The Open Nursing Journal
DOI: 10.2174/0118744346500736260831064918, 2026, 20, e18744346500736
ISSN: 1874-4346

RESEARCH ARTICLE OPEN ACCESS

Effects of Warm Water Bath and Ice Pack Application on Perineal Pain and Episiotomy Wound Healing among Mothers

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Abstract:

Introduction/Objective: Perineal pain following episiotomy is a common postpartum problem that can negatively affect maternal comfort and daily functioning. This study aimed to evaluate the effects of a postpartum educational programme, including the use of ice packs and warm water baths, on perineal pain and on the healing of episiotomy wounds.

Methods: A quasi-experimental study was conducted with 104 postpartum mothers who underwent mediolateral episiotomy, recruited from a maternity teaching hospital in Erbil. Participants were assigned to an intervention group (n = 52) and a control group (n = 52). The intervention group received structured education on perineal self-care, including the application of ice packs for the first 48 hours, followed by warm water baths for one week, whereas the control group received routine care. Perineal pain was assessed using the Visual Analogue Scale (VAS), and wound healing was evaluated using the Redness, Edema, Ecchymosis, Discharge, and Approximation (REEDA) scale. Data were analysed using nonparametric statistical tests.

Results: There was a statistically significant reduction in perineal pain and an improvement in wound healing in the intervention group compared with the control group ($p < 0.001$).

Discussion: Structured postpartum education, combined with non-pharmacological interventions, effectively reduced pain and enhanced wound healing, supporting their integration into routine postpartum care.

Conclusion: Postpartum educational programmes incorporating ice packs and warm water baths significantly improve maternal outcomes and should be incorporated into standard nursing practice.

Keywords: Warm water bath, Episiotomy, Perineal pain, Ice pack application, Postpartum care, Postpartum instructional programme.

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Cite as: Khudhur S, Piro T. Effects of Warm Water Bath and Ice Pack Application on Perineal Pain and Episiotomy Wound Healing among Mothers. Open Nurs J, 2026; 20: e18744346500736.
http://dx.doi.org/10.2174/0118744346500736260831064918

Received: April 08, 2026
Revised: July 07, 2026
Accepted: July 08, 2026
Published: September 07, 2026

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1. INTRODUCTION

The perineum, between the vaginal opening and the anus, is surgically incised during an episiotomy to create a wider vaginal opening, typically done due to infant distress, prolonged second stage of labour, a rigid perineum, or macrosomia [1, 2]. Although episiotomy has medical reasons for use, it often leads to pain, discomfort, and slower recovery after childbirth. It can hinder a mother's ability to move, perform daily tasks, breastfeed, and enjoy life in the initial postpartum phase [3].

Pain in the perineal area after an episiotomy is at its worst in the initial 24–48 h post-suturing and usually lessens as the wound heals [4]. Healthcare providers frequently use standardised instruments, such as the REEDA scale, to gauge the healing of episiotomy wounds. This scale enables an objective assessment of perineal tissue recovery by evaluating redness, swelling, bruising, discharge, and the extent of wound edge closure [5-7]. Therefore, effective management of perineal pain and wound healing is crucial in postpartum nursing and midwifery [8].

Postpartum perineal pain is frequently managed with pain relief [9]. Applying ice packs and taking warm baths are widely recommended non-medicinal methods owing to their simplicity, affordability, and ease of use in both medical facilities and at home. Applying an ice pack helps ease pain by reducing local swelling and inflammation and by dampening nerve signals, especially immediately after giving birth [10, 11]. Conversely, immersing oneself in warm water can improve blood flow to the area, relax tissues, and aid in wound recovery once the initial inflammation subsides [12, 13].

Previous studies have shown that applying an ice pack or taking a warm water bath alone reduces perineal pain and supports episiotomy wound healing [14]. However, there remains some inconsistency across studies, and factors such as differing intervention timing and duration, as well as the level of educational support provided, limit the comparability of the results. Several studies have focused primarily on pain outcomes, without concurrently using validated assessment tools to evaluate wound healing.

Nurses and midwives are crucial in postpartum care, providing education, pain relief, and wound evaluation. Organised education after childbirth could enhance mothers' understanding, commitment to perineal self-care, and overall recovery [15]. Existing research has not sufficiently examined how educational programmes that incorporate non-drug approaches to perineal care affect perineal pain and the healing of episiotomy wounds.

This study sought to determine how a postpartum educational programme, which included the use of ice packs initially and then warm water baths, impacted perineal pain and episiotomy wound recovery in mothers after childbirth. This study aimed to provide evidence for nursing-led, non-pharmacological postpartum care by evaluating subjective pain and wound healing using standardised tools. Figure **1** shows the pain visual analogue scale verified from the study [16].

2. MATERIALS AND METHODS

2.1. Study Design

A quasi-experimental study with a non-equivalent control group and pretest–posttest design was conducted to evaluate the effect of a postpartum instructional programme incorporating ice pack application and warm water bath on perineal pain and episiotomy wound healing among postpartum mothers.

2.2. Study Setting

This study was conducted in the postpartum unit of the Maternity Teaching Hospital in Erbil City, Kurdistan Region, Iraq. Data collection was conducted over four months, from December 2024 to March 2025.

2.3. Participants and Sampling

A purposive, non-probability sample of 104 postpartum mothers who underwent normal vaginal delivery with mediolateral episiotomy was recruited. Participants were allocated to an intervention group (n = 52) and a control group (n = 52) based on eligibility criteria and the sequence of ward admissions.

2.4. Inclusion Criteria

Inclusion criteria are as follows:

- Primiparous or second-parous mothers
- Normal vaginal delivery with mediolateral episiotomy
- Ability to read and write
- Willingness to participate in the study

2.5. Exclusion Criteria

Exclusion criteria are as follows:

- Median episiotomy, perineal tears, or lacerations
- Postpartum complications (*e.g.*, puerperal sepsis, postpartum haemorrhage)
- Chronic medical conditions affecting wound healing (*e.g.*, diabetes mellitus)
- Use of prolonged antibiotic or anticoagulant therapy

2.6. Sample Size Determination

Sample size was calculated using (G*Power) software (version 3.1.9.2). A total of 104 participants (52 per group) were used to detect statistically significant differences between groups with adequate power.

2.7. Data Collection Instruments

Three instruments were used for the data collection.

2.7.1. Instrument I: Structured Questionnaire

A researcher-developed structured questionnaire was used to collect data on socio-demographic characteristics (age, education, residence, occupation, and income) and obstetric history (parity, antenatal care attendance, infant weight, and perineal pain relief). The questionnaire was developed based on an extensive review of the literature.

2.7.2. Instrument II: VAS

Perineal pain intensity was assessed using the VAS, a validated self-reported instrument ranging from 0 (no pain) to 10 (worst pain imaginable). Each participant independently selected the number that best represented their perceived pain intensity. Scores of 1–3 were categorised as mild pain, 4–6 as moderate pain, 7–9 as severe pain, and ten as the worst pain possible. The individual numerical scores represent a progressively increasing pain intensity within each category.

2.7.3. Instrument III: REEDA Scale

Episiotomy wound healing was assessed using the REEDA scale, originally developed by the study [17], later adapted by the study [6]. The total REEDA score ranges from 0 to 18, with lower scores indicating better wound healing and higher scores indicating greater impairment. The wound healing status was categorised as completely healed (score = 0), moderately healed (scores 1–2), mildly healed (scores 3–4), and not healed (scores ≥5). Within the 'not healed' category, increasing numerical scores represent progressively more severe impairment in wound healing; for example, a score of five indicates less severe tissue impairment than a score of 18.

2.7.3.1. Scoring System

The total REEDA score ranged from 0 to 18. As shown in Table **1**, a higher score reflects poor wound healing, whereas a lower score reflects good healing.

2.8. Validity and Reliability

The content validity of the study instruments was assessed by a panel of 12 experts in maternal health nursing and gynecology. Reliability testing using Cronbach's alpha showed acceptable internal consistency for the questionnaire subscales, including knowledge (α = 0.86), attitude (α = 0.76), and practice (α = 0.83) subscales.

2.9. Pilot Study

A pilot study was conducted on 10% of the estimated sample size to assess the clarity, feasibility, and time required for data collection. Minor modifications were made based on pilot feedback, and participants from the pilot study were excluded from the final analysis.

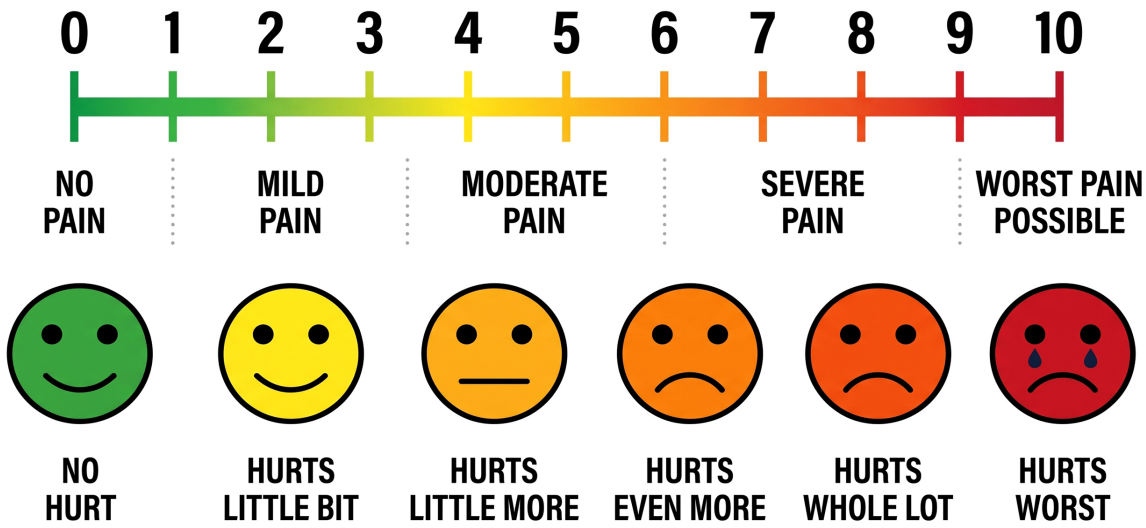

Fig. (1). Pain visual analogue scale verified from the study [16].

Table 1. REEDA scale scoring criteria for assessment of episiotomy wound healing.

Parameter	0 Points	1 Point	2 Points	3 Points
Redness	No redness	0.25 cm from each side of the incision	0.5 cm from each side of the incision	> 0.5 cm from each side of the incision
Swelling (dema)	No swelling	In the perineum, < 1 cm from the cut area	1–2 cm from the cut in the perineum and vulva	In the perineum and vulva, > 2 cm from the cut
Bruising (Ecchymosis)	No bruising	~0.25 cm on either side of the cut or 0.5 cm at one end	About 1 cm on either side of the cut or 2–5 /0 cm on one side of the cut	> 1 cm on either side or > 2 cm on one side
Wound discharge	None	Serous	Watery–bloody	Bloody–purulent
Wound edge approximation	Skin edges closed	Separation ≤ 3 mm, double-edged skin	Separation of the skin and subcutaneous fat layer between the wound edges	Separation of the subcutaneous fat and fascial layer of wound edges

2.10. Intervention Procedure

Participants in the intervention group received a structured postpartum instructional programme developed by the researcher, informed by the current literature. The programme included education on perineal self-care and demonstrations of ice pack application and warm water bath use. Educational materials were provided in Kurdish to enhance comprehension.

- **Ice Pack Application:** Ice packs were applied to the perineal area for **20 minutes per session, three times daily**, during the first 48 hours postpartum. The packs were wrapped in a clean cotton cloth before application to prevent direct skin contact and minimise the risk of cold injury.
- **Warm Water Bath:** After the first 48 h postpartum, the participants were instructed to use a warm water bath for 25–30 min twice daily for 7 days.

The control group received routine postpartum care from hospital staff without additional instruction.

2.11. Outcome Assessment

Baseline wound condition was assessed using the REEDA scale immediately after completion of episiotomy suturing and before initiation of the intervention. A follow-up wound healing assessment was performed on the seventh postpartum day.

2.12. Ethical Considerations

The College of Nursing Ethics Committee, Hawler Medical University, Erbil, Iraq, granted ethical approval for this study. The committee's institutional policy states that it did not assign a formal ethics approval number to this study. The College of Nursing Ethics Committee at Hawler Medical University conducted the study in accordance with the ethical principles of the Declaration of Helsinki. We obtained written informed consent from all participants before enrolment. Researchers informed participants about the study's purpose, voluntary nature, their right to withdraw without consequences, and assured them that personal information would remain confidential and anonymous throughout the research process.

2.13. Statistical Analysis

Data normality was assessed before statistical analysis. Because the REEDA and VAS scores were not normally distributed, nonparametric statistical tests were applied. The Wilcoxon signed-rank test was used for within-group comparisons, the Mann–Whitney U test for between-group comparisons, and the Chi-square test for categorical variables.

3. RESULTS

3.1. Socio-demographic Characteristics

A total of 104 postpartum mothers who underwent normal vaginal delivery with mediolateral episiotomy participated in the study, with equal allocation to the control group (n = 52) and the intervention group (n = 52). The two groups were broadly comparable in their socio-demographic profiles.

Table 2 compares the socio-demographic characteristics of the mothers between the two groups. Most mothers in both groups were aged 20–29 years, accounting for 71.2% and 55.8% of mothers in the control and intervention groups, respectively. Most participants were housewives (82.7% in the control group and 80.8% in the intervention group) and lived in urban areas. Educational levels varied across groups, with primary education being the most common in the control group (28.8%) and intermediate education predominating in the intervention group (32.7%). Household income was low to moderate, with more than half of the control group reporting a monthly income of ≤500,000 IQD, whereas most of the intervention group reported an income between 500,000 and 1,000,000 IQD. Overall, no clinically meaningful baseline imbalance was observed between the groups.

3.2. Longitudinal Comparison of Perineal Pain

Table 3 presents the longitudinal analysis of perineal pain scores measured with the VAS at baseline, immediately after the intervention, 24 h after the intervention, and on the 7th postpartum day.

Table 2. Socio-demographic characteristics of postpartum mothers in the control and intervention groups (n = 104).

Items	Control Group		Intervention Group	
	No	(%)	No	(%)
Age Groups				
• Less than 20 years	9	(17.3)	10	(19.2)
• 20 - 29 years old	37	(71.2)	29	(55.8)
• 30 years old and above	6	(11.5)	13	(25.0)
Level of mother's education				
• Can read and write	4	(7.7)	1	(1.9)
• Primary school degree	15	(28.8)	11	(21.2)
• Intermediate school degree	7	(13.5)	17	(32.7)
• High school degree	9	(17.3)	14	(26.9)
• Diploma degree	9	(17.3)	3	(5.8)
• Bachelor's degree	8	(15.4)	6	(11.5)
Mothers' Occupation				
• Housewife	43	(82.7)	42	(80.8)
• Employed	6	(13.4)	6	(13.4)
• Student	2	(3.8)	3	(5.8)
Current Residential				
• Urban	35	967.3)	30	(57.7)
• Rural	6	(11.5)	9	(17.3)
• Township	11	(21.2)	13	(25)
Monthly Income				
• 500000 and below	27	(51.9)	18	(34.6)
• Between 500000 – 1000000	23	(44.2)	31	(59.6)
• Between 1000000 - 1500000	2	(3.8)	3	(5.8)
Total	52	(100)	52	(100)

Table 3. Longitudinal comparison of perineal pain scores (VAS) within control and intervention groups.

Time Point	Control Group Median (IQR)	Z	*p*-value*	r	Intervention Group Median (IQR)	Z	*p*-value*	r
Pretest (baseline)	10 (10–10)	−0.905	0.366	0.126	10 (10–10)	−6.553	<0.001	0.909
Immediate posttest	10 (10–10)	−3.300	0.001	0.458	6 (6–6)	−6.006	<0.001	0.833
24 hours posttest	10 (8–10)	−1.556	0.120	0.216	4 (4–6)	−6.379	<0.001	0.885
7th postpartum day	9 (8–10)	-	-	-	0 (0–2)	-	-	-

***p*-value**: Wilcoxon Signed Ranks Test.
Note: Data are presented as median (interquartile range). The Wilcoxon signed-rank test was used for within-group comparisons. Statistical significance was set at $p < 0.05$.

Table 4. Comparison of episiotomy wound healing status (REEDA scale) between control and intervention groups at baseline and posttest.

Healing Status	Control Group n (%)	Intervention Group n (%)	*p*-value
Baseline (pretest)	-	-	<0.001
Complete healing	27 (51.9)	4 (7.7)	-
Moderate healing	24 (46.2)	37 (71.2)	-
Mild healing	1 (1.9)	10 (19.2)	-
Not healed	0 (0.0)	1 (1.9)	-
Post-test (7th day)	-	-	<0.001
Complete healing	0 (0.0)	51 (98.1)	-
Moderate healing	16 (30.8)	1 (1.9)	-
Mild healing	19 (36.5)	0 (0.0)	-
Not healed	17 (32.7)	0 (0.0)	-

Note: Episiotomy wound healing was assessed using the REEDA scale. Data are presented as numbers (percentages). Between-group comparisons were conducted using the Chi-square test. $p < 0.05$ indicates statistical significance.

In the intervention group, a marked and statistically significant reduction in the median perineal pain scores was observed at all follow-up points. The median pain score decreased from ten at baseline to six immediately after the intervention ($Z = -6.553$, $p < 0.001$, $r = 0.909$), indicating a large effect size. Pain levels further declined to a median score of four at 24 h post-intervention ($Z = -6.006$, $p < 0.001$, $r = 0.833$) and reached a median score of zero by the 7th postpartum day ($Z = -6.379$, $p < 0.001$, $r = 0.885$).

In contrast, the control group showed no significant reduction in perineal pain over time. Median pain scores remained at ten from baseline through immediate and 24-hour assessments, with only a slight and non-significant reduction observed on the 7th postpartum day (median = 9; $Z = -1.556$, $p = 0.12$, $r = 0.216$). These findings demonstrate the superior effectiveness of the combined ice pack and warm water bath intervention in reducing postpartum perineal pain.

3.3. Episiotomy Wound Healing (REEDA scale)

Table 4 compares episiotomy wound healing status between the control and intervention groups using the REEDA scale.

At baseline (immediately after episiotomy suturing and before the intervention), REEDA scores were recorded to document the initial wound condition. Wound healing outcomes were subsequently evaluated on the seventh postpartum day using the REEDA scale.

On the 7th postpartum day, the posttest assessment showed that wound healing outcomes differed substantially between the groups. Nearly all mothers in the intervention group achieved complete wound healing (98.1%), whereas only 30.8% of mothers in the control group did. Notably, 32.7% of the mothers in the control group showed no evidence of healing at follow-up. The between-group difference in the posttest REEDA scores was highly statistically significant ($p < 0.001$), indicating that the intervention significantly enhanced episiotomy wound healing.

4. DISCUSSION

This study evaluated the effectiveness of a postpartum instructional programme incorporating ice pack application and warm water baths for reducing perineal pain and promoting episiotomy wound healing. These findings provide strong evidence supporting the effectiveness of these non-pharmacological interventions.

The socio-demographic characteristics of participants were comparable between groups, suggesting that the observed differences in outcomes were because of the intervention rather than baseline disparities. The predominance of mothers aged 20–29 years was observed. These results are consistent with those reported by Mohamed-Nabil Aboushady in 2023 [18], who studied the effect of ice pack application on episiotomy wounds among mothers. According to the researchers, all participants in both groups were statistically homogeneous in age, being 20-30 years old.

Regarding participants' occupations, the results of this study show that the majority of mothers were homemakers in both groups. In 2024, Mohammad Emam *et al.* Conducted a study on 126 postpartum mothers with episiotomy [19]. Their findings were in line with this study's, which showed that the highest proportion of mothers was homemakers.

In the present study, more than half of the study participants were primigravida in both groups. This result is similar to a study which found that the majority of mothers were primigravida.

Regarding perineal pain, the intervention group showed a rapid and sustained reduction in pain intensity, with complete pain relief achieved by the 7th postpartum day. The large effect sizes observed across all follow-up points underscored the clinical relevance of the intervention. In the same line [20], who studied the Effect of Cryotherapy on Pain Perception and Wound Healing among mothers with Episiotomy. They supported these findings and stated that the level of perineal pain experienced by the postpartum mothers was reduced to mild pain severity in seventy-five percent of the cases after the programme, compared with before. Also, congruence with [21] reports a significant difference in perineal pain level after applying an ice pack immediately after suturing the episiotomy wound, and more than half of Postpartum Women felt more comfortable in the intervention group. Ice pack application decreases edema, muscle spasm, and inflammatory responses, whereas warm water baths enhance local circulation and promote tissue relaxation, facilitating pain relief.

The fact that mothers desiring routine care experienced ongoing perineal pain illustrates how traditional postpartum care is insufficient without particular non-pharmacological measures.

The REEDA scale illustrated that the intervention group had better outcomes in healing from an episiotomy. By the seventh day after giving birth, almost everyone The intervention group was fully healed. This finding corroborates the evidence that blood circulation, inflammation control, and self-care are positively correlated with tissue repair. This finding is consistent with the study by Lazarus *et al*. in 2022 [22]. This study showed that Malaysian mothers who received tructured self-care education improved episiotomy pain management and wound healing. This study found a significant gap in REEDA scores on day seven between the intervention and control groups.

In contrast, mothers who received routine care alone experienced persistent perineal pain, highlighting the limitations of standard postpartum management when not supplemented with targeted non-pharmacological interventions.

Regarding episiotomy wound healing, the intervention group showed significantly better outcomes, as measured by the REEDA scale. The near-universal complete healing observed in the intervention group by the 7th postpartum day aligns with evidence suggesting that improved circulation, reduced inflammation, and enhanced self-care practices accelerate tissue repair. This study agrees with the result of [22], who studied the effects of structured self-perineal care education on episiotomy pain score and wound healing outcomes among mothers in Malaysia, and reported that the wound healing process was significantly different in the mean total score of REEDA at the 7th day of posttest evaluation in the intervention group compared with the control group. In contrast, some previous research showed concern about warm-site baths alone, as well as the effectiveness of site baths in wound healing, suggesting that the combination strategies used here: cryotherapy, warm water, and the educational component, are crucial for achieving the best results. For example, Ramesh *et al*. [23] and Kona, in 2024 [24] studied the impact of infrared lamp therapy on pain and recovery of episiotomy in Postpartum Women. They reported no significant changes in redness, swelling, bruising, discharge, or edge approximation of episiotomy wounds after warm-site baths only.

CONCLUSION

The research shows that a systematic postpartum protocol combining ice packs and warm baths is effective in reducing perineal pain and improving episiotomy wound healing. This approach is more effective than basic care at promoting wound healing and reducing pain.

The results highlight the value of providing fundamental postpartum care and of offering care free of pharmaceuticals. The midwife's and nurse's roles are pivotal in perineal assessment, self-care instruction, and emotional counselling. These actions can enhance childbirth safety, improve women's health, and accelerate women's return to their usual responsibilities.

AUTHORS' CONTRIBUTIONS

The authors confirm their contributions to the paper as follows: S.K., T.P.: Study conception and design; S.K.: Data collection; S.K., T.P.: Analysis and interpretation of results; S.K., T.P.: Draft manuscript. All authors reviewed the results and approved the final version of the manuscript.

LIST OF ABBREVIATIONS

REEDA = Redness Edema, Ecchymosis, Discharge, and Approximation

SPSS = Statistical Package for the Social Sciences

VAS = Visual Analogue Scale

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The College of Nursing Ethics Committee, Hawler Medical University, Erbil, Iraq, granted ethical approval for this study.

HUMAN AND ANIMAL RIGHTS

All human research procedures followed were in accordance with the ethical standards of the committee responsible for human experimentation (institutional and

national), and with the Helsinki Declaration of 1975, as revised in 2013.

CONSENT FOR PUBLICATION

Written informed consent was obtained from all participants before enrolment.

STANDARDS OF REPORTING

STROBE and TREND guidelines were followed.

AVAILABILITY OF DATA AND MATERIALS

The datasets used and/or analyzed during the current study are available from the corresponding author [S.K.] on reasonable request.

FUNDING

None.

CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

ACKNOWLEDGEMENTS

Declared none.

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