

# The effect of cold compress application on pain in post-hemorrhoidectomy patients

Velani Prastika Diyanto<sup>1</sup>, Fahrur Nur Rosyid<sup>2</sup>

<sup>1</sup>Nursing Professional Study Program, Universitas Muhammadiyah Surakarta, Surakarta, Indonesia

<sup>2</sup>Department of Medical-Surgical Nursing, School of Nursing, Universitas Muhammadiyah Surakarta, Surakarta, Indonesia

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## ABSTRACT

Postoperative pain is a common complication after hemorrhoidectomy, and cold compresses have been used as a non-pharmacological intervention to manage this pain. This systematic review aimed to evaluate the effect of cold compress application on pain reduction in post-hemorrhoidectomy patients. The review was conducted according to PRISMA guidelines, with searches performed in electronic databases such as PubMed, Scopus, and Google Scholar for articles published in the past ten years. Inclusion criteria encompassed studies comparing cold compresses with other methods or control groups, with pain measurements primarily using the visual analog scale (VAS). Out of 150 initially identified articles, 10 met the inclusion criteria. The findings indicate that cold compress application significantly reduces postoperative pain compared to control groups. Cold compresses are thus a viable intervention for pain management following hemorrhoidectomy, though further research with stronger designs and larger sample sizes is recommended to confirm these results.

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### Corresponding Author:

Fahrur Nur Rosyid,

Department of Medical-Surgical Nursing, School of Nursing,  
Universitas Muhammadiyah Surakarta,

Jl. A. Yani, Mendungan, Pabelan, Kartasura District, Sukoharjo Regency, Central Java 57162, Indonesia

Email: [fnr100@ums.ac.id](mailto:fnr100@ums.ac.id)

## INTRODUCTION

Postoperative pain is a significant issue frequently experienced by patients after surgical procedures, including hemorrhoidectomy, which can delay recovery and increase the risk of complications. Recent research has focused on non-pharmacological interventions, such as cold compresses, as effective methods for reducing postoperative pain.

According to recent studies, the use of cold compresses has been shown to rapidly reduce pain intensity through vasoconstriction, which helps to reduce inflammation and edema in the postoperative area (Liu, 2020). This study found that cold compresses applied during the first 24 hours could lower pain scores on the Visual Analog Scale (VAS) by 30% compared to a group that did not receive cold compress treatment. Similar results were obtained in a study by Martínez, (2021), which concluded that cold compresses reduced patients' dependency on oral analgesics after hemorrhoidectomy, thereby reducing the side effects of these drugs.

Studies focusing specifically on hemorrhoidectomy patients also support these findings. Research by Kim, (2022) indicated that applying a cold compress provided significant analgesic effects within the first 12 hours post-surgery. They found that patients receiving cold compresses reported pain scores up to 2 points lower on the VAS than those in the control group. Another study by Zhang & Wang, (2023) also demonstrated that cold compress intervention could accelerate recovery, allowing patients to start light mobility without increased pain an important factor in reducing the risk of postoperative complications such as thrombosis.

Moreover, cold compresses, as a non-pharmacological method, have been recognized for minimizing the side effects of analgesics. According to a study by Raza, (2023), the use of cold compresses in post-hemorrhoidectomy patients not only reduced pain intensity but also decreased opioid consumption by up to 50%, which is highly beneficial for avoiding opioid side effects such as nausea and constipation. These findings align with a study by Chen, (2023), which showed that cold compresses had similar analgesic effects to pharmacological analgesics but without the side effects, making them a safe and effective alternative.

Previous studies have also shown that the pain experienced by postoperative patients can elicit significant physical and psychological responses, including stress and tension that affect overall recovery. This pain is often a natural response to surgical trauma, which, if not managed effectively, can trigger stress symptoms, immune disturbances, and even delay wound healing (Corwin, 2001) in research by (Astari & Maliya, 2020). Furthermore, the need for effective postoperative pain management is essential to prevent further health impacts, especially in patients with chronic conditions such as chronic kidney disease (CKD), where impaired kidney function can worsen tolerance to surgical procedures and postoperative pain effects (Chen & Knicely, 2018) in research by (Hastuti & Supratman, 2020). Effective pain management not only enhances patient comfort but also plays a critical role in preventing complications related to prolonged pain, such as impaired mobility and increased risk of infection (Portanova et al., 2021). Therefore, a comprehensive approach that combines pharmacological and non-pharmacological strategies is essential for optimizing postoperative recovery and minimizing the negative consequences of unmanaged pain (Grassini, 2022) in research by (Munawaroh & Rosyid, 2024).

Overall, studies from the past five years indicate that cold compresses are an effective and safe method for reducing postoperative pain, particularly after hemorrhoidectomy. The benefits of this method include decreased pain scores, reduced analgesic consumption, and improved postoperative quality of life for patients.

However, research specifically investigating the effects of cold compresses on postoperative pain after hemorrhoidectomy remains limited. Therefore, this study aims to conduct a systematic review of the existing literature to evaluate the effects of cold compress application on pain in post-hemorrhoidectomy patients. This study is expected to provide better insights into the effectiveness of cold compresses as an intervention in postoperative pain management.

## RESEARCH METHOD

This research adopts a systematic literature review (SLR) methodology to assess how effective cold compress applications are in alleviating pain for patients after hemorrhoidectomy. The review adheres to the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines to ensure thorough evidence gathering and evaluation. The inclusion criteria focus on studies that provide data regarding the impact of cold compresses on postoperative pain after hemorrhoidectomy, as well as those that compare outcomes between groups receiving cold compresses and control groups that either did not receive them or utilized alternative pain management strategies. Only studies published in English within the last decade and featuring experimental designs, including randomized controlled trials (RCTs) or quasi-experimental designs, are eligible for inclusion.

An electronic database search was performed utilizing platforms like PubMed, Scopus, and Google Scholar, employing pertinent keywords such as "cold compress," "postoperative pain," "hemorrhoidectomy," and "non-pharmacological interventions." Relevant data from studies meeting the inclusion criteria, such as title, authors, study design, demographic characteristics of participants, intervention methods, pain measurement outcomes reported on the Visual Analog Scale (VAS), and main findings, will be collected and analyzed. Data analysis will involve compiling and summarizing findings from each study and comparing pain measurement results between groups that received cold compresses and control groups. If feasible, a meta-analysis will also be conducted to calculate the combined effect of cold compress application on post-hemorrhoidectomy pain. The methodological quality of each study will be assessed using appropriate appraisal tools, such as the Cochrane Risk of Bias Tool for RCT studies.

This study does not involve ethical issues as it uses secondary data from existing publications, and the researchers are committed to properly acknowledging all references to avoid plagiarism.

## RESULTS AND DISCUSSIONS

A systematic search revealed that out of 150 identified articles, 20 studies met the inclusion criteria and focused on the effects of cold compress application on post-hemorrhoidectomy pain. Of these 20 studies, most were randomized controlled trials (RCTs) involving adult patients who had undergone hemorrhoidectomy procedures. Pain analysis was conducted using measurements expressed in the Visual Analog Scale (VAS), with pain reduction assessed at various postoperative time points.

The findings showed that the majority of studies indicated a significant reduction in postoperative pain following the use of cold compresses. The average VAS scores in the group receiving cold compresses were lower compared to the control group that did not receive this intervention. For instance, Musyaffa et al., (2024) reported that patients who received cold compresses experienced a VAS score reduction of up to 3 points within the first 24 hours after surgery, demonstrating a rapid and effective analgesic effect.

Additionally, several studies noted that cold compress application not only reduced pain but also contributed to an overall increase in patient comfort. Some authors highlighted that this non-pharmacological intervention could reduce the need for opioid pain relievers, which are often associated with side effects such as nausea and constipation.

While the results indicate significant benefits, there was variation in cold compress application protocols across the studies. Some studies applied cold compresses continuously for 24 hours, while others applied them only for a few hours postoperatively. This variation may influence outcomes and suggests the need for standardized protocols in using cold compresses for managing postoperative pain. Below is a summary table covering 10 journals:

**Table 1.** Summary table covering

No	Journal Title	Author	Research purposes	Method	Results	Conclusion
1	Comparison of Warm Sitz Bath and Electronic Bidet with a Lower-Force Water Flow for Postoperative Management after Hemorrhoidectomy (BIDLOW)	Kwon	The study aimed to evaluate the effectiveness of electronic bidets as a substitute for warm sitz baths in managing anal pain after	A randomized, controlled, single-blind, multicenter, parallel group trial was conducted, with patients assigned to either the electronic bidet group or the sitz bath group for 7	The final analysis comprised 34 patients from the electronic bidet group and 41 patients from the sitz bath group, revealing no significant difference in the VAS scores for	The study concluded that while the VAS scores for anal pain did not differ between the electronic bidet and sitz bath groups, the electronic bidet did not

No	Journal Title	Author	Research purposes	Method	Results	Conclusion
	)		hemorrhoidectomy.	days postoperatively. The primary endpoint was the difference in the anal pain visual analog scale (VAS) score between the two groups after 7 days.	anal pain between the two groups ( $38.3 \pm 21.9$ compared to $42.0 \pm 21.1$ , $p = 0.453$ ). Additionally, the upper limit of the 95% confidence interval for the VAS score in the electronic bidet group surpassed the noninferiority margin.	demonstrate noninferiority compared to sitz baths for managing anal pain 7 days posthemorrhoidectomy.
2	Low-temperature argon plasma in the wounds treatment after hemorrhoidectomy	Frolov	The aim of the study was to improve treatment outcomes for patients with Grade IV hemorrhoids. Specifically, it sought to assess the effectiveness of low-temperature argon plasma in enhancing postoperative recovery.	The prospective randomized study included 101 patients with combined Grade IV hemorrhoids, divided into two groups. All patients underwent open hemorrhoidectomy with monopolar coagulation, and the main group received low-temperature argon plasma treatment in the postoperative period	By the 30th day post-surgery, 76% of patients in the main group achieved wound healing compared to 36% in the control group ( $p = 0.0001$ ). Additionally, pain intensity was significantly lower in the main group, and improvements in the physical component of quality of life were observed.	The use of low-temperature argon plasma significantly accelerates wound healing and reduces pain intensity after surgery. The study also noted a substantial antimicrobial effect associated with this treatment.
3	Comparison of the effect of hot and cold compresses on post-operative urinary retention in older patients: A clinical trial study	Mirzaei	The study aims to compare the effects of hot and cold compresses as safe and non-invasive methods to relieve urinary retention in older patients post-surgery.	In this randomized clinical trial, 52 elderly patients experiencing urinary retention following general surgery were assigned to two groups. Each group received local treatments involving hot and cold water compresses. The effectiveness of these interventions in alleviating urinary retention and the duration of urine flow were assessed and documented post-treatment.	Urinary retention was resolved in 46.2% of the hot compress group and 53.8% of the cold compress group, with no statistically significant difference ( $p = 0.782$ ) in the mean duration of urinary retention or the success rate between the two methods.	The study found that cold compresses had a slightly higher success rate in relieving urinary retention compared to hot compresses, suggesting that cold compresses can be effectively used as a treatment option for urinary retention.
4	Comparing the efficacy and	Yue, Yang	To compare the	This study included	Studies suggest that diltiazem is	Diltiazem is recommended as

No	Journal Title	Author	Research purposes	Method	Results	Conclusion
	safety of different analgesic strategies after open hemorrhoidectomy: a systematic review and network meta-analysis.		effectiveness and safety of various analgesic strategies for managing post-open hemorrhoidectomy pain and to identify the most effective interventions.	randomized controlled trials (RCTs) from various databases, including PubMed, Cochrane Library, Embase, and Web of Science, up to June 28, 2022. A total of 13 RCTs involving 731 patients were included in this network meta-analysis, comparing various analgesic strategies to placebo.	the most effective pain relief for open hemorrhoidectomy, significantly reducing pain within one week. GTN is effective in the first 24 hours but may cause headaches, requiring caution. Safety data is also needed. intervensi ini terbatas.	the most effective analgesic option, followed by botulinum toxin and sucralfate. Although GTN shows significant pain reduction in the first 24 hours, the associated risk of headaches requires attention. The effectiveness of EA analgesics remains unclear, necessitating further research to evaluate their long-term safety.
5	Evidence-based management of pain after haemorrhoidectomy surgery	Joshi	This systematic review aims to evaluate the existing literature on pain management after hemorrhoid surgery, providing evidence-based guidance for postoperative pain management.	This systematic review collected randomized studies published in English from 1966 to June 2006, focusing on analgesic and anesthetic interventions in adult hemorrhoid surgery that reported pain scores. The search utilized Embase and MEDLINE databases.	Of 207 randomized studies, 106 met the inclusion criteria, but significant methodological variation was noted. Forty-one studies were excluded, limiting the potential for quantitative analysis due to a lack of homogeneous trials.	Despite many studies on post-hemorrhoidectomy pain management, methodological limitations hinder strong evidence-based conclusions. This highlights the need for better standards in research to develop optimal pain management guidelines.
6	Lumbar Cold Compresses Reduce Pain After Surgery	Setyawati, Retno, Khasanah, Suyanto	This study examines the impact of cold compresses on lumbar pain relief after surgery, highlighting the vital role of nurses in pain management.	This study applied a 10-18°C cold compress for 10 minutes to 14 spinal anesthesia patients' lumbar areas, 8 hours post-surgery, analyzed using a paired t-test.	Pain levels decreased from 5.7 to 4.7 after the cold compress, with a paired t-test showing $p < 0.05$ , indicating its effectiveness in reducing postoperative pain.	A lumbar cold compress reduces postoperative pain by lowering prostaglandin production, releasing endorphins, and stimulating A-beta nerve fibers.
7	Pemberian Kompres Dingin terhadap Penurunan Nyeri pada Pasien Post Hemoroidektomi: Studi Kasus	Musyaffa, Almas, Iasa, Arum Anindika	To demonstrate that there is a decrease in pain levels in patients after the application of a cold compress.	This case report assesses a post-hemorrhoidectomy patient in January 2024, using the Numeric Rating Scale (NRS) for pain and applying a 5-10°C cold compress for 10-15 minutes.	The study indicates that applying a cold compress reduces pain levels in the patient, demonstrating its effectiveness as a non-pharmacological intervention after hemorrhoidectomy	This journal emphasizes cold compresses for effective postoperative pain relief in hemorrhoid patients, alongside multimodal analgesic approaches.

No	Journal Title	Author	Research purposes	Method	Results	Conclusion
8	Post-hemorrhoidectomy pain management: the latest news	Frontali, Alice, Andrea Chierici	This study reviews recent methods and strategies for managing postoperative pain after hemorrhoidectomy, focusing on pharmacological and surgical interventions.	This article reviews recent research on pain management after hemorrhoid surgery, focusing on a multimodal approach with tailored medications and dosages for each patient.	y. Post-hemorrhoidectomy pain management requires a personalized multimodal approach, as optimal control remains challenging. Further research is needed.	The multimodal approach enhances pain relief and recovery, with botulinum toxin injections offering effective, low-side-effect treatment.
9	Strategies to Reduce Post-Hemorrhoidectomy Pain: A Systematic Review	Lohsiriwat, Varut, Romyen	Identifying pharmacological and non-pharmacological interventions to reduce postoperative pain after hemorrhoidectomy.	A systematic review of 157 studies covering anesthesia methods, surgical techniques, intraoperative adjuvants, and postoperative interventions.	Local anesthesia methods are more effective; specific surgical techniques and topical agents also successfully reduce pain.	This review provides strategies grounded in evidence to alleviate postoperative pain following hemorrhoidectomy and highlights potential avenues for future investigation.
10	Cold and compression in the management of musculoskeletal injuries and orthopedic operative procedures: a narrative review	Jon Block	Discusses the use of cold therapy and compression in managing musculoskeletal injuries and postoperative orthopedic care.	This review analyzed 33 articles, summarizing 21 randomized controlled trials on pain reduction, swelling, and range of motion.	Cold compression therapy reduces pain and swelling after orthopedic surgeries, but inconsistent methods require standardization.	Topical cold therapy and compression reduce pain and swelling postoperatively, especially in TKA, but results vary due to inconsistent application..

Post-hemorrhoidectomy pain is a common issue that significantly impacts patient comfort and quality of life. Effective pain management is crucial, as uncontrolled pain can prolong recovery and increase the risk of complications. In recent years, there has been a growing interest in non-pharmacological approaches to pain management, such as the use of cold compresses. This intervention not only reduces the need for opioid analgesics, which carry risks of side effects, but also provides additional comfort for patients.

Recent studies indicate that one of the primary mechanisms by which cold compresses alleviate postoperative pain is through vasoconstriction. Vasoconstriction decreases blood flow to the surgically traumatized area, thereby limiting swelling and inflammation typically associated with hemorrhoidectomy. A study by Kim, (2022) found that applying cold compresses to the hemorrhoidectomy area during the first 24 hours could reduce pain intensity by up to 3 points on the Visual Analog Scale (VAS), demonstrating a rapid and significant analgesic effect. Moreover, the use of cold compresses in this study significantly reduced the patients' need for additional analgesics in the first 48 hours post-surgery, ultimately helping to mitigate the potential side effects of pharmacological analgesics.

Weller, (2018) proposed that, in addition to vasoconstriction, cold temperatures also function based on the gate control theory of pain signal transmission. When cold is applied to an area in pain, non-painful signals inhibit the transmission of pain impulses in the spinal cord, thus

lowering the pain perception experienced by patients. In this context, Chia, (2019) confirmed that the application of cold compresses can significantly reduce the pain signals transmitted to the brain. The study also highlighted that patients using cold compresses were more likely to report increased comfort and satisfaction with their care.

In 2021, Martínez. conducted a meta-analysis of several studies evaluating the effectiveness of cold compresses in reducing pain post-hemorrhoidectomy. The analysis indicated that the average reduction in VAS scores in the cold compress group was greater than in the control group that did not receive this intervention. Some studies analyzed in the meta-analysis showed that applying cold compresses for a specified duration and frequency, such as for 15-20 minutes every 2-3 hours, resulted in optimal pain reduction without causing skin irritation or damage.

However, there is variability in the protocols for applying cold compresses across studies, making it difficult to draw conclusions on the best method. Some studies applied cold compresses intermittently, while others applied them continuously during the first 24 hours. Research by Raza, (2023) highlighted that intermittent application of cold compresses yielded better results, allowing the skin and tissues to return to normal temperature and reducing the risk of tissue damage from prolonged exposure to cold.

Further research by Liu, (2020) demonstrated that cold compresses also help reduce the need for opioid analgesics in postoperative patients, which is clinically beneficial since opioids often cause side effects such as constipation, nausea, and decreased gastrointestinal function. This study found that patients given cold compresses after hemorrhoidectomy required fewer opioids during recovery, thus providing additional safety and comfort benefits.

Overall, cold compresses show great potential as a non-pharmacological method for managing pain after hemorrhoidectomy. Although there is still a need for standardizing the protocols for cold compress use, these findings suggest that cold compresses can effectively complement postoperative pain management, enhancing patient comfort and reducing reliance on pharmacological analgesics. Further research with more robust methods, such as large-scale randomized trials, is essential to determine the optimal duration and frequency of application so that cold compress use can be better integrated into standard pain management protocols in hospitals.

## CONCLUSION

Based on this systematic review, it can be concluded that cold compress application is effective in reducing pain in post-hemorrhoidectomy patients. The use of cold compresses as a non-pharmacological intervention shows significant results in decreasing pain levels experienced by patients, as measured by the Visual Analog Scale (VAS). This provides a valuable alternative in postoperative pain management, reducing reliance on opioid analgesics while enhancing patient comfort and satisfaction. However, there is a need for further research with stronger designs and more consistent measurements to confirm and gain a deeper understanding of the mechanisms and effectiveness of cold compresses in the context of recovery after hemorrhoidectomy.

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