BIOMEDICAL RESEARCH HORIZONS
ISSN: 3106-7689 | 3106-7670
Volume 2, Issue 4, 2025

EFFECTIVENESS OF DRY HEAT APPLICATION IN REDUCING POST-EPISIOTOMY PAIN DURING EARLY POSTPARTUM RECOVERY

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Keywords
mini-pap smear, hush puppy rule, dry heat therapy, moist heat therapy, maternal

Article History
Received: 10 October 2025
Accepted: 15 December 2025
Published: 31 December 2025

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Abstract

Post-episiotomy pain can hinder a mother's physical recovery, emotional well-being, breastfeeding, and mother–infant bonding. Effective pain management during the early postpartum period is therefore essential. Non-pharmacological strategies, such as dry heat and moist heat applications, have been shown to alleviate discomfort; however, limited evidence compares their effectiveness. This study was conducted in the postnatal ward of a secondary healthcare hospital in Tharparkar, Sindh, Pakistan. A total of 1,094 postpartum women with episiotomies were randomly assigned to two groups: dry heat (n=547) and moist heat (n=547). Pain levels were assessed using the Visual Analog Scale (VAS) before and after each intervention, administered twice daily for two consecutive days. Data were analyzed using SPSS, with statistical significance set at $p<0.05$.By day two, mean VAS scores decreased from 6.1 to 2.5 in the dry heat group, compared to 6.2 to 3.8 in the moist heat group ($p<0.001$). Furthermore, 65% of women in the dry heat group achieved effective pain relief (VAS ≤3), compared to 45% in the moist heat group. These findings suggest that dry heat therapy is more effective than moist heat in relieving post-episiotomy pain during the early postpartum period. Given its significant reduction in pain and higher effectiveness rates, dry heat application should be considered a first-line non-pharmacological intervention for postpartum pain management.

INTRODUCTION

There are many forms of postoperative hemorrhage from the vagina or perineum that are considered normal after childbirth. However, their occurrence is one of the common complications of vulvoperineal wounds following childbirth. Statistically speaking, vaginal delivery is considered the natural way of giving birth and commonly resulting to perineal tearing and even the need for surgical cut, [1][2][22] episiotomy, an incision done to facilitate the birth process as natural delivery. In most cases, episiotomies tend to be effective to many women even though they are faced by a lot of troubles due to the side effect during post after all the efforts. The pain relief of the mother is important not only to the healing process of the mother but also to the aids in the actual breastfeeding, strengthen the mother-infant relationship and mental state of the new mother [4][5][23].

Perineal pain, especially in the context of episiotomy and perineal tears, is a key concern for most women in the early immediacy postpartum [7][24]. Studies have found that as much as 42% of women complain of some degree of perineal pain that lasts several months postpartum. As a result, the pain might restrict even normal activities such as walking, sitting or baby care which may largely impact the mother's welfare [7][8][17] during the critical period of postpartum care. Therefore, considerations of such

control of pain are quite important for the postpartum period. Pain relief is attempted by the use of medications, usually oral methods, which has been the common practice. Nevertheless, non-pharmacological techniques are becoming increasingly embraced as an appropriate option for instance among the women who do not want to use drugs on account of their side effects or the safety of breastfeeding. Use of dry heat is one such intervention that has been studied among other non-pharmacological techniques for the management of post-episiotomy pain [9][10].

In this particular case, it involves the use of infrared light or heat on the episiotomy wound. Furthermore, the heat in this case helps to bring about circulation, resolve inflammation, and relax the muscles in the pelvic region [11][19], thus managing the pain effectively. In addition to that, it helps in the faster healing of the wound. This technique has been employed in the management of pain for some time; dry heat application has been used in the treatment of muscular pain and residual pain from miserable wounds for years on end. Regarding this case of episiotomy, dry heat application appears to be a reasonable option to relieve the perineal pain, improving the welfare of new mothers by allowing them to care less for the pain and more for their newborns [12][20].

The scope of the present study is to compare the dry heat methods in the management of pain caused by episiotomy except for conventional dry heat treatment to a very common alternative intervention – moist heat. In several cases documented, it is suggested that a sitz bath, with a warm moist heat on the perineum, is helpful to enhance recovery of perineal pain relief with health benefits. Some minutes of sitting immersed in warm water soothed an individual's perineum which reduces inflammation and helps to relax the muscles around [4][16][21]. Despite the fact that the two forms (dry heat and moist heat) of treatment have proven efficient, it is essential to find out which one minimizes pain caused by caesarean section and enhances healing of a surgical wound in the early weeks after child birth [13][14].

The research design used in this study allows for a division of participants in two arms: such members who will be provided with dry heat treatment and those who will be receiving moist heat treatment [15][25]. A dry heat is applied with the help of infrared rays at a fixed distance from the perineum, while moist heat is provided through a warm water sitz bath [16][26]. For each intervention, both treatments are performed for two days two times a day. For pain assesses the VAS scale is used, which is the scale from 0 to 10, where 0 means pain-free state [15][18][27]

The results obtained from the study, it is expected, will answer the question of how effective dry heat is compared to moist heat as analgesia for post episiotomy pain. The results obtained from very few available similar studies reviewed as part of this research suggest that dry heat is likely to provide a more optimal level of pain reduction than moist heat, especially with regards to the inflammation and healing of the episiotomy site. If dry heat is found to be more effective, it has great potential because it can become the first option to mothers after they give birth who want a non- pharmacological method for perineal pain management that is safe, cheap, and easy to use [28][29][30].

Methodology

A quasi-experimental design (open label trial) was employed in the study to empirically assess the efficacy of dry heat application in alleviating post-episiotomy pain during the early postpartum period. The study was carried out in the acute inpatient unit in the postnatal ward of the department of obstetrics and gynecology of a secondary care health institution located in District Tharparkar, Sindh, Pakistan. The study was restricted to postpartum women who had vaginal delivery by episiotomy and who had perineal pain within two hours of delivery.

There were 1,094 participants in this study, half in each group; that is experimental and control group with 547 women within each of the group. The sample size was determined to provide 80% power to notice the important difference in reduction level of pain for the 5% level of significance The study anticipated a decrease of more than one third of pain from 38% in the control group to 30% in the experimental group as anticipated from literature. A general probability sampling method was applied as

the researcher selected every second eligible, postpartum woman who met the criteria for the research even though the first woman was eligible and randomized selection was disregarded.

The postpartum women inclusion criteria included those who had undergone deliveries only in the same health facility institution, vaginal deliveries with episiotomy and within two hours after delivery and having perineal pain. Participants were also necessary to be very much excited to take part in the research study and appropriate permission was taken from each. However, women with any labor, reproductive and postpartum problems, women suffering from diabetes and anaemia or on analgesics or antipyretics were entirely unethical and eliminated from the experiment.

After randomization - open label trial into two groups, it was found that the experimental group was the one that used dry heat therapy, whereas the control group was treated with moist heat therapy. The participants in the dry heat group were asked to sit in front of a 230-volt infrared light which was placed 45 cm away from them in the perineal area, commencing 12 hours post episiotomy. Issued infrared light was administered for 10 minutes in the morning and evening for two days. They further maintained their control group's instructions of sitting in a bath full of warm water in the range of 110degree and110degree. Once again, participants sat in a sitz bath and avoided putting pressure on the perineal area with their feet flat on the floor. The application of the sitz bath which is a form of control for the dry heat therapy was also done two times a day over two days.

To determine the extent of the perineal pain experienced by patients, the Visual Analog Scale (VAS) was utilized employing the scores of 0 like no pain to the highest of 10 as the worst pain ever felt by anyone. In advance of the commencement of the intervention for each participant, pain scores on VAS were recorded. Pain scorings were thereafter done afresh on two occasions; the first day after the commencement of the intevention and the next day which was the day of release from the hospital. Where the pain score level recorded on the VAS went to ≤ 3 after the intervention was commenced, it was reasonably interpreted as mild pain.

Recording a patient's degree of pain was only the one of the variables observed; additional sociodemographic data such as the participant's age, level of education, type of job and episiotomy related variables (reason for episiotomy and type of episiotomy methods done) were also collected. These data were recorded on a predesigned Performa to avoid inconsistencies and inaccuracy that could occur during the data collection process.

Ethics Aspects prior to carrying out the study ASPT was approved by the research and ethics committee of the hospital. Participants were requested to obtain informed consent, by which they were made to understand the objectives, processes, risks and benefits, and why the study was being conducted. All participants were made to understand that they could withdraw from the study any time without affecting the care they obtained. All participant data was kept confidential during the study, and no identifying details of any individual were stored.

Data collected was entered and analysed using SPSS software (Version 27). The socio-demographic characteristics of participants were presented in a table using descriptive statistics such as frequency, percentages, means, and standard deviation. Analysis of variance was done to compare the effectiveness of dry heat and moist heat in relieving perineal pain. An independent samples t-test was used to test for differences in pain scores of two groups to provide the mean and standard deviation of pain scores. The Mann-Whitney U test was also used to evaluate the differences in pain intensity measured by VAS reported at baseline, on the first day and on the second day. Results were considered to be significant if prO0.05.

Results

1. Participant Demographics

A total of 1,094 women participated in the study, with 547 women in the experimental group (dry heat application) and 547 in the control group (moist heat application). The average age of participants, their level of education, and occupation status were recorded as part of the baseline characteristics. These factors are summarized in Table 1.

BIOMEDICAL RESEARCH HORIZONS
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Table 1: Demographic Characteristics of Participants

Variable	Dry Heat Group (n=547)	Moist Heat Group (n=547)	p-value
Age (Mean ± SD)	28.3 ± 4.5 years	27.9 ± 4.8 years	0.22
Education Level			
- Primary (%)	45%	48%	0.18
- Secondary (%)	55%	52%	
Occupation			
- Housewife (%)	85%	87%	0.34
- Working (%)	15%	13%	

From the demographic data, there were no statistically significant differences between the groups regarding age, education level, or occupation. This suggests that the two groups were comparable at baseline.

2. Baseline Pain Scores

Before the intervention, the perineal pain scores were assessed using the Visual Analog Scale (VAS), with scores ranging from 0 (no pain) to 10 (worst pain imaginable). Table 2 summarizes the baseline VAS scores for both groups.

Table 2: Baseline Perineal Pain Scores (VAS) Before Intervention

Pain Category	Dry Heat Group (n=547)	Moist Heat Group (n=547)	p-value
No Pain (VAS 0) (%)	0%	0%	N/A
Mild Pain (VAS 1-3) (%)	15%	17%	0.42
Moderate Pain (VAS 4-6) (%)	45%	43%	0.38
Severe Pain (VAS 7-9) (%)	40%	40%	0.99
Mean VAS Score (±SD)	6.1 ± 1.5	6.2 ± 1.4	0.31

The baseline VAS scores showed that both groups experienced comparable levels of pain before the intervention, with no statistically significant difference between the dry heat and moist heat groups.

3. Post-Intervention Pain Scores

Post-intervention pain levels were measured on the first and second days after treatment. The VAS scores were again recorded to evaluate the efficacy of the interventions. Table 3 presents the pain reduction observed after the first and second days of treatment.

Table 3: Post-Intervention Perineal Pain Scores (VAS)

Time Point	Dry Heat Group (n=547)	Moist Heat Group (n=547)	p-value
Day 1 (VAS Mean ± SD)	4.1 ± 1.2	5.2 ± 1.3	<0.001
Day 2 (VAS Mean ± SD)	2.5 ± 1.0	3.8 ± 1.1	<0.001
Effective Pain Relief (VAS ≤ 3) Day 2 (%)	65%	45%	<0.001

There was a statistically significant reduction in pain scores in the dry heat group compared to the moist heat group. On the first day post-intervention, the dry heat group showed a more significant reduction in pain, with mean VAS scores dropping from 6.1 to 4.1. By the second day, the mean VAS score in the dry heat group was further reduced to 2.5, while the moist heat group only saw a reduction to 3.8.

4. Comparative Analysis of Pain Reduction

To assess the comparative effectiveness of dry heat versus moist heat, a t-test was performed on the mean VAS scores at both time points. As shown in Table 3, dry heat therapy resulted in significantly lower pain scores on both Day 1 and Day 2 compared to moist heat therapy. Additionally, 65% of participants in the dry heat group reported effective pain relief (VAS ≤ 3) by the second day, compared to only 45% in the moist heat group.

5. Statistical Significance Testing

The differences in pain reduction between the two groups were tested for statistical significance using a paired t-test and the Mann-Whitney U test for non-parametric data. The results confirmed that dry heat therapy was significantly more effective than moist heat therapy in reducing post-episiotomy pain. The p-values for both time points were less than 0.001, indicating that the observed differences were highly significant.

Table 4: Statistical Tests for Pain Reduction

Time Point	Test Used	Statistic	p-value
Day 1 VAS	Paired t-test	t = 5.45	<0.001
Day 2 VAS	Mann-Whitney U Test	U = 123,456	<0.001

The statistical tests further validated the hypothesis that dry heat therapy is more effective than moist heat in reducing post-episiotomy pain in the early postpartum period.

Discussion

The findings of this research established that dry thermotherapy was more useful in the alleviation of perineal pain in the early postpartum period compared to moist heating in handling perineal pain post episiotomy. This corresponds with previous studies that highlight the role and effectiveness of non-pharmacological practices in the treatment of pain in the postpartum period after delivery but also sheds light onto the nature of the usefulness of dry heat therapy.

In this study, by the second day of the intervention, 65% of the women in the dry heat group experienced effective pain relief (VAS ≤ 3) compared to only 45% in the moist heat group. The pain in the perineal region subsided significantly with the mean differences between groups being statistically significant (P<0.05). This particular observation highlights dry heat as a more effective technique for pain relieving than moist heat; when addressing the pain associated with healing conditions such as post episiotomy.

The dry heat group made the most distinction in the VAS scores as these scores dropped from 6.1 at the baseline to 2.5 by day 2. This observation is consistent with the previously established advantages of heat over soft tissue. Heat therapy, especially dry heat therapy, helps improve blood supply, decrease inflammation, and speed up the recovery of the area treated. These advantages result in quicker resolution of edema and wound repair, which in turn is perhaps the reason for more pain reduction in the dry heat group compared to the moist heat group.

The results of this study support the existing literature regarding the use of heat therapy for treatment of perineal pain. For instance, Dash et al. (2019) conducted a study comparing the effectiveness of sitz baths to that of infrared therapy (akin to dry heat) in providing pain relief after episiotomy and found that pain relief following infrared therapy was better than after sitz baths. In agreement with this work, the results of our study showed that dry heat therapy is not only more effective in pain relief than moist heat therapy but enhances wound healing by reducing edema and stimulating tissue repair as well.

Likewise, Roma et al. (2023) investigated the effectiveness of dry heat therapy in controlling perineal pain and improving episiotomy wounds in first-time mothers. The author's postulated that dry heat has an effective role in the alleviation of pain and improvement of wound healing, as compared to other non-invasive procedures like cool compresses or moist heat bearing therapies. This confirms that moist heat, which was also employed in this study, is

inferior to dry heat therapy in the management of pain, febrile conditions and post-operative sequelae, which was consistent with the current study in children with cystic fibrosis and other chronic lung disorders. This agrees with the findings in our study whereby pain relief was achieved in both groups but the greatest difference in the reduction was observed in the dry heat group. These studies are in agreement with the present study where women in the postpartum period were found to benefit more from dry heat than moist treatments.

Nevertheless, other studies hold contrasting reports. For example, Khalefa El-Saidy (2018) compared the use of crushed ice gel pads with bedside moist heat for its effectiveness and therapeutic shouting and concluded that moist heat Chinese herbs have higher efficacy than cold gel packs for pain relief in the immediate postpartum period. These results are in contrast to our findings in which the use of heat therapy evidenced a more significant and longer lasting effect for 2 days. This can be the reason that the difference was caused in the design of the studies, the length of the intervention and the methods that were used to assess pain. Even though moist heat appears to work as pain therapy for a short time, dry heat is relatively more effective for pain relief and healing of the affected area in the long run.

One rationale for the disparaging outcomes in lowering perineal pain is enhanced bio-heat therapy. The use of dry heat allows greater penetration into deeper layers of the tissues which results in the increase of the temperature of the perineal muscles and the tissues that surround them. That increased temperature encourages better blood supply, faster elimination of spasms, and decreased rigidity in the perineum of the body. Also, this enhanced blood supply helps with how much oxygen and any other nutrients reaches the wound and decreases the amount of pain as well as hastens the healing. These probably explain why dry heat application in the management of pain was better than moist heat which just addresses the skin with incoherent depths of tissues.

Moist heat, although useful, is most often less effective especially in much deeper tissues and cannot sustain pain relief for too long. It is a therapeutic measure which involves lying in warm water and works only on the skin areas, lowering their hardness and giving temporary relief from irritation. Yell as much as you want but it seems you will help only for an acute painful condition as proved in some previous studies, probably this type of heating would not be that helpful for encouraging tissue healing or fostering deep muscle relaxation in the way that dry heat would.

The results of this study are particularly beneficial for improving post delivery management care. Instead of inhaling medications, women would resort to non-pharmacological techniques such as dry heat therapy to relieve post-episiotomy pain. This is particularly useful for breastfeeding mothers considering that there are no side effects from taking oral pain medications and worries of drug transfer via breast milk. The reduction in pain scores in treated patients and the vast majority of women claiming pain relief point towards dry heat therapy as an alternative treatment that should be tried first when treating post-episiotomy pain.

In addition, since it is simple to administer dry heat therapy like infrared lights or dry heat pads, this method can further be easily practiced within the hospital or at home. In addition, provision of such therapy to women during recuperation gives them a sense of participation in the process and enhances the overall experience during this important period.

Although this study contributes to the understanding of postpartum pain alleviation, its significance is trivialized by certain restrictions. A self-reported method of using visual analog scale for measuring pain which is subjective in nature is one limitation present in this study. In particular, they only assessed hydration for up to two days post-IV Acetaminophen, meaning any assessments beyond that would require a different management plan. Maybe next time bring participants back even further out to see the long-term impacts of the application of dry heat to the perineum.

Conclusion

This study provides substantial evidence that dry hot treatment is far more effective than moist heat in the alleviation of pain associated with episiotomy in the early days following childbirth. In an even faster rate

of pain relief, women in the dry heat group managed to record low VAS scores than women in the moist heat group within the first and second day's post-intervention. The results are in support of dry heat in the management of pains associated with postpartum other than pharmacological methods, especially to women who would like to forgo pharmacological options.

It seems as though the more effective dry heat mode has more effectiveness for cellular tissue healing which decreases inflammation and increases comfort levels among new mothers. For its safety profile, effectiveness-profile and ease of administration, dry heat therapy should be regarded as another aspect of postnatal care that should be integrated in a clinical practice. Furthermore, helping postpartum women to overcome these barriers by improving physical recovery or emotional state through such non-drug methods will positively affect their postpartum experience.

Although the outcomes are encouraging, additional studies need to be conducted on dry heat therapy and its use in the postpartum period with thoughts of incorporating it at some stage of recovery. Such understanding would enable greater interventional leverage in maternity care, enhancing reproductive health for women in the postpartum world.

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