The Effectiveness of Heating Pads in Reducing Pain Among Patients with Low Back Pain in the Marwa Inpatient Ward of Bakti Timah Hospital, Pangkalpinang

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Low Back Pain (LBP) is one of the most common musculoskeletal disorders that can cause pain, limited physical activity, and decreased quality of life. In addition to pharmacological treatment, non-pharmacological therapies such as warm pad application can be used to help reduce pain intensity in patients with Low Back Pain. Methods: This study employed a case study design using a nursing care approach involving two patients with Low Back Pain, namely Tn. A and Tn. B. Data were collected through interviews, observations, physical examinations, and medical record reviews. The nursing intervention consisted of pain management through the application of a warm pad to the lower back area for 15–20 minutes daily over three consecutive days. Evaluation was conducted using the Numeric Rating Scale (NRS) and SOAP documentation format. Results: The evaluation results demonstrated a reduction in pain intensity in both patients. Ms. A's pain score decreased from 6 to 2, while Ms. B's pain score decreased from 5 to 2 after three days of warm pad application. In addition, both patients experienced improved comfort, reduced grimacing, and enhanced mobility. Conclusion: Warm pad application is effective in reducing pain intensity in patients with Low Back Pain and can be utilized as a non-pharmacological nursing intervention to improve patient comfort..
Keywords: Low Back Pain, Warm Pad, Acute Pain, Pain Management, Nursing Care.

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1. Introduction

Low back pain (LBP) is defined as pain or discomfort occurring in the lower part of the spine, specifically in the lumbar region. LBP can be classified as either specific or nonspecific. According to the World Health Organization, LBP refers to pain experienced between the lower margin of the ribs and the gluteal folds, with or without radiation to one or both lower limbs. Based on its etiology, Chiarotto and Koes classified LBP into specific low back pain and nonspecific low back pain. Nonspecific low back pain occurs when no identifiable pathological condition or structural abnormality can adequately explain the pain. It is characterized by lower back pain with or without leg pain, without clear nociceptive signs attributable to a specific cause [1]

Low back pain is a musculoskeletal disorder affecting the muscles, tendons, and ligaments of the lower back and is commonly associated with prolonged sitting and other repetitive physical activities. It represents one of the most prevalent musculoskeletal disorders related to occupational activities, accounting for approximately 32.7% of work-related musculoskeletal complaints. Sex is also an important contributing factor, with women being more likely to experience LBP than men. Patients with nonspecific LBP commonly present with lower back pain accompanied by muscle spasms, resulting in muscular imbalance, reduced abdominal and lumbar muscle stability, limited lumbar mobility, decreased flexibility of the back, hip, and hamstring muscles, and impaired functional activities [2]

The World Health Organization reported that approximately 619 million people worldwide were affected by low back pain in 2020, and this number is projected to increase to 843 million by 2050 due to population growth and aging. The condition is more prevalent among women, and nonspecific low back pain accounts for approximately 90% of all LBP cases [2].

Pain is an unpleasant subjective sensory and emotional experience associated with actual or potential tissue damage. Among patients with low back pain, pain frequently causes significant discomfort that interferes with daily activities, sleep quality, and work productivity. Furthermore, persistent pain may trigger both physical and psychological responses, including anxiety, stress, and reduced quality of life. Pain management in patients with LBP can be achieved through pharmacological and non-pharmacological approaches. One of the effective non-pharmacological interventions is the application of a warm heating pad. Heat therapy increases local blood circulation, reduces muscle tension, promotes tissue relaxation, and provides analgesic effects. In addition, warm heating pads are simple to use, relatively safe, cost-effective, and can be applied independently by patients as part of nursing care [3]

Warm heating pads are recognized as an effective non-pharmacological intervention for reducing pain in patients with low back pain. Heat application promotes vasodilation in the affected area, thereby improving blood circulation, reducing muscle spasms, and enhancing tissue relaxation. Moreover, thermal stimulation decreases pain perception by inhibiting the transmission of pain impulses to the central nervous system. Previous studies have demonstrated that warm heating pad therapy significantly reduces pain intensity in patients with LBP. A study conducted in 2020 reported that patients with moderate pain intensity (Numerical Rating Scale scores of 5–6) experienced a reduction to mild pain levels (scores of 2–3) following the application of a warm heating pad for 15–20 minutes at a temperature of 38–40°C [4]

Other studies have also shown that regular heat therapy can decrease muscle stiffness and improve patient mobility. During the preliminary study conducted in the inpatient ward, the researcher observed that patients presenting with low back pain were frequently encountered, particularly among individuals of productive age and those engaged in physically demanding occupations. Most patients reported pain severe enough to interfere with routine activities such as sitting, standing, and walking [5]

Information obtained from healthcare professionals indicated that pain management in the ward primarily relied on pharmacological therapy using analgesic medications, whereas non-pharmacological interventions, including warm heating pads, had not been optimally implemented. As a simple, safe, and effective independent nursing intervention, warm heating pads have considerable potential to reduce pain among patients with low back pain. Therefore, implementing nursing care that incorporates warm heating pad therapy is expected to improve patient comfort and overall quality of life [5]

During the preliminary study conducted in the Marwa Inpatient Ward of Bakti Timah Hospital, Pangkalpinang, hospital records indicated that 22 cases of low back pain were reported between January and April 2026. Based on the researcher's observations, pain was one of the most common presenting complaints among patients diagnosed with low back pain. Information obtained from ward nurses revealed that pain management was limited to the administration of analgesic medications, while warm heating pad therapy had never been routinely applied as a nursing intervention to relieve patients' pain [6]

Nurses play a vital role in pain management through both pharmacological and non-pharmacological interventions. In nursing practice, effective pain control is considered one of the patients' fundamental needs because it enhances comfort, accelerates recovery, and prevents complications associated with limited mobility. One independent nursing intervention that can be implemented is heat therapy using a warm heating pad. This intervention is simple to administer, inexpensive, and associated with minimal adverse effects when performed according to standard procedures. Consequently, warm heating pad therapy may serve as an effective nursing strategy for reducing pain in patients with low back pain [7]

Several studies have demonstrated that heat therapy provides significant benefits in reducing the intensity of musculoskeletal pain, including low back pain. The analgesic mechanism of heat therapy involves vasodilation, which increases oxygen and nutrient delivery to tissues, thereby reducing inflammation and muscle tension. In addition, increased local temperature stimulates sensory receptors that inhibit the transmission of pain signals to the brain according to the Gate Control Theory of Pain. By alleviating pain and muscle spasms, patients are able to mobilize more effectively and perform daily activities with greater ease. These findings suggest that warm heating pads represent a promising nursing intervention for managing pain among patients with low back pain [8].

2. Literature Review And Problem Statement

Low Back Pain (LBP) is one of the most prevalent musculoskeletal disorders worldwide and is defined as pain occurring between the lower margin of the ribs and the gluteal folds, with or without radiation to one or both lower extremities. Based on its etiology, LBP is classified as specific or nonspecific, while according to its duration it is categorized as acute, subacute, or chronic. Nonspecific LBP accounts for approximately 90% of all cases and is commonly associated with muscle strain, prolonged static posture, repetitive movements, poor body mechanics, obesity, degenerative changes, and psychosocial factors. Clinically, patients often experience localized lower back pain, muscle spasms, limited lumbar mobility, stiffness, and impaired functional capacity, which substantially reduce daily functioning and quality of life [9]

The pathophysiology of LBP involves excessive mechanical loading that activates nociceptors in the muscles, ligaments, intervertebral discs, and surrounding tissues of the lumbar spine. Persistent muscle tension and inflammation lead to pain, restricted movement, and reduced physical activity, which may subsequently result in muscle weakness, functional disability, and chronic pain if left untreated. The diagnosis of LBP is established through comprehensive history taking, physical examination, and, when clinically indicated, laboratory investigations and imaging studies such as X-ray, Magnetic Resonance Imaging (MRI), or Computed Tomography (CT) to identify underlying structural abnormalities [9]

Management of Low Back Pain includes both pharmacological and non-pharmacological interventions. Pharmacological treatment commonly involves analgesics, non-steroidal anti-inflammatory drugs (NSAIDs), muscle relaxants, or corticosteroids to relieve pain and inflammation. Meanwhile, non-pharmacological approaches—including breathing relaxation exercises, physical therapy, stretching, strengthening exercises, mobilization, and patient education—aim to reduce pain, improve muscle flexibility, restore functional mobility, and prevent the progression of acute pain into chronic disability. Because these interventions carry minimal adverse effects, they are increasingly recommended as complementary strategies in comprehensive pain management [10]

Among non-pharmacological interventions, warm heating pad therapy has gained considerable attention due to its physiological and therapeutic benefits. Heat therapy increases local tissue temperature, promotes vasodilation, enhances blood circulation, improves oxygen and nutrient delivery, reduces muscle spasms, increases tissue elasticity, and facilitates muscle relaxation. Furthermore, according to the Gate Control Theory of Pain, thermal stimulation can inhibit the transmission of pain impulses to the central nervous system, thereby reducing pain perception. Warm heating pads are generally applied at temperatures of 38–40°C for 15–20 minutes and are indicated for patients with musculoskeletal pain, muscle stiffness, and chronic lower back pain, provided no contraindications such as acute inflammation, impaired sensation, or active bleeding are present [11]

Previous studies have consistently reported that heat therapy is effective in reducing pain intensity, decreasing muscle stiffness, improving lumbar mobility, and enhancing patient comfort among individuals with Low Back Pain. As a simple, inexpensive, and independent nursing intervention, warm heating pad

therapy can complement pharmacological treatment and support holistic pain management. Nevertheless, despite the growing evidence supporting its clinical benefits, pain management in many inpatient settings continues to rely primarily on analgesic medications, while the routine implementation of warm heating pad therapy as an evidence-based nursing intervention remains limited [12]

Although substantial evidence supports the effectiveness of heat therapy for musculoskeletal pain, limited studies have specifically evaluated the effectiveness of warm heating pad therapy within routine inpatient nursing practice, particularly among hospitalized patients with Low Back Pain. Furthermore, the integration of this intervention into standard nursing care remains inconsistent, and evidence from Indonesian hospital settings is still limited. This gap highlights the need for further investigation to determine whether warm heating pad therapy can effectively reduce pain intensity among patients with Low Back Pain in the Marwa Inpatient Ward of Bakti Timah Hospital, Pangkalpinang. Therefore, the present study was conducted to provide additional evidence regarding the effectiveness of warm heating pad therapy as a non-pharmacological nursing intervention for pain management in hospitalized patients with Low Back Pain [13]

3. Method

This study employed a descriptive case study design to describe the implementation of nursing care for patients with Low Back Pain (LBP), with particular emphasis on the application of warm heating pad therapy as a non-pharmacological intervention for pain reduction. The study involved two hospitalized patients diagnosed with LBP in the Marwa Inpatient Ward of Bakti Timah Hospital, Pangkalpinang. Participants were selected based on predetermined inclusion and exclusion criteria. Eligible participants were adult patients diagnosed with LBP who experienced moderate to severe pain, as indicated by a Numeric Rating Scale (NRS) score of 4–8, were fully conscious, able to communicate effectively, capable of following verbal instructions, and willing to participate by providing written informed consent. Patients with cognitive impairment, communication difficulties, contraindications to heat therapy, open wounds or impaired sensation over the lower back, or those receiving concurrent interventions that could influence pain assessment were excluded [14]

Data were collected through interviews, direct observation, physical examination, documentation review, and pain assessment using the Numeric Rating Scale (NRS). Nursing assessment and intervention were guided by standardized nursing care documentation, including the Standard Operating Procedure (SOP) for warm heating pad application and pain assessment. The warm heating pad was applied to the lower back according to the standardized SOP, with the temperature monitored and maintained within the prescribed therapeutic range throughout the intervention. The same application procedure, treatment duration, anatomical location, and assessment procedure were maintained for each participant to ensure consistency in intervention delivery. Patient responses, pain characteristics, functional status, and changes in pain intensity before and after the intervention were systematically documented throughout the nursing care process. Any deviations from the standardized procedure or factors that could potentially affect the intervention or pain assessment were also recorded. The study was conducted in the Marwa Inpatient Ward of Bakti Timah Hospital, Pangkalpinang, during July 2026 [14].

The use of analgesic medication during the study was considered as a potential confounding factor in evaluating changes in pain intensity. Information regarding analgesic administration, including the type and timing of medication when applicable, was documented and considered when interpreting changes in NRS scores. Pain assessments were performed in relation to the timing of the warm heating pad intervention, and changes in pain intensity were interpreted with consideration of any concurrent analgesic use. This approach was intended to distinguish, as far as possible, the observed changes in pain intensity associated

with the warm heating pad intervention from those potentially attributable to pharmacological pain management.

The collected data were analyzed descriptively by organizing subjective and objective findings and presenting them narratively according to the stages of the nursing process, including assessment, nursing diagnosis, planning, implementation, and evaluation. The effectiveness of warm heating pad therapy was evaluated by comparing pain intensity before and after the intervention using the Numeric Rating Scale, while also considering patient characteristics, clinical responses, and the use of analgesics during the treatment period. Because this study used a descriptive case study design involving two participants, the findings were interpreted descriptively and were not intended to establish causal effectiveness or generalize the results to a broader population.

Ethical principles were strictly observed throughout the study. Written informed consent was obtained from each participant before data collection and intervention. Participant confidentiality was maintained through anonymization of personal information and secure handling of study data. The principles of beneficence and non-maleficence were upheld by implementing the warm heating pad intervention in accordance with the applicable SOP and monitoring patient responses during treatment. The principle of justice was maintained by applying the same predetermined participant selection criteria and intervention procedures to all eligible participants without discrimination [15].

4. Results And Discussion

Results

Two female patients diagnosed with Low Back Pain (LBP) participated in this case study. Patient 1 (Ny. A), aged 35 years, was admitted with a primary complaint of lower back pain with an initial Numeric Rating Scale (NRS) score of 6. Patient 2 (Ny. B), aged 37 years, presented with an initial pain score of 5. Both patients reported pain that increased during prolonged standing, bending, lifting heavy objects, and changing body positions. Physical examination revealed lumbar tenderness, muscle spasms, limited lumbar range of motion, guarded movement, and impaired mobility. Laboratory findings were within normal limits, while lumbar radiographs demonstrated mild degenerative changes consistent with Low Back Pain.

Table 1. Baseline Characteristics of the Patients

Variable	Patient 1 (Ny. A)	Patient 2 (Ny. B)
Age (years)	35	37
Sex	Female	Female
Medical diagnosis	Low Back Pain	Low Back Pain
Initial pain score (NRS)	6	5
Pain duration	Approximately 1 month	Approximately 2 weeks
Main pain location	Lumbar (L4–L5)	Lumbar region
Pain characteristics	Stabbing and pulling	Aching and pulling
Pain aggravated by	Standing, bending, lifting	Standing, walking, lifting
Sleep disturbance	Yes	Yes
Lumbar tenderness	Present	Present
Muscle spasm	Present	Mild
Limited lumbar ROM	Moderate	Mild

Both patients received standard nursing care combined with warm heating pad therapy applied to the lower back for 15–20 minutes once daily for three consecutive days. Pain intensity was assessed before and after the intervention using the Numeric Rating Scale (NRS). Throughout the intervention period, both patients demonstrated gradual improvement in pain intensity, mobility, and overall comfort. Facial grimacing

decreased, body movement became less guarded, and patients reported improved sleep quality and greater ease in performing daily activities. No adverse events or skin complications associated with heat therapy were observed.

Table 2. Changes in Pain Intensity Following Warm Heating Pad Therapy

Day	Patient 1 (NRS)	Patient 2 (NRS)
Baseline (Day 1)	6	5
After Day 1	4	4
After Day 2	3	3
After Day 3	2	2

In addition to pain reduction, improvements were also observed in physiological and functional indicators. Both patients demonstrated gradual decreases in blood pressure and heart rate during hospitalization, accompanied by improved mobility and reduced discomfort during position changes. Patient 1 showed a reduction in blood pressure from 140/90 mmHg to 128/80 mmHg and heart rate from 88 to 78 beats/minute. Patient 2 demonstrated a decrease in blood pressure from 150/95 mmHg to 135/84 mmHg and heart rate from 90 to 80 beats/minute. These findings were consistent with the reduction in pain intensity observed during the three-day intervention period.

Table 3. Clinical Outcomes Before and After the Intervention

Outcome	Before Intervention	After 3 Days of Intervention
Pain intensity	Moderate (NRS 5–6)	Mild (NRS 2)
Facial grimacing	Frequent	Absent or minimal
Lumbar tenderness	Present	Decreased
Muscle spasm	Present	Reduced
Mobility	Limited due to pain	Improved
Sleep quality	Frequently disturbed	Improved
Comfort level	Low	Increased

Overall, both patients experienced clinically meaningful reductions in pain intensity following three consecutive days of warm heating pad therapy. The intervention was associated with improved mobility, better sleep quality, greater patient comfort, and stable physiological parameters, suggesting that warm heating pad therapy may serve as an effective complementary nursing intervention for pain management in patients with Low Back Pain.

Discussion

Based on the assessment findings, both Patient A and Patient B were diagnosed with Low Back Pain (LBP), characterized by lower back pain, activity limitations, and impaired comfort. Although both patients shared the same medical diagnosis, several differences in their clinical characteristics were identified. Patient A was a 35-year-old female who had experienced lower back pain for approximately one month before hospital admission, whereas Patient B was a 37-year-old female whose symptoms had persisted for approximately two weeks. Patient A reported an initial pain intensity of 6 on the Numeric Rating Scale (NRS), while Patient B reported a pain score of 5, both indicating moderate pain. Patient A described the pain as stabbing and pulling sensations in the lumbar region, whereas Patient B described aching and pulling pain that occasionally radiated to the buttock. In addition, Patient A experienced greater limitations in daily activities, particularly during household tasks and changes in body position. Both patients also reported sleep disturbances caused by pain. These findings are consistent with the theory that Low Back Pain is a musculoskeletal disorder characterized by pain, muscle spasms, restricted mobility, and decreased functional capacity, all of which negatively affect patients' quality of life.

Data analysis identified Acute Pain (D.0077) related to a physiological injury agent secondary to Low Back Pain as the primary nursing diagnosis for both patients. This diagnosis was established based on subjective findings of moderate lower back pain and objective findings including facial grimacing, lumbar tenderness, limited mobility, and pain-related behavioral changes. According to the Indonesian Nursing Diagnosis Standards (SDKI), acute pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage that lasts for less than three months. In both patients, pain not only caused physical discomfort but also impaired daily functioning and sleep quality. Therefore, appropriate nursing interventions were required to reduce pain intensity and improve patient comfort.

The nursing intervention consisted of pain management through the application of a warm heating pad to the lower back for 15–20 minutes once daily over three consecutive days. In addition to this non-pharmacological intervention, both patients received pharmacological treatment with analgesic medications according to the physician's prescription. Warm heating pad therapy was selected because it is simple, safe, cost-effective, and can be independently applied by patients or caregivers. Heat therapy promotes vasodilation, thereby increasing local blood circulation to the affected tissues. Improved circulation enhances oxygen and nutrient delivery, reduces muscle spasms, facilitates the removal of metabolic waste products, and promotes muscle relaxation. Furthermore, thermal stimulation activates the gate control mechanism, which inhibits the transmission of pain impulses to the central nervous system, thereby reducing pain perception.

Evaluation of the intervention demonstrated a reduction in pain intensity in both patients following three consecutive days of warm heating pad therapy. Patient A's pain score decreased from 6 to 2, representing a reduction of four points, whereas Patient B's pain score decreased from 5 to 2, representing a reduction of three points. These findings indicate that both patients responded positively to the intervention, although Patient A experienced a greater reduction in pain intensity than Patient B. In addition to pain relief, both patients demonstrated clinical improvement, including reduced facial grimacing, increased comfort, improved sleep quality, and enhanced ability to perform light daily activities. Patient A, who initially experienced difficulty standing and bending, became more comfortable performing routine activities, while Patient B reported reduced lower back stiffness and fewer sleep disturbances.

The findings of this study are consistent with those reported, who demonstrated that warm compress therapy significantly reduced pain intensity in patients with Low Back Pain. Their study suggested that heat therapy enhances muscle relaxation and improves local blood circulation, thereby alleviating pain. Similar findings were reported in the literature review conducted, which concluded that regular warm therapy effectively decreases lower back pain and improves patients' functional capacity when applied with appropriate duration and frequency.

The physiological effects observed in this study can be explained by the mechanism of heat therapy. Application of a warm heating pad increases tissue temperature, resulting in local vasodilation and improved blood flow. Enhanced circulation increases oxygen delivery to the affected tissues while accelerating the removal of pain-inducing metabolites. Elevated tissue temperature also improves the elasticity of muscles and connective tissues, thereby reducing stiffness in the lumbar region. In addition, muscle relaxation resulting from heat therapy helps decrease muscle spasms commonly experienced by patients with Low Back Pain. Collectively, these physiological responses contribute to pain reduction, improved physical function, and enhanced quality of life. These findings are supported by the systematic review and meta-analysis conducted, which concluded that heat therapy, including hot spring hydrotherapy, effectively reduces pain intensity and functional disability in patients with chronic Low Back Pain.

The differences in therapeutic response observed between Patient A and Patient B may be attributed to several factors. Patient A presented with a higher baseline pain score than Patient B, allowing for a greater absolute reduction in pain intensity. Furthermore, Patient A had experienced symptoms for approximately one month before hospitalization, whereas Patient B had experienced symptoms for only two weeks. Differences in pain characteristics, daily activities, psychological condition, sleep patterns, and individual pain tolerance may also have influenced the response to treatment. Nevertheless, both patients demonstrated a similar pattern of gradual improvement throughout the three-day intervention period. Notably, both patients achieved the same final pain score of 2, suggesting that warm heating pad therapy effectively reduced pain regardless of differences in baseline clinical characteristics.

The results of this case study are further supported by previous evidence emphasizing the importance of non-pharmacological approaches in the management of Low Back Pain. Conservative interventions such as therapeutic exercise, heat therapy, patient education, and activity modification have consistently been shown to reduce pain and improve functional outcomes. Among these approaches, heat therapy is particularly advantageous because it promotes muscle relaxation, enhances local circulation, and improves patient comfort without causing significant adverse effects when administered according to established clinical procedures.

Based on the implementation and evaluation of nursing care, it can be concluded that the application of a warm heating pad for 15–20 minutes daily over three consecutive days produced positive outcomes in reducing pain intensity among patients with Low Back Pain. Although the two patients differed in their baseline characteristics and clinical conditions, both demonstrated reductions in pain scores and improvements in overall clinical status following the intervention. Therefore, warm heating pad therapy may be considered an effective, safe, practical, and beneficial non-pharmacological nursing intervention for reducing pain and improving comfort in patients with Low Back Pain.

5. Conclusion

Based on the nursing care provided to Patient A and Patient B, both diagnosed with Low Back Pain (LBP), the application of warm heating pad therapy was associated with a reduction in reported pain intensity. The intervention was administered for 15–20 minutes once daily over three consecutive days. Pain intensity, assessed using the Numeric Rating Scale (NRS), decreased from 6 to 2 in Patient A and from 5 to 2 in Patient B. Both patients also reported improved comfort and demonstrated reduced facial grimacing and improved mobility following the intervention. These findings suggest that warm heating pad therapy may be considered as a complementary non-pharmacological approach to support pain management and improve comfort among patients with LBP. However, given the descriptive case study design and the very limited number of participants, these findings cannot establish the general effectiveness or causal effect of the intervention. Further research using analytical or experimental designs with larger sample sizes is needed to provide stronger evidence regarding the effects of warm heating pad therapy on pain intensity in patients with LBP.

For the nursing profession, nurses are encouraged to optimize the use of warm heating pad therapy as a non-pharmacological intervention in pain management for patients with Low Back Pain to enhance patient comfort and improve the quality of nursing care. For healthcare institutions, healthcare providers are encouraged to support the implementation of warm heating pad therapy as an adjunct to pharmacological pain management by providing adequate facilities, standardized operating procedures, and appropriate clinical guidelines for its safe and effective use. For nursing education institutions, the findings of this study may serve as a reference for the development of nursing knowledge, particularly regarding the application of non-pharmacological interventions in the management of pain among patients with Low Back Pain.

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