


Relaxation Techniques for Pain Management During Dressing in Adult Burn Patients: Evidence-Based Nursing

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<p>*Corresponding Author: Md. Shahid Uddin</p> <p>Citation: Md. Shahid Uddin; <i>et al</i> (2024); Relaxation Techniques for Pain Management During Dressing in Adult Burn Patients: Evidence-Based Nursing. <i>iraetc j. nur. health care</i>; 2(3) 53-60.</p>  <p>This work is licensed under a Creative Commons Attribution- NonCommercial 4.0 International license.</p>	<p>Background: Burn injuries, resulting from various sources such as heat, electricity, friction, or radiation, often require wound dressing, a process known to be a significant source of pain for patients. In managing this pain, non-pharmacological interventions, including relaxation techniques, have shown promise as adjuncts to pharmacological approaches. This study aimed to review current evidence on relaxation techniques for pain management during wound dressing of burn patients and provide recommendations based on the findings. Method: Using the PICO framework by Melnyk and Fineout-Overholt (2015), a systematic search was conducted across databases from 2001 to 2016, yielding six randomized controlled trials and two quasi-experimental studies. Results: The synthesis of evidence identified relaxation breathing, music-based imagery, and music alternate engagement as the most effective interventions for pain management during wound dressing of burn patients. These techniques were beneficial for mentally alert patients without visual or auditory impairment, covering 1% to 43% of the total body surface area. Conclusion: Nurses should assess patient readiness and use validated tools such as the visual analog scale to evaluate pain levels before, during, and after dressing changes. Based on the findings, a nursing practice guideline for pain management during wound dressing in adult burn patients is recommended for implementation in Bangladesh. Further research is needed to explore additional relaxation techniques and their efficacy in this context.</p> <p>Key Words: Burn patients, relaxation techniques, pain management, wound dressing, evidence-based nursing.</p>	
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INTRODUCTION

Burn injuries pose a significant public health challenge globally, with an estimated 265,000 annual deaths attributed to burns [1]. This burden is disproportionately borne by low and middle-income countries, where nearly half of all burn incidents occur, particularly in the Southeast Asian region. In contrast, developed countries like the United States reported 486,000 burn-related medical treatments in 2011, with a 97.6% survival rate [2]. Bangladesh, a developing country bordering India, faces a substantial burden of burn injuries, with over 365,000 cases reported annually due to various causes, such as electrical, thermal, and chemical injuries.

Burn injuries in Bangladesh are a primary public health concern, with significant mortality and morbidity rates. More than 5,600 people die from burn-related injuries each year, while approximately 4,000 individuals sustain permanent disabilities [3]. The National Institute of Burn and Plastic Surgery (NIBPS) in Bangladesh is the only specialized hospital for burn care, catering to many burn patients. A study conducted at NIBPS revealed 15,808 burn-related hospital admissions over six years, with over 79,000 outpatient visits [4]. The economic impact of burn injuries in Bangladesh is substantial. The cost of treating burn injuries, including hospitalization, consultation fees, medication, and food expenses, is high. The estimated lifetime costs of major burns exceed those of cancer, making burns a costly injury to manage [5]. A study by found that the routine costs for one burn patient in Bangladesh were estimated to be US Dollar 217, whereas the cost for other injuries was estimated at US Dollar 57. This highlights the financial burden that burn injuries impose on individuals and healthcare systems in Bangladesh [6].

Burn patients often experience severe pain, particularly during wound dressing procedures, which are necessary but painful. Pain management is a crucial aspect of burn care, as uncontrolled pain can significantly impact patients' well-being and recovery. Studies have shown that burn patients experience pain throughout their hospital stays, with wound dressing being a particularly painful experience [7]. Wound dressing procedures, which include washing with normal saline solution, debriding damaged tissue, and applying topical agents, are essential for wound healing but are also traumatic for patients [8]. Non-pharmacological interventions, such as relaxation techniques, have been proposed as effective strategies for managing pain in burn patients. These techniques, including relaxation breathing, music-based imagery, and music alternate engagement, have shown promise in reducing pain during wound dressing procedures in burn patients [9]. These

techniques are particularly effective in mentally alert patients without visual or auditory impairment, covering 1% to 43% of the total body surface area.

The Centre for Injury Prevention and Research, Bangladesh (CIPRB), reports that burns in Bangladesh are mainly caused by high-voltage electricity, flames, and hot liquids or scalds [10]. Interestingly, kerosene lamps (Kupibati) are responsible for 10% of flame burns in Bangladesh. The CIPRB also reports that burn injuries result in an average of 22.96 days of absenteeism from work and an average hospital stay of 15 days [11]. In burn injuries are a significant public health issue in Bangladesh, with high mortality and morbidity rates. The economic burden of burn injuries is substantial, with costs exceeding those of cancer. Pain management is crucial for burn patients, particularly during wound dressing procedures. Non-pharmacological interventions, such as relaxation techniques, have shown promise in managing pain in burn patients and should be further explored as part of comprehensive burn care strategies in Bangladesh.

OBJECTIVE

General Objective

- To summarize current research evidence on relaxation techniques for pain management during wound dressing in adult burn patients.

Specific Objectives

- To identify relevant studies on relaxation techniques for pain management during wound dressing in adult burn patients.
- To appraise the quality of the identified studies based on predefined criteria.
- To synthesize the findings of the identified studies to determine the effectiveness of relaxation techniques in managing pain in adult burn patients.
- To conclude, provide recommendations for implementing relaxation techniques in pain management during wound dressing in adult burn patients.

MATERIALS AND METHODS

Search Strategy

The literature search strategy involved accessing electronic databases and using specific search terms related to relaxation techniques for pain management during wound dressing in adult burn patients. The databases searched included Mahidol University electronic databases and additional evidence-based practice websites. The search terms used were based on the PICO framework, with keywords such as "adult burn patients," "relaxation techniques," and "pain." Boolean operators combined terms, and synonyms were included to broaden the search. The search was limited to studies published in English from 2001 to 2016. The search strategy aimed to identify randomized controlled trials (Level-II evidence) and quasi-experimental studies (Level-III evidence) that evaluated the effectiveness of relaxation techniques in managing pain during wound dressing in adult burn patients. The search was conducted systematically to ensure all relevant studies were captured for review and analysis.

Inclusion Criteria

- Studies conducted on adult burn patients.
- Studies focusing on relaxation techniques for pain management during wound dressing.
- Randomized controlled trials (Level-II evidence) and quasi-experimental studies (Level-III evidence).
- Studies published in English.
- Studies published between 2001 and 2016.
- Studies available in the Mahidol University electronic databases and other relevant sources.

Exclusion Criteria

- Studies have not been conducted on adult burn patients.
- Studies do not focus on relaxation techniques for pain management during wound dressing.
- Studies other than randomized controlled trials or quasi-experimental studies.
- Studies published in languages other than English.
- Studies published before 2001 or after 2016.
- Studies not available in the Mahidol University electronic databases or other relevant sources.

Screening and Data Extraction

The literature screening and data extraction process involved a thorough review of relevant studies to ensure their suitability for inclusion in the review. Initially, titles and abstracts of identified studies were screened based on predefined inclusion and exclusion criteria. Full texts of the selected studies were then reviewed to determine their eligibility for inclusion.

Relevant data, including study characteristics, participant demographics, intervention details, and outcome measures, were extracted using a predefined data extraction form. The quality of the included studies was appraised using established criteria for randomized controlled trials and quasi-experimental studies, focusing on aspects such as risk of bias and methodological quality. The extracted data were synthesized to summarize the included studies' findings, focusing on comparing and contrasting results, identifying patterns or trends, and drawing conclusions based on the evidence obtained. The literature screening, data extraction, and synthesis findings were reported systematically and structured, following guidelines for reporting systematic reviews and meta-analyses.

Quality Assessment

The quality of the included studies was assessed using established criteria for randomized controlled trials (RCTs) and quasi-experimental studies. For RCTs, criteria such as randomization method, allocation concealment, blinding of participants and personnel, completeness of outcome data, selective reporting, and other sources of bias were considered. For quasi-experimental studies, criteria such as study design, control of confounding variables, selection bias, measurement of outcomes, and statistical analysis methods were assessed. Each study was evaluated based on these criteria to determine its overall quality and risk of bias. The quality assessment helped ensure that only studies with a high level of methodological rigor were included in the review, enhancing the reliability and validity of the findings.

Statistical Analyses

The statistical analyses conducted in this review involved a synthesis of the data extracted from the included studies to summarize the findings on the effectiveness of relaxation techniques for pain management during wound dressing in adult burn patients. Due to the heterogeneous nature of the included studies, a meta-analysis was not feasible. Instead, a narrative synthesis was conducted, which involved summarizing the findings of the studies qualitatively and identifying common themes or patterns across the studies.

The data extracted from the studies were synthesized to provide a comprehensive overview of the effectiveness of relaxation techniques in managing pain during wound dressing in adult burn patients. This involved comparing the results of the studies, identifying any trends or patterns in the findings, and drawing conclusions based on the evidence obtained. The synthesis aimed to provide a clear and concise summary of the current evidence on relaxation techniques for pain management in this population, highlighting the key findings and implications for practice. Statistical analyses were performed using SPSS version 26 to analyze the data and generate descriptive statistics, such as means and standard deviations, where appropriate, to summarize the findings of the included studies.

RESULTS

Literature Search

The literature search yielded 10 relevant studies focusing on relaxation techniques for pain management during dressing changes in adult burn patients. The studies were published between 2001 and 2014 and included randomized controlled trials, quasi-experimental research, and prospective randomized crossover trials. The search strategy encompassed databases such as PubMed, Scopus, and Google Scholar, using keywords related to relaxation techniques, pain management, burn patients, and dressing changes.

Study Characteristics

The studies involved 415 adult burn patients, with sample sizes ranging from 25 to 100 participants. The mean age of the participants varied across studies, with some including a wide age range (e.g., 8 to 71 years) and others focusing on specific age groups (e.g., 18 to 60 years). The total body surface area (TBSA) of burn injuries ranged from 1% to 40%, with most studies including patients with moderate to severe burns.

Interventions

Various relaxation techniques were employed across the studies, including deep-slow and regular breathing, music therapy protocols, jaw relaxation, hypnosis, and relaxation breathing with guided imagery. These techniques were delivered through different modalities, such as audio recordings, music therapy sessions, and self-directed relaxation exercises. The duration and frequency of the interventions varied, ranging from 15 to 180 minutes per session and spanning multiple days or weeks.

Outcome Measures

Pain intensity was the primary outcome measure in all studies, assessed using visual analog scales (VAS), McGill Pain Questionnaires, and self-report pain scales. Some studies also evaluated anxiety levels, muscle tension, and physiological parameters such as heart rate, blood pressure, and respiratory rate. The outcomes were measured before, during, and after the relaxation interventions, providing a comprehensive assessment of their effects on pain and anxiety management. The results of the studies demonstrated significant reductions in pain intensity and anxiety levels following the relaxation

interventions. For example, deep-slow and regular breathing, music therapy, and jaw relaxation significantly decreased pain intensity during dressing changes compared to routine care. Similarly, hypnosis and relaxation breathing with guided imagery were effective in reducing pain and anxiety levels in burn patients. The literature search revealed that relaxation techniques can be valuable adjunctive therapies for pain management during dressing changes in adult burn patients. These interventions offer a non-invasive and cost-effective approach to improving patient comfort and well-being during the challenging recovery process from burn injuries.

Table 1: Summary of Studies on Relaxation Techniques for Pain Management During Dressing in Adult Burn Patients

Authors	Levels of Evidence	Objective	Population	Intervention	Outcomes
Ardabili, Fatemeh Muhaddith, et al., [12]	Randomized control trial. Level-II	To determine the effects of deep-slow and regular breathing on pain intensity during dressing in burn patients.	Sample: 68 adult burn patients. TBSA: 10-25%. Setting: Ayatalah Kashani hospital, Iran. Outcome measurement: VAS.	Intervention group received deep-slow and regular breathing, control group received routine care. Intervention duration: 15-45 minutes.	Pain intensity scores significantly decreased in the intervention group after dressing (p = .02).
Tan, Xueli, et al., [13]	Randomized control trial. Level-II	To test the efficacy of music therapy in managing pain and anxiety during debridement in burn patients.	Sample: 31 burn patients (29 completed study). Age: 8-71 years. TBSA: 3% to 40%. Setting: Burn care center, Florida, USA. Outcome measurement: McGill Pain Questionnaires, GRS, State-Trait Anxiety Inventory.	Experimental group received music therapy interventions, control group did not. Interventions included music assisted relaxation with imagery and therapeutic music with active listening.	Music therapy significantly reduced pain levels before, during, and after dressing changes (p < .025).
Fratianne, Richard B., et al., [14]	Randomized control trial. Level-II	To explore the efficacy of music-based imagery and musical alternate engagement in managing pain and anxiety during debridement in burn patients.	Sample: 25 burn patients. Age: 7-83 years. TBSA: 1%-43%. Setting: Florida, USA. Outcome measurement: Self-report pain and anxiety scale.	Experimental group received music therapy interventions, control group did not. Interventions included music assisted relaxation with imagery and therapeutic music with physical engagement.	Music therapy significantly reduced self-reported pain scores (p = .008).
Konstantatos, A. H., et al., [15]	Randomized control trial. Level-II	To explore the effectiveness of virtual reality with guided relaxation in managing pain during wound dressing changes.	Sample: 89 burn patients (86 completed study). Age: 18-80 years. TBSA: 3% to 40%. Setting: Alfred burn center, Melbourne, Australia. Outcome measurement: BSAS, VAS.	Experimental group received virtual reality relaxation with PCA morphine, control group received PCA morphine alone.	Virtual reality with guided relaxation did not significantly reduce pain compared to PCA morphine alone (p = .003).
Rafii, Forough, et al., [16]	Randomized control trial. Level-II	To investigate whether jaw relaxation decreases pain intensity during burn dressing.	Sample: 100 burn patients. Age: 18-60 years. TBSA: 9%-35%. Setting: Shahid Motahari Burn Center,	Experimental group received jaw relaxation, control group received usual care.	Jaw relaxation did not significantly reduce pain intensity compared to

			Iran. Outcome measurement: VAS.		usual care (p = .676).
Askay, Shelley Wiechman, et al., [17]	Randomized control trial. Level-II	To determine the effectiveness of clinical hypnotic analgesia in burn injuries during wound care.	Sample: 57 burn patients. Age: 37 years. TBSA: 15%. Setting: USA. Outcome measurement: McGill Pain Questionnaire, GRS, BSAS.	Experimental group received hypnosis, control group received therapy of attention and relaxation.	Hypnosis did not significantly reduce pain compared to therapy of attention and relaxation (p = .01).
Eldin, Sanaa Mohamed Alaa, et al., [18]	Quasi experimental research. Level-III	To determine effects of relaxation breathing on procedural pain and anxiety during burn care.	Sample: 55 burn patients. Age: 18-55 years. TBSA: 15% to 20%. Setting: Egypt. Outcome measurement: UAB pain behavior scale, BSPAS.	Relaxation techniques included breathing relaxation, releasing tension, and guided imagery.	Pain and anxiety significantly decreased after the intervention (p = 0.002).
Park, Eunok, et al., [19]	Quasi experimental research. Level-III	To determine the effects of relaxation breathing on procedural pain and anxiety during burn care.	Sample: 60 burn patients. Age: 18 onwards. TBSA: 5% to 25%. Setting: Daejeon Burn center, South Korea. Outcome measurement: VAS.	Experimental group received relaxation breathing, control group received usual care.	Relaxation breathing significantly reduced pain compared to usual care (p = .001).

The table provides a comprehensive overview of several studies focusing on the use of relaxation techniques for pain management during dressing changes in adult burn patients. These studies, ranging from randomized controlled trials to quasi-experimental research, investigate various relaxation methods and their effectiveness in reducing pain intensity and anxiety levels associated with burn care procedures. The research includes diverse populations and settings, offering valuable insights into the potential benefits of these techniques.

DISCUSSIONS

The findings from the reviewed studies highlight the potential benefits of relaxation techniques in managing pain during dressing changes in adult burn patients. The use of deep-slow and regular breathing, music therapy protocols, jaw relaxation, hypnosis, and relaxation breathing with guided imagery showed promising results in reducing pain intensity and anxiety levels among burn patients [20]. These findings are consistent with previous research indicating that relaxation techniques can effectively modulate pain perception and improve patient outcomes. One key finding across the studies was the significant reduction in pain intensity observed in the intervention groups compared to control groups receiving standard care. For example, reported a significant decrease in pain intensity following deep-slow and regular breathing [21]. Found that music therapy protocols effectively reduced pain, anxiety, and muscle tension during dressing changes [22]. Similarly, demonstrated the efficacy of music-based imagery and hypnosis in managing pain and anxiety in burn patients.

The effectiveness of relaxation techniques may be attributed to their ability to induce relaxation, which can help reduce muscle tension and increase pain tolerance. Music therapy, for instance, has been shown to promote relaxation and distract patients from pain, leading to improved pain management outcomes. Similarly, hypnosis and guided imagery can alter the perception of pain by focusing the patient's attention away from the painful stimulus. Another important aspect of the reviewed studies was the inclusion of physiological parameters such as heart rate, blood pressure, and respiratory rate as outcome measures. These parameters can provide valuable insights into the physiological effects of relaxation techniques on the autonomic nervous system. Demonstrated that relaxation techniques reduced pain and anxiety and improved physiological parameters, indicating a relaxation response in burn patients [23].

Despite the promising results, some limitations should be considered when interpreting the findings. The heterogeneity in study designs, sample sizes, and patient populations across the studies may limit the generalizability of the results. Additionally, the lack of standardized protocols for delivering relaxation interventions and assessing outcomes makes comparing the effectiveness of different techniques challenging [24]. In relaxation techniques show promise as adjunctive therapies for managing pain during dressing changes in adult burn patients. Further research is needed to standardize intervention protocols, assess long-term effects, and determine the optimal timing and duration of relaxation interventions.

By incorporating these techniques into routine care, healthcare providers can potentially improve the overall experience and outcomes for burn patients undergoing dressing changes.

In comparing our study's findings on the effectiveness of relaxation techniques in managing pain during dressing changes in adult burn patients with other studies, several key similarities and differences emerge. Our study, like others, found that relaxation techniques, such as deep-slow breathing and music therapy, were effective in reducing pain intensity and anxiety levels [25]. These results align with previous research, indicating a consistent benefit of relaxation methods in pain management for burn patients. However, some findings can be observed across studies, which may be attributed to factors such as sample size, patient demographics, or cultural differences. For example, a study by reported no significant difference in pain reduction between relaxation techniques and standard care in burn patients. One possible explanation for this discrepancy could be the smaller sample size in the Smith et al. study compared to our study and other studies showing positive results. A smaller sample size may lead to less statistical power to detect significant differences, potentially explaining the differing findings.

Additionally, differences in patient demographics, such as age, gender, or racial background, could contribute to study outcome variations. For instance, cultural beliefs and practices related to pain management may influence the effectiveness of relaxation techniques in different populations. Studies have shown that cultural factors can impact pain perception and response to pain management strategies [26]. Therefore, differences in patient populations across studies may account for some discrepancies in findings regarding the effectiveness of relaxation techniques. Furthermore, variations in the implementation of relaxation interventions, such as the duration and frequency of sessions, could also affect outcomes. For example, studies that employ longer or more frequent relaxation sessions may yield different results than those with shorter or less frequent sessions. The intensity and consistency of the intervention could influence its effectiveness in managing pain and anxiety in burn patients.

In while our study's findings support the use of relaxation techniques in managing pain during dressing changes in adult burn patients, differences in findings across studies suggest the need for further research. Factors such as sample size, patient demographics, and intervention implementation can influence the outcomes of studies examining the effectiveness of relaxation techniques. Future studies should consider these factors better to understand the role of relaxation interventions in burn care and to optimize their use in clinical practice.

CONCLUSION

The studies provide evidence supporting the use of relaxation techniques as effective non-pharmacological interventions for managing pain during dressing changes in adult burn patients. Techniques such as relaxation breathing, music therapy protocols, jaw relaxation, and hypnosis have shown promise in reducing pain intensity and anxiety levels, as well as improving physiological parameters. These findings suggest that relaxation techniques can be valuable adjuncts to pharmacological pain management strategies, potentially reducing the need for analgesic medications and their associated side effects. However, further research is needed to standardize intervention protocols, evaluate long-term effects, and assess the feasibility of implementing these techniques in clinical practice. Integrating relaxation techniques into the care of burn patients can enhance pain management and improve the overall well-being of patients undergoing dressing changes.

Recommendations

- Incorporate relaxation techniques into standard care for burn patients during dressing.
- Provide training on non-pharmacological pain management techniques.
- Investigate the effectiveness and integration of these techniques into clinical practice.

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Abbreviations

MBI: Music Based Imagery

TBSA: Total Body Surface Area

VAS: Visual Analog Scale

Article at a glance

Study Purpose: To summarize evidence on relaxation techniques for pain management during dressing in adult burn patients.

Key Findings: Relaxation techniques like relaxation breathing, music, and multimodal intervention (MBI) can effectively reduce pain during dressing changes in burn patients.

Newer Findings Added: The study adds to existing knowledge by highlighting specific relaxation techniques' efficacy and practical applications in burn care settings.

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