

The Effectiveness of Non-Pharmacological Methods in the Management of Wound Dressing Pain: A Systematic Review

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ABSTRACT

Wound dressing changes can be painful experiences for patients. This study aims to systematically analyze the research conducted on the non-pharmacological methods used for the management of dressing pain.

The study includes research published in the CINAHL, EBSCO, Medline, Pubmed, Cochrane, Ovid, Science Direct, Scopus, Web of Science, and Wiley Online Library databases between 2010-2022 and used non-pharmacological wound pain, dressing change pain, complementary therapies in wound pain, and wound dressing pain management as keywords to arrive at a total of 863 studies. Of these, the article evaluates the 25 studies that met the inclusion criteria.

At 80.77%, burn wounds were the most studied wound type in the included research. Of the studies, 60% were performed on adult patients, and 69.23% were randomized controlled clinical trials. The most commonly used methods were distraction (20%), virtual reality (20%), and music therapy (20%).

Using non-pharmacological methods can help reduce pain and pain-related anxiety during dressing changes. Clinics should develop protocols for the implementation of non-pharmacological methods and take into consideration patients' experiences and preferences regarding non-pharmacological methods.

Keywords: Wound pain, pain management, dressing change pain, non-pharmacological methods

INTRODUCTION

A wound may be defined as any disruption of the integrity of skin, mucous membrane, or organ tissue (1). The aim of wound care is the correction of impaired functional or anatomical structure as soon as possible, as well as the prevention and reduction of pain and edema. Dressing changes can be painful experiences for patients (2).

Dressing pain develops as a result of reasons such as not being gentle with the tissues during dressing, not performing the procedure carefully, and not using appropriate dressing material. The literature has determined the conditions that trigger pain during dressing change to be contact of the wound with air during dressing removal, cold dressing solutions, removal of dressing that has adhered to the wound, maceration of the wound and surrounding tissue, use of inappropriate wound care materials, and debridement (3,4). Practitioners have reported

dressing change to be the most painful aspect of the dressing procedure. This is particularly problematic where the dressing sticks to the wound or removal of the dressing tears the skin (5). Effectively relieving pain and providing patients with a less painful or painless wound-healing environment should be the primary goal in wound treatment (6).

Combining nursing with non-pharmacological methods can help relieve the pain caused by treatment procedures with fewer risks and side effects (7). Non-pharmacological pain management is a comprehensive method of pain relief (8). Using these methods together with pharmacological methods increases the effectiveness of treatment and applying them on their own can impact pain management by enabling the body's natural morphine and endorphin release. Compared to pharmacological methods, non-pharmacological methods have fewer side effects (9). Upon detecting comprehensive pain, the nurse should select

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the appropriate non-pharmacological methods specific to the patient, apply these methods together, teach the patient, and evaluate the results. The most commonly used methods for pain management are relaxation techniques, distraction, music, daydreaming, information, massage, positioning, restriction of movement, transcutaneous electrical nerve stimulation, therapeutic touch, hot-cold intervention, the use of menthol on the skin, and vibration (10). This study aims to systematically analyze the studies conducted on the non-pharmacological methods used for the management of wound dressing pain.

MATERIALS AND METHODS

Design

This study was designed according to the systematic review method.

Research and Study Selection

This research includes studies published in the CINAHL, EBSCO, Medline, PubMed, Cochrane, Ovid, Science Direct, Scopus, Web of Science, and Wiley Online Library databases between 2010-2022 and used non-pharmacological wound pain, dressing

change pain, complementary therapies in wound pain, and wound dressing pain management as the keywords used to search for articles.

Inclusion and Exclusion Criteria

This research included studies whose full text are available in English and Turkish and that used randomized controlled and non-randomized controlled experimental and quasi-experimental methods. According to the search criteria, 863 studies were reached, with 414 articles being examined after excluding duplications. Of the studies, those that were off-topic ($n = 198$); that involved dressing materials ($n = 152$); that were review articles ($n = 16$), case reports ($n = 15$), or meta-analyses ($n = 14$); that used a pharmacological method ($n = 11$); that involved practice experience ($n = 5$); that had partial texts ($n = 3$); that involved negative pressure therapy ($n = 3$); that were in-vitro studies ($n = 2$); that were not published in English ($n = 2$); or that were a book chapter ($n = 1$), perspective article ($n = 1$), or case series ($n = 1$) were excluded from the systematic review (Figure 1).

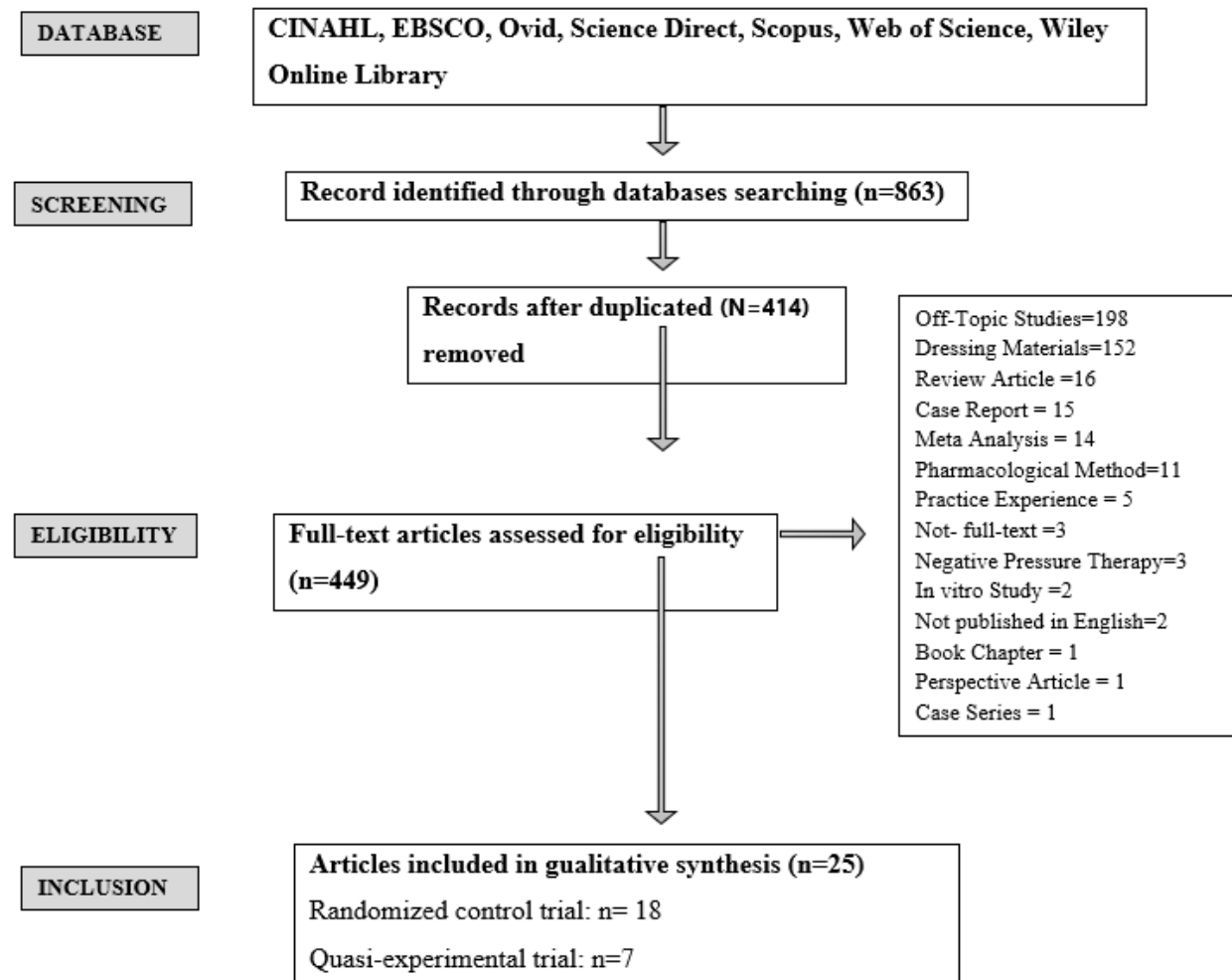


Figure 1: Systematic review of PRISMA flowchart

Data Analysis

A standardized data summarization form was developed for researchers to evaluate the studies. Each study was evaluated and summarized by two independent researchers. The summaries were then compared, and a consensus was established between the two researchers. The research data were evaluated within the scope of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist (11, 12).

RESULTS

A total of 863 studies were accessed, and the 25 studies that met the inclusion criteria were examined. Of the remaining studies, 40% had been performed on children and 60% on adult patients. Of the 25 studies, 80% had examined burn wounds as the most studied type. All of the studies used an experimental design, and 72% were randomized controlled clinical trials. The most commonly used methods were distraction (20%), virtual reality (20%), and music therapy (20%). Table 1 summarizes the years, country of research, design and sample, wound types, non-pharmacological methods, data collection tools, and results of the studies.

DISCUSSION

This systematic review has examined the effect of non-pharmacological methods on dressing pain and analyzed a total of 25 related studies. This section discusses in detail the nonpharmacological methods used in research.

Virtual reality (VR) distraction is a technology that allows the user to be immersed and interact with a computer-generated environment (13). VR provides a significant cognitive distraction to users, and the head-mount display blocks the patient's external view of the immediate medical environment, such as the equipment, health care personnel, and their wounds, thereby increasing the level of immersion and contributing to distracting the patient from perceiving pain (14). Recently, VR has also been found to change the way people interpret incoming pain signals and to reduce the amount of pain-related brain activity (13, 15). VR can therefore reduce both the emotional and sensory components of pain (15). Yun Hua et al. (6) evaluated pain and anxiety during dressing changes in pediatric patients with chronic wounds and found VR distraction to reduce pain and anxiety during dressing changes and to shorten dressing change time compared to standard distraction methods. Ding et al. (16) found immersive VR distraction to be an effective method for reducing pain during postoperative dressing changes. Small et al. (17) suggested that the dressing in burn wounds reduces pain, but a comprehensive evaluation of patient capacity and ergonomics was recommended.

Miller et al.'s (18) study using multi-modal distraction and handheld video games as a preparation or distraction tool in an outpatient burn clinic provided children with superior pain reduction across three dressing changes compared to standard practices. This device has the potential to improve clinical efficiency by shortening treatment times. Distraction is

applicable by games and without the need for special education and with few facilities needed for children according to their age and interest (19). Why distraction continues to be endorsed as a coping strategy for pain is no wonder, although some of the evidence discussed is equivocal regarding its efficacy (20). Hang Zhang et al. (21) found the satisfaction scores of the parents of the children working with the wound therapist to show better results compared to the control group. Xiang et al. (22) applied distraction differently in their research, and their results showed a smartphone VR game to be effective at reducing self-reported pain during pediatric burn dressing changes. Chu et al. (23) showed distraction therapy provided by a qualified play specialist in acute pediatric burns to be able to reduce the experienced pain. Moosavi et al. (24) demonstrated their medically guided play to effectively reduce pediatric procedure pain through children's cooperation during dressing changes. Ozsoy et al. (25) found allowing children to watch videos with a VR headset to reduce their pain and fear levels.

Child life therapy (CLT) techniques or devices have been shown to reduce the pain and anxiety children experience during procedures. Examples of the techniques used include music, bubbles, games, electronic devices, and virtual reality. In addition, the role of a child life therapist includes providing pre-procedural psychological support, education for the parent and child, and procedural support during dressing changes (26, 27). The results from Hyland et al.'s (27) research showed that guided imagery can be effective in reducing dressing change-induced anxiety and pain among burn patients.

Another non-medical treatment is guided imagery. This method is based on the relationship between mind and body. The effects of this method have been described to reduce the pain and distress caused by various diseases such as different cancers and musculoskeletal complications (28, 29). Asgharipur et al. (28) showed that guided imagery can be effective in reducing the anxiety and pain related to dressing changes in burn patients.

Spirituality was first introduced into human life to define the psychological aspect used to indicate the responsibility of the clergy. Spiritual care is very important in coping with physical and spiritual problems, especially individuals' emotional needs (30). When considering the performed studies, Keivan et al. (31, 32) and Nasiri et al. (31, 32) found similar results regarding the recommendation of spiritual care practices to alleviate pain in burn patients and to increase pain control and satisfaction.

Reflexology is another method used in pain management. Reflexology is a systematic intervention in which applying some pressure to any particular points on the feet and hands impact the health of the related parts of the body. Davodabady et al. (33) interpreted reflexology in an intervention group with burn injury to reduce pain and anxiety more compared to the control group.

Breathing and relaxation exercises are alternative techniques that help get rid of the pain in the body systematically. Several types of breathing exercises exist, such as rhythmic

Table 1: Characteristics of Studies in a Systematic Review of Nanopharmacological Management in Wound Dressing Pain (n=25)

Research	Design	Sample	Wound type	Non-pharmacological method	Data collection tools	Result
Miller et al. 2010 (18)	RCT	Pediatric patients (N=80)	Burn	Multi-modal Distraction	Visual Analogue Scale, FLACC Faces Pain Scale, Physiological Measure	The use of multi-modal distraction as both a procedural preparation and distraction tool by showing reduced pain scores in children accessing this method compared to standard distraction, and video game distraction.
Kahar et al. 2011 (42)	Quasi-experimental	Adult patients (N=30)	Burn	Music Therapy	Physiological Measure Numeric Pain Score, Pain Behavioral Tool	Patients who underwent burn dressing changes while listening to music reported fewer pain scores as compared to patients who did not have music to listen
Fakhar et al. 2013 (45)	RCT	Adult patients (N=100)	Burn	Jaw Relaxation	Burn Specific Pain Anxiety Scale	Jaw relaxation caused less pain anxiety before, during and after dressing in patients with burns.
Park et al. 2013 (35)	Quasi-experimental	Adult patients (N=66)	Burn	Relaxation Breathing	Visual Analogue Scale	Relaxation breathing appears to be a promising technique for pain and anxiety relief during burn care.
Hyland et al. 2015 (27)	RCT	Pediatric patients (N=100)	Burn	Child Life Therapy	Children's Fear Scale Children's Hospital of Eastern Ontario Pain Scale, Wong-Baker Faces Pain Scale, Visual Analogue Scale	Child Life Therapy can be effective in the reduction of dressing change-induced anxiety and pain among burn patients.
Small et al. 2015 (17)	RCT	Adult patients (N=25)	Burn	Virtual Restorative Environment Therapy	Numerical Rating Scale	The patient group to whom the virtual restorative system was applied was not capable of using the intervention. Therefore, the study did not give a clear result about dressing pain.
Hua Yun et al. 2015 (6)	RCT	Pediatric patients (N=65)	Chronic Wound	Virtual Reality	Wong-Baker Faces Pain Rating Scale	Demonstrates that the use of Virtual Reality distraction can significantly reduce dressing change time and pain during dressing changes in children with chronic wounds compared to standard distraction methods
Hsu et al. 2016 (9)	RCT	Adult patients (N=70)	Burn	Music Therapy	Numerical Rating Scale	Music therapy significantly reduced pain and anxiety during and after burn dressing changes
Kaheni et al. 2016 (19)	RCT	Pediatric patients (N=80)	Burn	Distraction	FLACC	Distraction technique was determined to be an effective method in reducing pain intensity in children.
Asgharipur et al. 2017 (28)	Quasi-experimental	Adult patients (N=40)	Burn	Guided Imagery Inventory	Beck Anxiety Inventory McGill Pain Questionnaire	Guided imagery can be effective in the reduction of dressing change-induced anxiety and pain among burn patients.
Bozorg-Nejad et al. 2018 (36)	Quasi-experimental	Adult patients (N=60)	Burn	Rhythmic Breathing	Pain Observation Scale	Rhythmic breathing was an effective method of pain reduction of dressing change in patients with burn injuries.
Ding et al. 2019 (16)	RCT	Adult patients (N=182)	Surgical Wound	Virtual Reality	Visual Analogue Scale	Immersive Virtual Reality was effective as a pain distraction tool in combination with standard pharmacological analgesia during dressing changes in patients that had undergone haemorrhoidectomy.
Hoseinzadeh-Karimkoshteh et al. 2019 (34)	RCT	Adult patients (N=30)	Burn	Regular Smooth Breathing	Visual Analogue Scale	Regular smooth breathing can help alleviate the pain induced by the dressing of burn patients.
Keivan et al. 2019 (31)	Quasi-experimental	Adult patients (N=68)	Burn	Spiritual Care	Visual Analogue Scale Numerical Rating Scale	Religious and spiritual care can help decrease the pain intensity caused by the dressing change and can increase the satisfaction of these patients with pain control.
Moosavi et al. 2019 (24)	RCT	Pediatric patients (N=82)	Burn	Medical-Directed Play	FLACC	The medical-directed play effectively reduces pediatric procedural pain through children's cooperation during dressing changes.

Table 1: Continue

Research	Design	Sample	Wound type	Non-pharmacological method	Data collection tools	Result
Xiang et al. 2019 (22)	RCT	Pediatric patients (N=90)	Burn	Smartphone Active and Passive Virtual Reality	Visual Analogue Scale FLACC	The Smartphone Virtual Reality game was effective in reducing self-reported pain during pediatric burn dressing changes.
Li-Yuan et al. 2020 (41)	Quasi-experimental	Adult patients (N=159)	Surgical Wound	Five Elements of Music Therapy	Visual Analogue Scale	Moxibustion combined with five elements of music therapy is effective to relieve the postoperative pain of patients undergoing a surgical operation for mixed hemorrhoids with damp-heat syndrome.
Nasiri et al. 2020 (32)	RCT	Adult patients (N=70)	Burn	Spiritual Care	Visual Analogue Scale	Chanting the name of God was found to be effective in reducing pain and anxiety associated with burn dressing.
Zhang et al. 2020 (43)	RCT	Adult patients (N=180)	Burn	Music Therapy	Visual Analogue Scale	The combination of self-selected music and tramadol is more effective than self-selected music or tramadol alone and can also effectively improve their overall satisfaction
Zhang et al. 2020 (21)	RCT	Pediatric patients (N=52)	Burn	Distraction	Behavioral Pain Scale	It was determined that Distraction method was curative effect to reduce pain during dressing change in children.
Akgul et al. 2021 (38)	RCT	Pediatric patients (N=108)	Burn	Inhalation Aromatherapy	FLACC	Inhalation of aromatherapy with lavender oil which is applied before burn dressing in children with burns affects the reduction of pain levels and stabilization of respiratory rate, heart rate, and mean arterial pressure.
Chu et al. 2021 (23)	Quasi-experimental	Pediatric patients (N=50)	Burn	Distraction	Visual Analogue Scale	In acute pediatric burns, distraction therapy provided by a qualified play specialist can reduce pain experienced and also has a more global effect on discomfort reported throughout the burns consultation.
Davodabady et al. 2021 (33)	RCT	Adult patients (N=66)	Burn	Reflexology	Visual Analogue Scale	Reflexology was an appropriate and safe intervention for patients with burns, which can reduce the level of pain and anxiety.
Ferraz et al. 2022 (44)	RCT	Adult patients (N=70)	Surgical Wound	Music Therapy	Numerical Rating Scale	The results of this demonstrate that the self-selected music is an effective adjunctive method for relieving pain during the first postoperative dressing change for tibial surgery.
Ozsoy et al. 2022 (25)	RCT	Pediatric patients (N=96)	Surgical Wound	Cartoon Distraction	Wong-Baker Faces Pain Rating Scale The Children's Fear Scale	The virtual reality distraction method was more effective than the cartoon distraction method as means of reducing fear and pain in children who had undergone abdominal surgery.

RCT: Randomized control trial; FLACC: Face, Legs, Activity, Cry, Consolability, Faces Pain Scales

breathing, abdominal breathing, breath holding, regular smooth breathing, and breathing in various positions (34). When looking at the performed studies, Park et al. (35) used the same method and stated it to be useful for helping burn patients manage their pain and concerns while changing dressings. Bozorg-Nejad et al.'s (36) study was designed as a quasi-experimental clinical study. Their results showed pain intensity after rhythmic breathing to decrease more in the test group. Hoseinzadeh-Karimkoshteh et al. (34) determined regular and smooth breathing to reduce the pain caused by dressing burn injuries.

Aromatherapy is a treatment method in which oil obtained from the various parts of plants is used for therapeutic purposes. Aromatherapy has a wide range of implementations, can be applied easily, and is a remarkable

complementary intervention (37). Some analgesic components in aromatherapy oils have been stated to affect the release of substances such as dopamine, endorphins, noradrenaline, and serotonin in the brain stem, and to resultantly have analgesic properties (38, 39). Akgul et al.'s (38) study found pain levels and vital signs to decrease after dressing with aromatherapy.

Music therapy affects many physical, psychological, and mental areas and is also a viable method (40). Music therapy provides relaxation by affecting the immune and endocrine systems and has positive effects such as reducing the use of painkillers. Li-Yuan et al.'s (41) study showed five-element music therapy combined with proximity to be effective at relieving postoperative pain for patients who'd undergone surgery. Kahar et al. (42) reported similar results, and their

patients reported lower pain scores when changing their burn dressings while listening to music. Zhang et al. (43) showed their music-plus-tramadol group to have better results in terms of pain and anxiety management regarding dressing changes. Hsu et al. (9, 44) and Ferraz et al. (44) both concluded music therapy to reduce the amount of pain medication used.

Jaw relaxation exercises used as a treatment method are very effective for pain. This method is widely used, especially to manage stress-induced conditions and anxiety caused by pain. Relaxation reduces pain and anxiety by improving confidence and self-control and reducing negative emotions. Although jaw relaxation has been used in many pain relief techniques, limited studies are found regarding burn pain (45, 46). Fahhar et al.'s study showed jaw relaxation exercise to have positive effects on reducing burn pain anxiety, and learning and practicing this method to be simple, with burn patients being recommended to practice this method (45).

Limitations of the Study

As this systematic review was conducted by two researchers, bias may have developed in setting the criteria and research methodology and in analyzing the findings. To have the systematic review be conducted by more researchers is thought to be better. Because the threat of inadequacy is always present in a systematic review and because the researcher attempted to access the literature within the possibilities that were available, other studies with results that would be valid for the research may not have been reached.

CONCLUSION

Non-pharmacological methods applied before starting dressing seem to be effective at reducing dressing pain. Clinics should develop protocols for the implementation of non-pharmacological methods. In addition, in-service training programs covering non-pharmacological methods should be planned, and knowledge, and opportunities should be provided on how to relieve the pain of patients in different groups. Patients' experiences and preferences regarding non-pharmacological methods should also be taken into consideration.

The focus of future studies should be on identifying the type and nature of pain in patients while using designs that take into account symptom control and on examining the pain outcomes of non-pharmacological methods that provide patients with demonstrable evidence-based benefits.

Peer Review: Externally peer-reviewed.

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