan Baru Puskesmas, Jambi City from February to October 2020.

2.2 Population and Sampel

This study population were all postpartum mothers who underwent vaginal delivery at Puskesmas Putri Ayu and

Pakuan Baru Jambi City with perineal wounds and experiencing pain. The sample was determined using a non-probability sampling method through accidental sampling, with a total sample of 70 respondents spread across two health centres, including 36 postpartum mothers at Puskesmas Putri Ayu and 34 postpartum mothers at Puskesmas Pakuan Baru. The inclusion criteria for the sample included postpartum mothers 6-24 hours, grade 1 and 2 perineal lacerations, not allergic to cold. In contrast, the exclusion criteria were mothers with STI disease, mothers who received epidural anaesthesia, ice packs and anti-inflammatory drugs after birth or analgesics up to 3 hours before the study was started.

2.3 Research Variables

The variables in this study were perineal pain, pain experienced by a woman who had given birth due to tearing both naturally and episiotomy, both minor and severe pain in the wound area and the vaginal area. The pain was assessed using Numerical Rating Scales (NRS) with a scale of 0 = no pain, 1-3 mild, 4-6 moderate, 7-9 severe, ten very severe. The study's dependent variable was ice pack therapy, in which the therapy was placed in the area of the episiotomy wound for 20 minutes. During the implementation of therapy, maintaining vaginal hygiene aims to reduce pain on the first day of postpartum (Bahiyatun, 2013). A warm compress is a form of cutaneous stimulation by utilizing the temperature placed in the area of the episiotomy wound for 20 minutes. The independent variable is then divided into two categories, namely 1 = ice pack, 2 = warm compress.

2.4 Data Collection

As a first step, we conducted a preliminary study at the Putri Ayu and Pakuan Baru Puskesmas in October 2019 to obtain secondary data regarding the number of perineal injuries in expected delivery and the discomfort felt postpartum mothers with episiotomy wounds and then frequent therapy for their treatment. We also conducted a literature study to see which therapies can be used to help reduce pain felt by the mother. The preparation stage is continued by preparing the therapeutic tools or materials to be used, namely ice packs and warm compresses. The ice pack consists of a 4x7cm plastic bag, gel-like in a container that does not break or leak quickly and is non-toxic. The bag is also filled with 50 ml of water stored in the freezer for 24 hours (minimum temperature 15 °C). This ice pack has a colour indicator. When it's finished, the colour will change to whitish. Ice packs are reusable, economical and effective. For a warm compress, the media used consists of a plastic bag measuring 4cmx7cm, in the form of a gel in a container that does not leak easily and is non-toxic. The bag contains 50 ml of water which is then soaked in hot water for 10-20 minutes at a temperature of 36° -38 °C. The media used for ice pack therapy or warm compresses is special underwear designed by the researcher and given to all respondents. This special underwear is made of waterproof material (waterproof) but are still comfortable to use by mothers. The perineum area consists of 2 layers which form like a bag to place the ice pack or warm compress so that it is in a fixed position and to maintain its function properly. Research permits are issued by the Department of Midwifery, Jambi Health Polytechnic, Jambi City Health Office, Putri Ayu Health Center and Pakuan Baru Community Health Center Jambi City. We conducted socialization, and provided information to post partum mothers who were present at the time. Initial tests were performed on both groups to determine the degree/intensity of perineal wound pain. The instrument used for measuring the pain scale is the Numerical Rating Scales (NRS) which consists of a horizontal line and is divided evenly into ten parts with the numbers 0

10. For this measurement of pain, respondents were asked to mark one of the points (numbers 0-10) on the line to describe the pain they felt. This number reflects the pain experienced. Based on the value of the NRS, which is filled in, there are categories of results, namely pain experienced can be painless (Score 0), mild pain (score 1-3), moderate pain (score 4-6), pain. Severe (score 7-9), very severe pain (score 10). The next stage was giving therapy to the episiotomy area to reduce pain, but previously the researchers and the team measured the environmental temperature, the respondent's body temperature, the temperature of the ice pack, the temperature of the warm compress. Both groups got the same time and method, only the type of therapy was different. The treatment group was given ice pack therapy, and the control group was given warm compress therapy. The therapy was given for 20 minutes. The implementation procedure consists of giving special underwear that the researcher has prepared, then an ice pack and warm pack are inserted into the part of the underwear, which is positioned right in the perineal area. The second intervention therapy was given for 20 minutes. Assessment of the degree/intensity of perineal wound pain (posttest) was carried out after the intervention in both groups. Assessment of the degree/intensity of pain in the perineum uses the Numerical Rating Scales (NRS) instrument, which consists of a horizontal line and is divided equally into ten parts with numbers 0-10. For this measurement of pain, respondents were asked to mark one of the points (numbers 0-10) on the line to describe the pain they felt. This number reflects the pain experienced. Based on the value of the NRS, which is filled in, there are categories of results, namely pain experienced can be painless (Score 0), mild pain (score 1-3), moderate pain (score 4-6), pain. Severe (score 7-9), very severe pain (score 10). The pain scale assessment was carried out immediately after the therapy was given at 21 minutes to see if there was a decrease in the pain scale from the therapy given to both groups.

2.5 Data Analysis

Before the data were analyzed, the normality test was performed using the Shapiro-Wilk test. The normal data distribution used the parametric test, while the non-normal distribution of data used the non-parametric test. Analysis of the characteristics of the respondents in the study subjects included age, Parity, pain intensity of perineal wounds before treatment using unpaired t-test for age, and the Mann-Whitney test for Parity. And perineal wound pain intensity before treatment. Analysis of the intensity of perineal wound pain before and after being given Ice Pack and warm compresses using the Wilcoxon test. Then, analysis of the effectiveness of using ice packs and warm compresses using the Mann_Whitney test.

2.6 Ethical Considerations

The study was approved by the Health Research Ethics Committee of komisi etik penelitian kesehatan poltekkes kemenkes jambi (Reference number LB.02.06/2/11/2020). Permission was requested and obtained from gatekeepers in Bayelsa state, southern Nigeria. Informed consent was obtained from all participants before their voluntary participation in the study. The researcher maintained the participants' right to privacy, anonymity and confidentiality, fair treatment, and the right to protect from discomfort and harm.

3. Results

Table 1: The initial state of the research subject

No	Variable	Groups		sig.
		Ice Pack **(n=36)**	**Warm Compress (n=34)**	
1.	Age Average Score (SB)	26,89 (5,36)	26,97 (5,67)	0,951*
2.	Parity Median Score (min-max)	1 (1-5)	1,50 (1-5)	0,768**
3.	Initial Pain Intensity Value Median score (min-max)	9 (7 - 9)	9 (7 - 9)	0,160**

* Unpaired *t test* **Uji *Mann-Whitney test*

The data in the table shows no significant difference in the initial state of the respondents. Based on age, the mean Score (S.B.) was 26.89 (5.36) vs 26.97 (5.67), Parity with a median score (min-max) of 1 (1-5) vs 1.50 (1-5), as well as the Initial Pain Intensity Value with a median score (min-max) of 9 (7-9) vs 9 (7-9), p> 0.05, this means that the two groups are equal (homogeneous).

Table 2: Analysis of ice pack and warm compresses therapy on the intensity of post partum maternal perineal wound pain

			ice pack group			Warm compress group		
Variable		**n**	**Median (min-max)**	**Average±s.b**	***p-Value***	**Median (min-max)**	**Average±s.b**	***p-value***
Pain Intensity	Before	36	9 (7-9)	8,75±0,50	0,000	8,59±0,55	8,59±0,55	0,102
	After	36	5 (3-7)	4,89±1,30		8,47±0,56	8,47±0,56	

The data in the table shows the effect of ice packs on reducing the intensity of perineal wound pain in postpartum mothers. Descriptively, it found that the intensity of perineal wound pain decreased from a mean of 8.75 before the intervention to 4.89 after the intervention. However, the application of warm compresses did not show the effect of reducing the intensity of perineal wound pain tested using the Wilcoxon test, although descriptively, there was also an insignificant decrease from 8.59 to 8.47.

Table 3: Decreased perineal wound pain intensity in both groups

Variable		**n**	**Median (min-max)**	**Average±s.b**	***P value***
Pain Intensity	*Ice Pack*	36	5,00 (3-7)	4,89±1,30	0,000
	Warm Compress	34	8,50 (7-9)	8,47±0,56	

The analysis results in the table obtained p-value = 0.000, which means that there is a statistically significant

difference between the provision of ice pack therapy and warm compresses on the intensity of perineal wound pain in the two groups. The intensity of perineal wound pain with ice pack therapy has a median of 5.00 with a minimum value of 3 and a maximum value of 7, while the intensity of perineal wound pain with warm compress therapy has a median of 8.50 with a minimum value of 7 and a maximum of 9. It proves that Ice packs are more effective in reducing the intensity of perineal wound pain in postpartum mothers.

4. Discussion

This study involved 70 mothers who gave birth vaginally and experienced perineal injuries. It is in line with the literature, which states that perineal wounds are tears that occur in the perineum during delivery and 70% occur in women who give birth vaginally [19]. Several factors are related to perineal injuries that occur in spontaneous or vaginal delivery, including maternal age and parity status [20], baby weight [21], uncontrolled and unsupervised labor [22], angle of the pubic arch is smaller than normal, the head of the fetus passes through the lower pelvic gates with a size larger than the circumference of the brekmatic suboxypito ference [23]. In this study, the average ages of postpartum mothers were 26.97 years and 26.89 years. Furthermore, Parity is more nulliparous than multiparous. Thus, there is compatibility between this study and previous research. The selection of samples of respondents in the current study was based on the similarity of pain intensity in the pretest of the two groups (ice pack and warm compress), where the minimum threshold score was seven and the maximum threshold score was 9 (severe pain). The initial assessment of the intensity of perineal wound pain in postpartum mothers was carried out using the Numerical Rating Scales (NRS) instrument, which consists of a horizontal line and is divided evenly into ten parts with numbers 0-10. For this measurement of pain, respondents were asked to mark one of the points (numbers 0-10) on the line to describe the pain they felt. This number reflects the pain experienced; based on the value of the NRS, which is filled in, there are categories of results, namely the pain experienced can be painless (Score 0), mild pain (score 1-3), moderate pain (score 4-6), severe pain. (score 7-9), very severe pain (score 10) [24]. Almost all respondents experienced severe perineal pain on a scale of 7-9 due to rupture after spontaneous delivery. Postpartum pain in mothers is often influenced by several factors, including age, Parity, gender, culture, and perception of pain, attention, anxiety, past experiences, coping patterns, and family support [25]. The current study limits the analysis to the factors of age and Parity. Age influences a person's perception of pain. In adults, pain is sometimes reported after a pathological condition and malfunctioning. Meanwhile, Parity affects the perception of labour pain because primiparous labour has a long and tiring labour process than multiparous. The cervix in primiparous clients requires greater strength to stretch because contraction intensity is more significant during the first stage of labour. In addition, primiparous mothers showed increased anxiety and hesitation in anticipating pain during labour. Current research reports the condition of each group, both in terms of age and Parity in the same condition; so that the effectiveness of the treatment given can be conditioned to help mothers find solutions in reducing the pain of perineal wounds those postpartum mothers feel. The difference with previous studies is related to the media used in the current study when administering ice pack therapy or warm compresses. Comfort and safety and patient privacy are the most important things that must be considered when providing these two therapies. The media/tools used to apply these two therapies are special underwear made of waterproof material but still comfortable when used. The perineal area of this underwear consists of 2 layers forming like a pocket to place an ice pack and a warm compress to maintain its position, and the benefits of this

therapy are maintained and provide accurate results. In the ice pack group, before being given therapy, the median value of pain intensity was 9.00 with a minimum value of 7.00 and a maximum value of 9.00, after therapy, the pain intensity decreased with a median value obtained of 5.00, a minimum value of 3.00 and the maximum value is 7.00. The mean Score (S.B.) before ice pack therapy was 8.75 (0.50), and there was a decrease after being given ice packs with a mean score of 4.89 (1.30). Based on these figures, giving ice packs was proven to reduce the intensity of perineal wound pain in postpartum mothers by 44%. In the analysis of the difference test between the pre and post-test of the ice pack group, the p-value was 0.000, which shows the effect of giving ice packs on the intensity of perineal wound pain in postpartum mothers. It is known that cold compresses are used to relieve pain by slowing down the conduction speed of the nerves ending in numbness and acting as a counter-irritant. Cold therapy is also known to reduce pain and accelerate healing. Cold application is concerned with slowing the ability of the pain nerves to transmit pain impulses. In line with previous research on Ice Pack Therapy, there are Changes in the Post Episiotomy Pain Scale, where ice pack therapy can reduce the pain scale from 9 down to a scale of 2. These results show a significant difference in the average pain before and after ice pack therapy (p-value = 0.001), which means that ice pack therapy affects changes in the post-episiotomy pain scale [26]. Another study also showed the effectiveness of cold therapy in reducing the intensity of perineal pain and oedema. Cold therapy is similar to ice pack therapy in preventing oedema and hematoma formation, which will increase pain in post-episiotomy mothers [27]. There was also a decrease in the level of perineal wound pain in 5 respondents in the warm compress group, one respondent had increased pain, and 28 respondents had no change in the pain scale. However, it was not statistically significant with a p-value = 0.102, meaning that giving warm compresses was not proven to reduce postpartum perineal wound pain intensity. It can be influenced by the use of underwear as a medium for placing warm compresses; thus, the therapy is less effective in providing a therapeutic effect. The results are in line with Hill's study, which found that warm compresses were not effective in reducing perineal wound pain [28]. In the difference test, it was found that there was a difference in the pain scale after giving ice packs and warm compresses with p-value = 0.000. The second result was related to the difference between giving ice packs and warm compresses to heal of perineal wounds in postpartum mothers. There was a difference in the mean Score of perineal pain intensity in the ice pack and warm compress groups (4.89vs 8.47) with the median scores in the ice pack and warm compress groups of 5 (3-7) vs 8.50 (7-9). These results prove that giving ice pack therapy can reduce the intensity of perineal wound pain in postpartum mothers compared to giving warm compress therapy. Different physiological responses between respondents caused differences in pain intensity in the ice pack group. The body's physiological response to cold causes the reduction of blood vessels (vasoconstriction), which in turn reduces blood flow to the wound area, thereby reducing the risk of bleeding and oedema. Cold compresses have an analgesic effect by slowing down the action of the nerves so that there are fewer pain impulses to the brain.

5. Limitation

Different responses of respondents when giving compresses affect the effectiveness of compresses on the level of pain in each respondent; thus, the matching of the characteristics of research respondents is entirely appropriate before the research is carried out

6. Conclusion

Ice pack therapy is more effective in reducing the intensity of perineal wound pain in postpartum mothers than warm compress. Ice packs can also be used to treat perineal wound pain in postpartum mothers, which is a problem or disorder that mothers often feel. Ice pack therapy is easy and practical to use; of course, postpartum mothers can apply it independently at home with their husbands or families' help.

7. Recommendation

It is suggested that the results of this study can be used as an alternative therapy in reducing pain due to perineal rupture using standard procedures.

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