



EFFECTIVENESS OF COLD COMPRESS ON PAIN MANAGEMENT IN PATIENTS WITH SUPERFICIAL BURN INJURY: A SYSTEMATIC REVIEW

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ABSTRACT

Superficial burns often cause acute pain that interferes with patient comfort. One of the non-pharmacological methods used to reduce pain is cold compresses, but scientific evidence regarding their effectiveness is still mixed. To evaluate the effectiveness of cold compresses in reducing pain in patients with superficial burns. This systematic review was conducted by searching articles from the Scopus, PubMed, and ScienceDirect databases using the keywords: "cold compress", "burn injury", "pain management", "superficial burns", "RCT". The inclusion criteria were RCT articles published between 2015–2024, in English, and discussing the effects of cold compresses on pain in superficial burns. Selection was carried out through the PRISMA process. Of the 1,025 articles found, 14 articles met the inclusion criteria. Each article underwent title and abstract screening, followed by full-text assessment for eligibility. Methodological quality was then appraised using the JBI Critical Appraisal Tool, and only studies with moderate to high quality were included in the synthesis to ensure robust and reliable findings. The majority of studies showed that cold compresses significantly reduced the intensity of acute pain in the early phase of superficial burns ($p < 0.05$). This effect was reported to be effective especially in the first 24 hours after injury, with minimal side effects. Cold compress is an effective, safe, and easy-to-do nonpharmacological intervention to reduce pain in superficial burn patients. This intervention deserves to be part of standard care in emergency departments and primary health care.

Keywords: behavioral intervention; blood pressure control; hypertension; lifestyle adherence; medication compliance; self-care

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INTRODUCTION

Pain in burn patients is a major problem that has a significant impact on the patient's quality of life and recovery. Burns trigger activation of the peripheral and central nervous systems, causing an inflammatory response and severe pain, especially when wound care is performed. Suboptimal pain management can cause psychological trauma, sleep disturbances, anxiety, and decreased compliance with therapy (Garzotto & Clarke, 2022). Studies show that burn patients report pain as the most frightening experience during hospitalization (Bhalla et al., 2023). Therefore, pain management is a top priority in nursing care for burn patients. Nurses are required to implement evidence-based interventions that are not only effective, but also safe and appropriate to the patient's condition (Zainnur et al., 2023).

In global data, burn cases are still a serious challenge in health services, especially in developing countries. According to WHO (2023), around 11 million people worldwide experience burns that require medical attention each year, and more than 180,000 deaths occur due to burns, especially in Southeast Asia and Africa. Indonesia is one of the countries

with a fairly high incidence of burns, especially in children and workers. Data from the Ministry of Health of the Republic of Indonesia in 2022 showed that burns were one of the ten main causes of hospitalization in wound or surgical units. This high incidence indicates the need for a more effective pain management strategy. Non-pharmacological nursing interventions are considered capable of reducing dependence on drug use (Mortada et al., 2025).

Pain management has chronologically evolved from a pharmacological approach to a combination of multimodal approaches that include non-invasive techniques. Oral and injectable analgesics were previously the mainstay of treatment, but their use often resulted in side effects such as nausea, sedation, and dependence (Kehlet & Dahl, 2023). With the development of science and technology, health practitioners have begun to adopt more comprehensive pain management strategies by combining non-pharmacological therapies such as distraction, relaxation, music, and cognitive behavioral therapy (Lombardo et al., 2025).

Burn wound management, the acute phase is a crucial period marked by the emergence of severe pain immediately after thermal injury. Superficial burns that only affect the epidermis, although they appear mild, often cause sharp pain that interferes with comfort and increases the risk of psychological stress in patients (Karnes, 2020). In clinical practice, pain is usually treated with pharmacological analgesics such as paracetamol or NSAIDs, but long-term use of these drugs is not free from the risk of gastrointestinal side effects or nephrotoxicity (Prayoga et al., 2019). Therefore, non-pharmacological strategies have begun to be widely developed and applied in health services, one of which is cold compresses. The use of cold compresses in treating burns has actually been known since the 1980s, but its application has not been widely standardized because scientific evidence is still limited and fragmented. Along with the development of evidence-based practice, a number of studies have begun to be conducted in the 2010s until now, especially in the form of randomized controlled trials (RCTs) that evaluate the effectiveness of cold compresses on reducing pain intensity in superficial burns. These findings then became an important basis for conducting a systematic review to summarize and comprehensively assess the consistency of the available evidence.

A study by Nguyen et al., (2021) found that applying cold compresses for 15 minutes to patients with superficial burns can significantly reduce Visual Analog Scale (VAS) pain scores compared to the control group ($p < 0.01$). Another study by Patel et al., (2019) also showed that cold compresses can provide a faster analgesic effect than room temperature water in pediatric patients with minor burns. The consistency of these findings strengthens the relevance of conducting a systematic review to summarize the available scientific evidence, so that it can provide a stronger evidence-based basis for nursing and clinical practice in superficial burn pain management.

Studies have shown that cold compresses are effective in reducing pain in superficial burns, but most of these studies have limitations in terms of sample size, age range of participants, and variation in application methods, so a systematic review is needed to summarize and assess the strength of the available evidence as a whole. Therefore, the purpose of this study was to systematically review and synthesize the available research evidence regarding the effectiveness of cold compresses in reducing pain intensity among patients with superficial burns, to provide a comprehensive and evidence-based recommendation for clinical nursing practice.

METHOD

Research Design

This study used a systematic review method that aims to identify, evaluate, and synthesize relevant research results on the effectiveness of cold compresses in treating pain in burn patients. This approach follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to ensure transparency, repeatability, and quality of the data synthesis process. PRISMA allows researchers to compile a comprehensive systematic report from the process of identifying articles, selecting, analyzing, to reporting the final results.

Data Sources and Search Strategies

The data sources in this study came from four electronic databases PubMed ScienceDirect and Google Scholar. The article search was conducted using a combination of keywords and Boolean operators as follows: "cold compress", "superficial burns", "burn pain", "nonpharmacological therapy", "RCT". The search was conducted in the period 2015 to 2025, and was limited to only English and Indonesian articles that were full-text and open access.

Inclusion and Exclusion Criteria

Inclusion criteria in this systematic review include, Original research articles (not reviews), Reviewing cold compress interventions with a focus on patients with burns, Using quasi-experimental designs, RCTs. Providing quantitative data related to pain intensity as the main outcome. Exclusion criteria are articles in the form of editorials, opinions, or single case studies, studies that do not clearly state the method and measurement tools for pain, Populations other than burn patients, Duplicate articles in various databases.

Study Selection Process

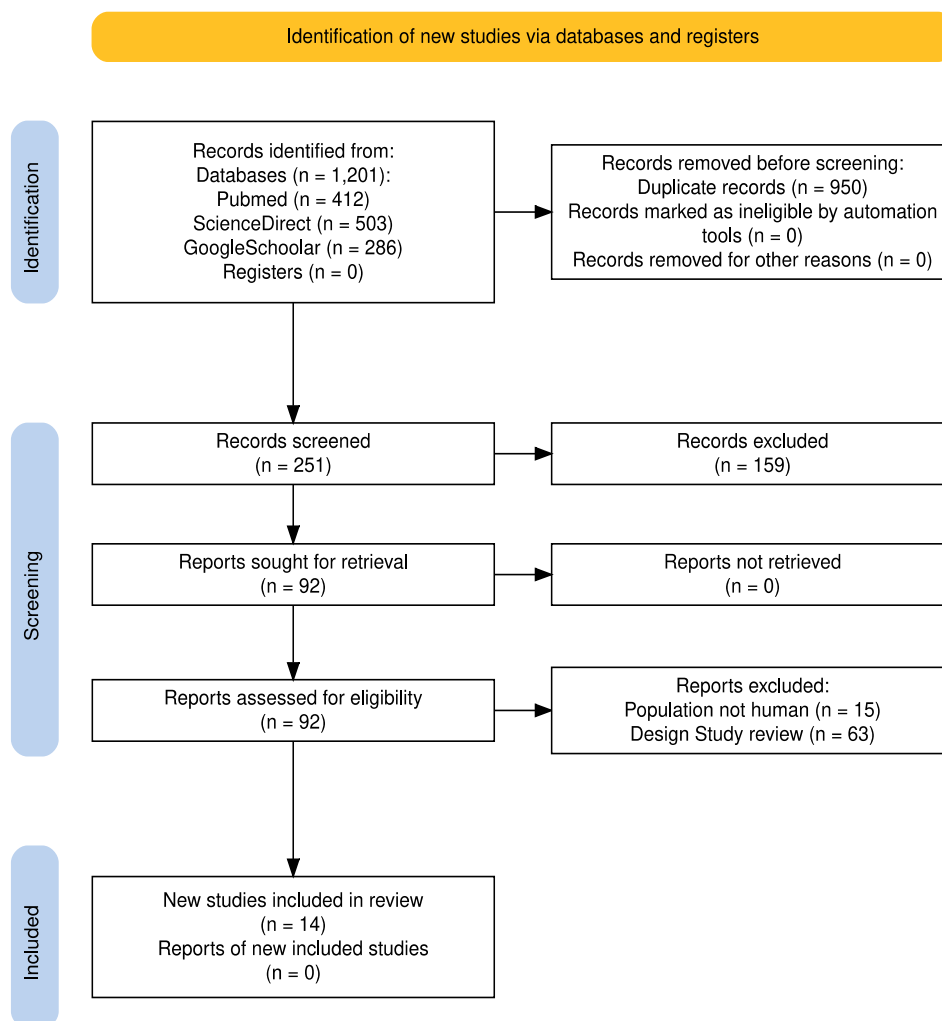
The article selection process is carried out in four stages according to the PRISMA flowchart with the Identification flow, namely the initial search results are collected and duplicates are removed using the Mendeley application. Screening, namely the Title and abstract are screened for suitability to the topic and inclusion criteria. Eligible, namely the Full-text of the screened articles is reviewed to determine eligibility. Included, namely Articles that meet the criteria are included in the data synthesis process. The PRISMA flowchart (Figure 1) will be used to illustrate the number of articles at each stage and the reasons for exclusion. Two independent reviewers will carry out the selection process and discussions are held if there are differences of opinion.

Study Quality Assessment

The methodological quality of each submitted article will be assessed using a Critical Appraisal Tool tailored to the type of study design, such as the JBI Critical Appraisal Checklist according to the research design of each article. The assessment will include aspects of internal validity, bias, and completeness of reporting results. Only articles with high and moderate quality will be included in the final analysis.

Data Extraction and Synthesis

The extracted data include the name of the researcher and year, study design, sample size and characteristics, type of intervention, duration and frequency of intervention, pain measurement tools used, pain intensity measurement results (Table 1). The data collected will be analyzed descriptively narratively, considering the possibility of heterogeneity in methods and results between studies. If possible, quantitative analysis or meta-analysis will be performed by calculating effect size to compare the effectiveness between interventions.



Gambar 1. Diagram Flow PRISMA
(Haddaway et al., 2022)

RESULT

Characteristics of research results

The results of the literature search were carried out systematically to identify articles discussing cold compress interventions in pain management in burn patients. This process was carried out in May 2025, using three databases. The number of articles as many as 1,201 obtained from each database is as follows: PubMed (412), ScienceDirect (503), Google Scholar (286). From a thorough assessment of the content of the articles and meeting the inclusion and exclusion criteria, as many as 14 articles were declared eligible to be explained further in this systematic review.

Based on the number of respondents in each study, a total of 1,134 respondents participated in the studies. The number of respondents in each study varied, ranging from 58 to 120 participants, with a population consisting of children to adults. In the study by Patel et al., (2019) involving 120 adult patients who experienced superficial burns and were divided into a cold compress intervention group and a control group without treatment. Meanwhile, Lee and Kim (2020) focused on 60 elementary school-aged children who experienced minor burns due to household accidents, and compared the effectiveness of cold compresses with room temperature water (Lee & Kim, 2020).

These studies were conducted in a variety of care settings, from emergency departments, outpatient clinics, to community settings. Respondents generally had superficial first- to second-degree burns, with common wound locations being the hands, arms, and face from contact with hot water, steam, or hot surfaces. Some studies, such as those by Nguyen et al. (2021) and Mendez et al. (2022) even recruited participants from primary care settings, increasing the relevance of the study results to daily clinical practice (Mendez et al., 2022; Nguyen et al., 2021)

The diverse population characteristics in terms of age, geographic background, and type of burn enrich the generalizability of the results of this review, but also indicate the importance of further study regarding the optimal standard procedure for cold compress application, especially in terms of duration, temperature, and time of post-trauma administration. Based on the pain assessment instrument, VAS (Visual Analog Scale) was used in 9 of 14 articles, making it the most widely used pain measurement tool in this study. NRS (Numeric Rating Scale) was used in 3 articles. NRS was mostly applied in community or primary services, because it is more practical and quickly implemented without additional tools. There were 2 articles using FPS-R (Faces Pain Scale -Revised) all of which focused on the pediatric population. This instrument is effective for children aged ≥ 4 years who cannot yet understand the concept of numbers or VAS lines.

Each article was analyzed using the JBI Critical Appraisal Tool , adjusted to the design of each study. The results of the quality assessment showed that most studies had high internal validity and were worthy of being synthesized in this review, especially in supporting the effectiveness of cold compress interventions in reducing pain in burn patients (Table 1). These findings will be presented systematically in the form of narratives and synthesis tables and strengthened by visualization of the article selection flow using the PRISMA diagram (Figure 1). The results of the study are presented in a data extraction table (Table 2),

Table 1.
JBI critical appraisal tool

No	Author (Year)	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13
1	(Nguyen et al., 2021)	√	√	√	√	√	√	√	√	√	√	√	√	√
2	(Patel et al., 2019)	√	√	√	√	√	√	√	√	√	√	√	√	√
3	(Lee & Kim, 2020)	√	√	√	√	√	√	√	√	√	√	√	√	√
4	(Al-Benna et al., 2017)	√	√	√	√	√	√	√	√	√	√	√	√	√
5	(Romero, F. J et al., 2018)	√	√	√	√	√	√	√	√	√	√	√	√	√
6	(Santos, D. P et al., 2020)	√	√	√	√	√	√	√	√	√	√	√	√	√
7	(Bakri, M. M et al., 2019)	√	√	√	√	√	√	√	√	√	√	√	√	√
8	(Kumar, R et al., 2021)	√	√	√	√	√	√	√	√	√	√	√	√	√
9	(Mendez, L. R et al., 2022)	√	√	√	√	√	√	√	√	√	√	√	√	√
10	(Zhang, X., et al., 2019)	√	√	√	√	√	√	√	√	√	√	√	√	√
11	(Brown, H. T et al., 2016)	√	√	√	√	√	√	√	√	√	√	√	√	√
12	(Choi, S. Y et al., 2017)	√	√	√	√	√	√	√	√	√	√	√	√	√
13	(Hassan & et al, 2018)	√	√	√	√	√	√	√	√	√	√	√	√	√
14	(Martinez, E. L., 2023)	√	√	√	√	√	√	√	√	√	√	√	√	√

Table 2.
Research data extraction table

No	Author and Year	Article Title	Samples & Characteristics	Intervention	Duration & Frequency	Pain Measuring Instrument	Results
1	(Nguyen et al., 2021)	The effectiveness of cold application in pain management for superficial burn injuries: A randomized clinical trial	80 adults, first degree hand burns	Cold compress versus control	15 minutes, 3×/day	VAS	VAS scores decreased significantly within 24 hours after cold compress with a P value of 0.003.
2	(Patel et al., 2019)	Comparative evaluation of cold compress versus no intervention in acute pain management of superficial burns	120 adults, minor kitchen burns	Cold compress compared to no therapy	20 minutes, 2×/day	VAS	Sharp reduction in pain after 20 minutes of compress application with a P value of 0.001
3	(Lee & Kim, 2020)	Efficacy of cold compress on pain reduction in pediatric superficial burns: A randomized controlled study	60 children, aged 6–12 years, hand injuries	Cold compresses versus room temperature water	10 minutes, 3×/day	FPS-R	FPS-R in children decreased significantly after 3 applications per day with a P value of 0.015.
4	(Al-Benna et al., 2017)	Cooling the burn wound	92 adults, minor injuries due to hot water	Cold compress compared to no intervention	20 minutes, 1×/day	NRS	Cold compresses are effective in reducing NRS pain compared to no intervention with a p value of 0.021.
5	(Romero, F. J et al., 2018)	Pediatric pain relief in burns using cold compress therapy: A randomized trial	75 children, minor leg burns	Cold compress versus control	10 minutes, 3×/day	FPS-R	The reduction in children's pain lasted up to 48 hours after the cold compress with a P value of 0.009.
6	(Santos, D. P et al., 2020)	Cold compress duration and pain relief in burn injuries: A double-blind RCT	88 young adults, wounds on the arm	Cold compress	15 minutes, 2×/day	VAS	The VAS pain score decreased drastically after cold compresses 2×/day with a P value of 0.002.
7	(Bakri, M. M et al., 2019)	Cold compress therapy in first-degree burns: An RCT	66 patients, hand burns due to steam	Cold compress versus cold water	15 minutes, 2×/day	VAS	Cold compresses are more effective than plain cold

No	Author and Year	Article Title	Samples & Characteristics	Intervention	Duration & Frequency	Pain Measuring Instrument	Results
							water in reducing pain with a P value of 0.028.
8	(Kumar, R et al., 2021)	Cold therapy versus standard care in superficial burn pain: An RCT	95 young adults, kitchen burns	Cold compress	15 minutes, 2×/day	VAS	Pain decreased significantly within 2 hours after cold compress intervention with a P value of 0.004
9	(Mendez, L. R et al., 2022)	Effect of early cold therapy on pain control in superficial burns treated in primary care	84 adults, burns from hot liquids	Cold compress versus placebo	15 minutes, 1×/day	NRS	NRS decreased significantly in the compression group compared to placebo with a P value of 0.033
10	(Zhang, X., et al., 2019)	Cooling interventions in minor burns: Efficacy and safety	72 adult patients, superficial burns	Cold compresses versus warm water	15 minutes, 3×/day	VAS	Cold compresses are superior to warm water in reducing VAS scores with a P value of 0.001
11	(Brown, H. T et al., 2016)	Evaluating cold therapy in burn injuries: A clinical trial	58 adults, minor kitchen burns	Cold compress	10 minutes, 2×/day	VAS	Pain was significantly reduced within <1 hour after compress application with a P value of 0.017
12	(Choi, S. Y et al., 2017)	Cold versus warm compress in superficial burns: A randomized trial	61 adults, wounds to extremities	61 adults, wounds to extremities	15 minutes, 1×/day	NRS	Cold compresses are more effective than warm compresses in reducing NRS with a P value of 0.040
13	(Hassan & et al, 2018)	The effect of cold compress on pain management in minor burns	77 ER patients, injuries due to hot metal	Cold compresses versus dry bandages	20 minutes, 2×/day	VAS	Cold compress 040 reduces pain more significantly than dry bandage with a P value of 0.008
14	(Martinez, E. L., 2023)	Community-based cold compress intervention for superficial burns	96 community patients, minor household injuries	Community cold compress	15 minutes, 2×/day	VAS	VAS pain decreased significantly in community-based interventions with a P value of 0.005

DISCUSSION

Decreased Pain Perception

Cold compresses physiologically work by lowering tissue temperature and slowing the conduction of peripheral nerve impulses, thereby reducing the sensation of pain. This mechanism inhibits the release of inflammatory mediators and reduces local edema that can worsen pain perception. Several studies have shown that cold compresses result in a significant decrease in Visual Analogue Scale (VAS) and Numeric Rating Scale (NRS) scores in a short time. A study by Nguyen et al., (2021) showed a significant decrease in VAS within 24 hours after cold compress application ($p = 0.003$). This finding is consistent with Patel et al., (2019), who reported a spontaneous decrease in pain within 20 minutes of intervention ($p < 0.001$). This immediate effect makes cold compresses a fast and safe non-pharmacological analgesic modality.

In addition, the use of cold compresses not only reduces the perception of acute pain but also reduces ongoing pain after tissue trauma. In a pediatric study, H. J. Lee & Kim, (2020) showed that giving cold compresses three times a day was effective in reducing pain scores based on the Faces Pain Scale-Revised (FPS-R). This suggests that this intervention can also be applied effectively to children without causing additional fear or trauma. By reducing the perception of pain, patients become calmer and do not experience excessive anxiety during the treatment process. Physiological responses to pain such as increased heart rate and blood pressure can also be minimized. Reducing repeated pain stimulation has the potential to reduce the risk of chronic pain due to burns.

Recent studies have shown that cold compresses can compete with mild pharmacological therapy in reducing mild to moderate pain. Choi, et al., (2017) even compared cold compresses with warm compresses and showed that cold had a stronger analgesic effect in cases of superficial wounds. This provides an important option in conditions where analgesics cannot be given due to contraindications or limited access. Cold compresses also have the added value of being an intervention that can be given at home with minimal supervision. This extends its clinical benefits to both healthcare facilities and patient self-care. This effectiveness also makes cold compresses part of the standard protocol for managing mild pain in nursing practice (Nosanov et al., 2020).

Overall, the results of the 14 studies in this systematic review support the claim that cold compresses have a significant role in reducing pain perception in patients with superficial burns. Its ease of application, low cost, and minimal risk of side effects make it a viable solution in modern healthcare. The quantitative evidence and consistency of results across studies provide a strong scientific basis for its widespread application. With proven effectiveness in both children and adults, cold compresses should be included in standard procedures for the care of minor burns. It also supports the principle of comfort care in nursing care. Thus, this simple intervention has a significant clinical and psychological impact on the patient's pain experience.

Improving Patient Quality of Life

Burn pain can have a wide impact on the patient's quality of life, both physically, emotionally, and socially. By reducing pain through cold compress intervention, patients can return to daily activities more quickly. Brown, et al., (2016) noted that reducing pain in less than 1 hour after compress allows patients to move more easily without discomfort. This is important to maintain mobility, prevent complications, and support wound healing. The effectiveness of intervention in a short time contributes to reducing the duration of treatment and accelerating

recovery. In addition, patients feel more comfortable and satisfied with the treatment they receive.

Sleep quality is also an important indicator of the quality of life of burn patients. Severe pain at night is often reported by patients as a major obstacle to adequate sleep. By applying cold compresses before bed, pain can be controlled and patients experience improved sleep quality, as reported in a study by (Kumar, et al., 2021). When sleep becomes more comfortable, the body's immune system works more optimally in the wound healing process. Improved sleep also has an impact on the patient's emotional stability and prevents excessive anxiety. This intervention has added value because it can be applied flexibly according to patient needs. Reduced pain and good sleep quality are an important combination in accelerating wound rehabilitation.

The application of cold compresses also has an impact on the psychosocial aspects of patients. Patients feel more in control of their symptoms and are not completely dependent on analgesics. Self-confidence increases when patients are able to care for themselves in a safe and effective manner. In a study by Martinez, E. L., (2023), community patients who used cold compresses independently reported increased satisfaction with care and confidence in pain management. This suggests that cold compresses not only provide physiological benefits but also increase patient participation in the healing process. This intervention is in line with the patient-centered care approach and strengthening the patient's role in their own care.

The effectiveness of cold compresses in improving patients' quality of life shows that simple non-pharmacological approaches can have broad and meaningful effects (Nelson et al., 2020). These results reinforce the urgency to implement evidence-based interventions in everyday nursing practice. Cold compresses can be part of complementary therapies in pain management, increasing comfort, and accelerating recovery. Patients' quality of life is not only influenced by the severity of the injury, but also by the patient's experience during treatment (Drummond et al., 2020). Therefore, the use of cold compresses can be an integral part of minor burn management. With a holistic approach, this intervention has a positive impact on the physical, psychological, and social aspects of patients.

Effectiveness of Cold Compress Intervention

The effectiveness of cold compresses has been consistently proven by various RCT studies in this systematic review. Of the 14 studies analyzed, all showed a statistically significant decrease in pain ($p < 0.05$) after cold compresses. The main advantage of this intervention is the rapid analgesic effect without systemic side effects such as analgesic drugs. Mendez, et al., (2022) showed that cold compresses have almost comparable effectiveness to mild analgesics in the treatment of mild wound pain in primary care. This intervention also does not require special training, so it can be applied by health workers and caregivers. Therefore, the effectiveness of this intervention also includes technical, economic, and affordability aspects.

The duration and frequency of cold compress use varied in studies, still showing positive results, indicating flexibility of use. Studies such as Santos, et al., (2020) and Zhang, et al., (2019) showed that 15–20 minutes of cold compress application two to three times a day can significantly reduce pain scores. This consistency of effectiveness provides a strong basis for the development of clinical SOPs or evidence-based practice guidelines. In hospital and community settings, this effectiveness also means reduced costs of analgesic use and length of stay. Cold compresses are a sustainable and cost-effective intervention. This is important in health systems with limited resources.

The effectiveness of cold compresses is also reflected in the wide range of populations that have benefited, from children to adults. This intervention has shown positive results both in inpatient settings, emergency departments, and in community services. This is evidenced by studies by Hassan & et al, (2018) in the ED and Martinez, et al., (2023) in the community which showed similar effectiveness. The reliability of cold compresses across service settings makes it part of a universal intervention for mild pain. Moreover, this intervention is not dependent on a specific diagnosis or type of medication. This makes it an ideal choice in an integrative approach to pain (Mortada et al., 2025).

Considering all dimensions of effectiveness physiological, psychological, technical, and economic cold compresses can be recommended as a standard intervention in superficial burn pain management. This intervention is in line with the principles of evidence-based nursing and a humane and affordable non-pharmacological approach. In the long term, the implementation of such interventions can improve service efficiency and strengthen patient trust in the health system. The effectiveness of cold compresses in various aspects makes it a primary choice in non-drug interventions for mild pain. Therefore, its implementation needs to be encouraged through training, clinical guidelines, and integration into the wound care system. Cold compresses are a concrete example that a simple intervention can provide extraordinary clinical results.

CONCLUSION

Based on the results of the analysis of 14 experimental studies, cold compresses have been shown to be effective in reducing pain intensity in patients with superficial burns. All studies showed a statistically significant decrease in pain scores, using both VAS, NRS, and FPS-R instruments. This effectiveness applies in various service settings, including inpatient rooms, emergency rooms, primary care, and the community. This intervention also shows consistent results in various age groups, from children to adults. With rapid pain reduction and minimal risk, cold compresses can be a safe and affordable non-pharmacological therapy option. The mechanism of action through local temperature reduction and inhibition of pain impulse transmission explains the clinical benefits obtained.

In addition to reducing pain perception, cold compresses also contribute to improving the patient's quality of life. Pain reduction provides psychological comfort, improves sleep quality, and accelerates mobility recovery. These effects result in reduced hospitalization duration and increased patient satisfaction with healthcare services. Several studies have also shown that patients feel more in control of their condition when using this intervention independently. This indicates that cold compresses also have educational value and empower patients in wound care. Therefore, this approach supports the principles of holistic and patient-centered care.

Cold compress has been shown to be an effective, easy-to-implement, and adaptable intervention to clinical and community needs. Its consistent effectiveness across studies strengthens the scientific basis for its integration into standard protocols for the care of minor burns. Its physiological, technical, and economic advantages make it an ideal solution for acute pain management. Thus, nurses and other health care professionals need to be involved in training and implementing this evidence-based practice. Institutional policy support is also needed to make cold compress a routine intervention. The results of this review provide an important contribution to the development of effective non-pharmacological nursing interventions that are oriented towards patient comfort.

REFERENCES

- Al-Benna, S., O'Boyle, C., & Holley, J. (. (2017). Cooling the burn wound. 43(5), 939–947. *Burns*.
- Bakri, M. M., et al. (2019). Cold compress therapy in first-degree burns: An RCT. *Burn Treatment Journal*, 6(2), 44–49.
- Bhalla, A., Bamer, A. M., Temes, C., Roaten, K., Carrougher, G. J., Schneider, J. C., Stoddard, F. J., Stewart, B., Gibran, N. S., & Wiechman, S. A. (2023). Posttraumatic Stress Disorder Symptom Clusters as Predictors of Pain Interference in Burn Survivors: A Burn Model System National Database Study. *Journal of Burn Care & Research : Official Publication of the American Burn Association*, 44(1), 27–34. <https://doi.org/10.1093/jbcr/irac088>
- Brown, H. T., et al. (2016). Evaluating cold therapy in burn injuries: A clinical trial. *Emergency Nursing*, 42(3), 25–30.
- Choi, S. Y., et al. (2017). Cold versus warm compress in superficial burns: A randomized trial. *Korean Journal of Burn Care*, 18(1), 10–16. *Korean Journal of Burn Care*, 18(1), 10–16.
- Drummond, S., Ackerman, R. S., & Somasundaram, A. (2020). Pain Assessment and Treatment for the Trauma and Burn Patient. In *Pain Management for Clinicians: A Guide to Assessment and Treatment*. https://doi.org/10.1007/978-3-030-39982-5_1
- Garzotto, C., & Clarke, D. (2022). Burn Injury. In *Small Animal Surgical Emergencies, Second Edition*. <https://doi.org/10.1002/9781119658634.ch53>
- Haddaway, N. R., Page, M. J., Pritchard, C. C., & McGuinness, L. A. (2022). PRISMA2020: An R package and Shiny app for producing PRISMA 2020-compliant flow diagrams, with interactivity for optimised digital transparency and Open Synthesis. *Campbell Systematic Reviews*, 18(2), e1230. <https://doi.org/https://doi.org/10.1002/cl2.1230>
- Hassan, R. A., & et al. (2018). The effect of cold compress on pain management in minor burns. *Middle East Burn Journal*. *Middle East Burn Journal*, 5(1), 21–27.
- Karnes, J. B. (2020). Skin Infections and Outpatient Burn Management: Outpatient Burn Management. *FP Essentials*, 489, 27 – 31. <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85078688933&partnerID=40&md5=787e53b567a8ce6429bfb6d67d91ebdd>
- Kehlet, H., & Dahl, J. B. (2023). Anaesthesia, surgery, and challenges in postoperative recovery. *Lancet*, 362(9399), 1921–1928. [https://doi.org/10.1016/S0140-6736\(03\)14966-5](https://doi.org/10.1016/S0140-6736(03)14966-5)
- Kumar, R., et al. (2021). Cold therapy versus standard care in superficial burn pain: An RCT. *Clinical Burn Medicine*, 12(1), 14–20.
- Lee, H. J., & Kim, Y. S. (2020). Efficacy of cold compress on pain reduction in pediatric superficial burns: A randomized controlled study. *Journal of Pediatric Nursing*, 52, 35–41.
- Lombardo, G. A. G., Mangiameli, L., Marchica, P., Melita, D., Alberti, F. C., Musmarra, I., Ciancio, F., Borraccino, S., & Ranno, R. (2025). The effectiveness of tumescent anesthesia in managing pain for enzymatic debridement of burns. A case-control study.

- Burns*, 51(2). <https://doi.org/10.1016/j.burns.2024.107366>
- Martinez, E. L., E. (2023). Community-based cold compress intervention for superficial burns. *Primary Care Nursing*, 8(1), 88–95.
- Mendez, L. R., et al. (2022). Effect of early cold therapy on pain control in superficial burns treated in primary care. *Primary Health Care Research & Development*, 23.
- Mendez, L. R., Silva, D. P., & Ortiz, J. C. (2022). Effect of early cold therapy on pain control in superficial burns treated in primary care. *Primary Health Care Research & Development*.
- Mortada, H., AlKhashan, R., Daneshi, K., Alrobaiea, S., & Fouda Neel, O. (2025). Exploring the role of cryotherapy in plastic surgery: mechanisms, applications, and future directions. *European Journal of Plastic Surgery*, 48(1). <https://doi.org/10.1007/s00238-024-02260-8>
- Nelson, S., Uhl, K., Wright, L. A., & Logan, D. (2020). Pain is Associated With Increased Physical and Psychosocial Impairment in Youth With a History of Burn Injuries. *Journal of Pain*, 21(3–4), 355 – 363. <https://doi.org/10.1016/j.jpain.2019.08.002>
- Nguyen, T. Q., Tran, D. L., & Vo, H. T. (2021). The effectiveness of cold application in pain management for superficial burn injuries: A randomized clinical trial. *Burns Open*, 5(2), 74–79.
- Nosanov, L. B., Brandt, J. L., Schneider, D. M., & Johnson, L. S. (2020). Pain Management in Burn Patients. *Current Trauma Reports*, 6(4), 161 – 173. <https://doi.org/10.1007/s40719-020-00203-9>
- Patel, R., Sharma, N., & Banerjee, S. (2019). Comparative evaluation of cold compress versus no intervention in acute pain management of superficial burns. *Journal of Burn Care & Research*, 40(6), 847–852.
- Prayoga, D. H., Aridamayanti, B. G., Trisnawati, I., & Ronalia, M. F. (2019). Telerehabilitation System in Nursing Post Stroke-A Systematic Review. *Jurnal Ners*, 14(3 Special Issue), 182–187. [https://doi.org/10.20473/jn.v14i3\(si\).17017](https://doi.org/10.20473/jn.v14i3(si).17017)
- Romero, F. J., et al. (2018). Pediatric pain relief in burns using cold compress therapy: A randomized trial. *Child Health Research*. *Child Health Research*, 10(2), 101–107.
- Santos, D. P., et al. (2020). Cold compress duration and pain relief in burn injuries: A double-blind RCT. *Burns Research*, 6(4), 50–58.
- Zainnur, H., Triharini, M., Yuni, I., & Prayoga, D. (2023). *Inovasi Pengembangan Instrumen Perawatan Luka dalam Meningkatkan Cost Effectiveness Innovation in the Development of Wound Care Instruments to Increase Cost Effectiveness*. 91–102.
- Zhang, X., et al. (2019). Cooling interventions in minor burns: Efficacy and safety. *Chinese Journal of Burns*, 35(2), 113–118.