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Research Article

Investigating the Impact of Nature Music and Acupressure on the Pain Intensity of Conscious Patients Hospitalized in ICU

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ABSTRACT

Background: Despite advances in pain management, the incidence of postoperative pain remains a concern. In addition, analgesics have many side effects. Therefore, non-pharmacological interventions aimed at reducing the dosage of analgesics seem necessary, whether as a complementary or independent medication. In this regard, the present study was conducted with the aim of investigating the impact of music and acupressure on the pain intensity in the conscious patients hospitalized in intensive care units (ICU).

Methods: The present quasi-experimental study was conducted on conscious patients undergoing laparotomy surgery who were hospitalized in the surgical ICU of hospitals affiliated with Shahid Beheshti University in 2023. We randomly assigned 90 patients to one of three groups: nature music, acupressure, or combined. The data collection tools consisted of patients' demographic information form and the visual pain assessment scale, which was measured once before the intervention and over five time points after it. For participants in the nature music group, sounds of rivers, birds, and waterfalls were played using an MP3 player device and headphones for 20 minutes on one occasion. For the participants in the acupressure group, pressure was applied to L14 or Hogo for 10 seconds of pressure, followed by 2 seconds of rest, for a duration of 20 minutes, so that the patient could feel heat, numbness, and heaviness. We simultaneously performed nature music and acupressure for the participants in the combined group. SPSS version 19 was used for data analysis.

Results: Three groups of participants were homogeneous, with no statistically significant differences in terms of demographic characteristics (P value < 0.05). There was no statistically significant difference in the pain intensity of the patients among the three groups before the intervention. However, there was a significant difference among the three groups at 30 minutes, 60 minutes, 2 hours, 3 hours, and 4 hours after the intervention, and the combined and concurrent use of music therapy and acupressure proved to be more effective in reducing the pain intensity.

Conclusion: The results indicated the effectiveness of both nature music and acupressure when used alone or in combination. Their combined and concurrent implementation is more effective. Therefore, we recommend that nurses adopt combined care programs for pain management in ICU patients.

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Introduction

The intensive care unit is a specialized department in a hospital that provides intensive care and treatment services for critical patients as well as major surgeries, emergencies, and traumas in order to maintain physiological stability and post-operative recovery [1]. Abdominal surgery is one of the causes of patients' postoperative hospitalization in ICU [2]. Correcting the physiological disorder is considered the first step in the care of these patients because, in many cases, the final outcome of the surgery is not related to the main cause but results from therapeutic care interventions and management and postoperative complications in the ICU. Therefore, we can have a better idea of the impact of therapeutic care in preventing or reducing postoperative complications during the patients' stay in the ICU [3].

Pain is one of the common complications among ICU patients and is considered the third complication related to therapeutic care [4]. Pain in the ICU has multiple causes. The injuries caused by trauma and surgical incisions are the most common causes of pain [5]. In addition to that, anxiety, fear, and uncertainty also contribute to the experience of pain in ICU patients [6].

Pain is an unpleasant sensory and emotional experience that is associated with potential or actual tissue damage or is defined as any type of damage [7]. Pain caused by surgery is a type of acute inflammatory pain [8]. Varying levels of pain are usually considered an inevitable aspect of any surgical intervention. However, acute pain can cause complications and, as a stressor, cause physiological and psychological changes by increasing secreted hormones [9]. Pain relief is a human right, but postoperative pain management is beyond its humanitarian aspects [10]. Pain assessment is the first and most important step in the care and treatment of these patients [6].

For several decades, pharmacological interventions, including opioids, have been the cornerstone of acute pain management and are still the first choice [11]. Pharmacological interventions cause varying problems, from minor to significant, such as gastrointestinal bleeding and kidney disorders [12-13]. Therefore, there is a need to use other interventions that can maximize comfort and accelerate pain relief in ICU patients [14]. Providing non-pharmacological interventions is often inexpensive, safe, and easy [15]. People use many non-pharmacological approaches, like nature music [16] and acupressure [17], to reduce pain intensity.

Acupressure, as a division of acupuncture, is a skill in traditional Chinese medicine in which fingers are used to apply pressure on some key points on the surface of the skin [18]. However, it does not have the side effects of acupuncture, such as blackout during the procedure, infection, bleeding, and hepatitis [19]. Applying pressure on specific points can stimulate small nerve fibers and send impulses to the spinal cord, midbrain, pituitary gland, and hypothalamus, regulating energy flow by balancing energy [20]. The Chinese believe that the body achieves this by balancing its Qi. Qi is connected to specific organs or pressure points through 12 main energy channels called meridians. Acupressure can eliminate the imbalance of vital energy, leading to pain relief, reduced muscle contraction, improved blood circulation, and enhanced performance of vital activities [18].

One of the most popular non-pharmacological nursing interventions, which is also pleasant for patients, is the use of music as a therapeutic approach [21]. Physiologically, listening to music can stimulate the brain to release endorphins, which is similar to the effect of morphine. Psychologically, listening to music can affect the brain by stimulating an unconscious automatic response [22]. Nature music has a gentle and uniform progression and is attractive and pleasing to humans, enhancing their happiness. This music is a positive factor that contributes to increased dopamine in the nucleus accumbens, associated with reward-related behaviors. Thus, nature music can divert attention from anxiety, pain, and negative experiences by helping reduce emotional stress and stimulating relaxing reactions [23]. Although, according to nurses, non-pharmacological interventions such as deep breathing, massage, and position change contribute to pain management in ICUs, few studies have investigated their effectiveness on pain intensity [24]. This study aims to investigate the effect of music and acupressure on pain intensity in the conscious patients hospitalized in ICUs.

Methods

Trial design

This was a quasi-experimental research study, with three study groups, that was approved by the ethics committee of Shahid Beheshti University of Medical Sciences (code IR.SBMU.PHARMACY.REC.1401.246).

Participants

The research population included conscious hospitalized patients who underwent laparotomy surgery in ICUs at Shahid Beheshti University of Medical Sciences in 2023. The inclusion criteria consisted of: patient's willingness to participate in the study and signing an informed consent form before the surgery, no wounds, scratches, or deformities on the acupressure point (L14: between the first and second bones of the palm, between the thumb and index finger on the back of the hand), being conscious, no hearing impairment, age between 18 and 65 years, no visual impairment, no cognitive impairment, no paralysis, mild to moderate

pain, and receiving laparotomy with similar drain and dressings. Exclusion criteria included connection to mechanical ventilation, being retransferred to the operating room, and severe pain.

Sample size

The ANOVA table determined the sample size for the three groups (r=3) in the research. A total of 90 samples (30 in each group) were selected, considering a type-I error of 5% (α=0.05), a study power of 90% (1-β=0.90), and a 10% attrition rate.

Randomization

A total of 90 patients were randomly selected and assigned into three groups: the nature music group (Group NM), the acupressure group (Group AC), and the combined approach group (Group CA).

Data collection

The data collection tools included a patient demographic information form (containing age, gender, education level, and underlying diseases) and a pain intensity rating checklist using the Visual Analogue Scale (VAS). The visual analogue scale consisted of a 0-10 cm graduated ruler, where the pain intensity was estimated according to the patient's statement from no pain to maximum pain, similar to NRS [25].

The researcher assigned samples to the three intervention groups, managed the group, and was present at the patient's bedside. A nurse took each patient from the operating room for routine pain relief care, and the researcher performed the non-pharmacological intervention on them. The researcher played nature music for patients using MP3 devices and headphones after evaluating their pain intensity (mild to moderate). Headphone pads were replaced in order to prevent the transmission of infection through headphones after each use. Concurrently with the music, the researcher also applied bilateral pressure with thumbs on the L14 point (10 seconds of pressure followed by 2 seconds of rest, for a duration of 20 minutes). The applied pressure was approximately 3 to 5 kg, causing the patient to feel heat, numbness, and weight. Anatomically, the LI4 point is located on the back of the hand, between the first and second metacarpal bones and almost along the radial bone. We then measured the pain intensity 30 minutes after the intervention. According to the PAD guideline, the patients' pain was evaluated before the intervention and over 4 time points after it (30 minutes, one hour, two hours, three hours, and four hours after the intervention). As in the first intervention group, in the second group, nature music was performed, and in the third group, acupressure was performed by trained nurses for twenty minutes on one occasion. Finally, the data was statistically analyzed and compared before and after the intervention within each group and also between the study, groups in terms of the trend of pain intensity. In order to comply with the ethical principles, the patients participated in the study voluntarily and were able to withdraw at any time of their choice. Informed consent was also obtained from all patients. We also observed the confidentiality of all data and information sources. We used descriptive statistics like mean, standard deviation, and frequency to look at the data. We also used inferential tests like chi-square, one-way ANOVA, and repeated measures ANOVA on SPSS version 19.

Results

In the present study, 90 individuals were present in three groups of 30; all of whom remained until the end of the study. The three groups were homogeneous with no statistically significant differences among them in terms of age (P value = 0.25), gender (P value = 0.64), level of education (P value = 0.24), and underlying disease (P value = 0.80) (Table 1). To compare the mean age, a one-way ANOVA test was implemented, indicating no significant differences among the three groups in terms of mean age (P value=0.25). A chi-square test was used to compare the gender, level of education, and underlying disease of the participants in the three groups, which showed no statistically significant differences (P value > 0.05) (Table 1).

Comparing the results at 6 time points showed that all three methods—nature's music, acupressure, and combined (nature's music plus acupressure)—are effective in reducing pain intensity. However, Table 2 and (Figure 1) shows that the combination approach outperforms the two other methods used separately.

Table 1- Descriptive statistics of demographic characteristics in the three groups

Variable	Group	NM		AC		CA		P value
Age (year)	Mean± SD	49.93± 10.66		47.73± 11.54		52.20± 8.91		
		*P-Value = 0.25 F= 1.37						
		N	%	N	%	N	%	
Gender	Male	19	63.3	15	50	18	60	**P value:0.64
	Female	11	36.7	15	50	12	40	
Level of education	Illiterate	4	13.2	5	16.7	4	13.3	***P value:0.24
	Elementary school	8	26.7	2	6.7	4	13.3	
	Middle school	2	6.7	9	30	7	23.3	
	High school diploma	10	3.33	6	20	10	33.3	

	University	6	20	8	26.7	5	16.7	
Underlying disease	Yes	18	60	15	50	17	56.7	**P value:0.08
	No	12	40	15	50	13	43.3	

SD standard deviation, *One-Way ANOVA, **Fisher Exact Test, ***Chi square

Table 2- Comparison of pain intensity among ICU patients measured over 6 time points

Pain Intensity		**Mean± SD**	**Results of one-way ANOVA**		
Time	Group		P value	Df	F
Before the intervention	NM	5.53±0.5	0.77	2	0.25
	AC	5.60±0.49			
	CA	5.50±0.62			
30 minutes after the intervention	NM	5.4±0.62	0.008	2	5.14
	AC	5.3±0.87			
	CA	4.76±0.93			
60 minutes after the intervention	NM	4.46±0.93	0.015	2	42
	AC	4.43±0.77			
	CA	3.39±0.58			
Two hours after the intervention	NM	3.76±0.43	0.009	2	4.99
	AC	3.5±0.82			
	CA	3.26±0.52			
Three hours after the intervention	NM	3.3±0.56	0.014	2	51
	AC	3.1±0.8			
	CA	2.76±0.43			
Four hours after the intervention	NM	2.83±0.37	0.001	2	8.52
	AC	30±0.74			
	CA	2.4±0.56			

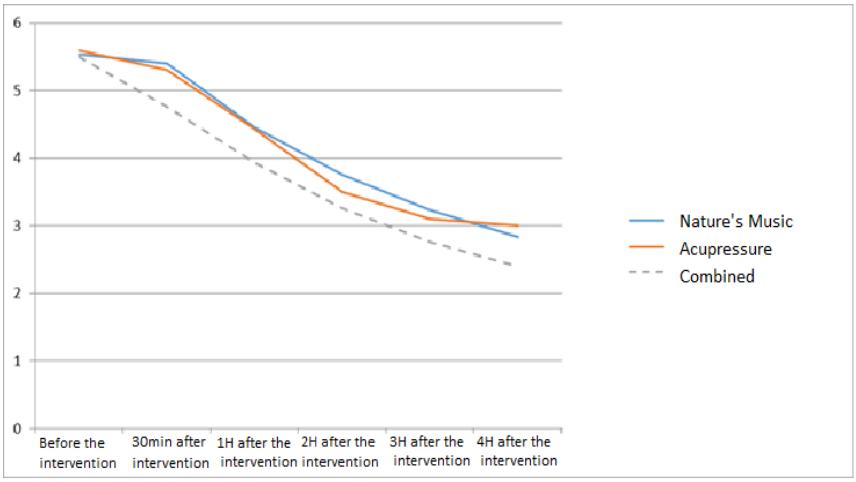

Figure 1. Changes in the mean pain intensity over 6 time points

Discussion

This study was conducted with the aim of determining the impact of nature's music and acupressure on pain intensity in conscious patients hospitalized in the ICU. The results showed that nature's music reduced pain intensity in conscious ICU patients at 30 minutes, 60 minutes, 2 hours, 3 hours, and 4 hours after the intervention. In this regard, the results of the systematic review study by Richard-Lalonde et al. (2020) under the title "The effect of music therapy on reducing pain in ICU patients" showed that playing various types of music for a long time (20 to 30 minutes) can effectively reduce pain intensity in patients hospitalized in ICU [26]. Mousavi et al. (2017) showed that nature's music plays an effective role in controlling pain in end-of-life patients [27]. According to the researcher, the nature of music, especially nature's music, is one of the main reasons for obtaining consistent results in reducing pain intensity.

By reviewing these studies, it can be said that sounds of lithotripsy," found that acupressure nature, such as rivers, waterfalls, and birds, are effective in reducing the pain intensity in patients hospitalized in the ICU. In the second part, the results showed that acupressure reduced the pain intensity in conscious ICU patients at 30 minutes, 60

minutes, 2 hours, 3 hours, and 4 hours after the intervention. So, Safdari et al.'s study from 2024, called "Investigation of the effect of acupressure on pain intensity and physiological indicators in patients undergoing extracorporeal shockwave can effectively lower pain intensity and raise patient satisfaction in people who are undergoing extracorporeal shockwave lithotripsy [28]. Shadi et al. (2022) determined that the acupressure technique is an effective method to reduce pain intensity [29]. The researcher says that one of the main reasons why the results of previous studies and this one are so similar is that acupressure has pain-relieving effects that help increase blood flow, lymph flow, and blood supply to tissues. These effects also help reduce muscle stiffness, affect the nervous system by stimulating or soothing nerves, and make it easier for body tissues to heal and repair themselves. On the other hand, acupressure can have an indirect influence by diverting patients' thoughts. The use of standard and common tools, such as the visual analog scale, is another effective factor in the consistency of results. Based on the findings of this study and the reviews of other studies in the same field, along with the fact that most of them found acupressure to be helpful, it can be concluded that acupressure can help make pain less severe in conscious patients who are hospitalized in intensive care units.

The comparison between two groups—acupressure and nature's music—showed no significant difference in their effectiveness at reducing pain intensity, indicating that both groups are equally effective. Previous studies' results confirm the effectiveness of both non-pharmacological methods in reducing pain intensity.

However, a study by Deyhamifar et al. (2024) called "Comparative study on the impact of acupressure and music on pain intensity during venipuncture in children" found that music has a stronger effect on reducing the pain of venipuncture than acupressure [30]. This is different from the results of this study. More studies appear to be necessary to compare the two methods of nature's music and acupressure, as they have varying effects on reducing pain intensity. The results showed that the combination of two intervention approaches, acupressure and nature's music, reduced pain intensity more effectively than each approach did separately in conscious ICU patients at 30 minutes, 60 minutes, 2 hours, 3 hours, and 4 hours after the intervention. The researcher in this study did something new by using both nature's music and acupressure on one intervention group. This is similar to a study done in the US by Boer et al. called "Nature's music and music on pain intensity and anxiety of patients after open heart surgery." This study found that a combination of music and sounds of nature can reduce pain intensity and anxiety in ICU patients who have had open heart surgery [31]. However, contrary to the results of the present study, Wan & Wen (2018), which was conducted in China under the title "Effects of acupressure and music therapy on reducing labor pain,"

The results showed that music therapy, acupressure, and a combination approach (music therapy along with acupressure) are effective in reducing the intensity of labor pain, but no difference in effective pain relief was observed between the combination approach and other methods [32].

Conclusion

The results of this research showed that nature's music and acupressure are both effective in reducing the pain intensity of patients hospitalized in the ICU, but their concurrent and combined use is more successful. According to this finding, it is suggested that nurses use the combination approach when providing care for their patients, especially to reduce the pain intensity in patients hospitalized in ICU.

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References

[1] Sawyer RG, Leon CAT. Common complications in the surgical intensive care unit. Crit Care Med. 2010; 38(9):S483-S93.

[2] Capdevila M, Ramin S, Capdevila X. Regional anesthesia and analgesia after surgery in ICU. Curr Opin Crit Care. 2017; 23(5):430-9.

[3] Moreno AP, Alvarez AA, Conde SM, Flecha MP, Ureña MG. The intensive care unit in the postoperative period of major abdominal surgery. Med Intensiva (Engl Ed). 2019; 43(9):569-77.

[4] Rasulehvandi R, Kazeminia M, Jafari F, Rahmati M, Mohamad Gholizadeh A, Khashmin MM. Pain Relief Management in the Intensive Care Unit (ICU): A systematic review. J Mil Med. 2022; 24(5):1291-309.

[5] Nazari R, Sharifnia H, Mousazadeh N, Hasani A. Validation of the Persian version of critical care pain observation tool. J Crit Care Nurs. 2021; 14(3):51-9.

[6] Siffleet J, Young J, Nikoletti S, Shaw T. Patients' self-report of procedural pain in the intensive care unit. J Clin Nurs. 2007; 16(11):2142-8.

[7] Kotfis K, Zegan-Barańska M, Szydłowski Ł, Żukowski M, Ely E. Methods of pain assessment in adult intensive care unit patients—Polish version of the CPOT (Critical Care Pain Observation Tool) and

BPS (Behavioral Pain Scale). Anaesthesiol Intensive Ther. 2017; 49(1):66-72.
[8] Mędrzycka-Dąbrowska W, Dąbrowski S, Gutysz-Wojnicka A, Basiński A, Kwiecień-Jaguś K. Nurses' knowledge and barriers regarding pain management. J Perianesthesia Nurs. 2018; 33(5):715-26.
[9] Joshi GP, Beck DE, Emerson Jr RH, Halaszynski TM, Jahr JS, Lipman AG, et al. Article commentary: defining new directions for more effective management of surgical pain in the United States: highlights of the inaugural surgical pain Congress™. Am Surg. 2014; 80(3):219-28.
[10] Puntillo KA, Max A, Timsit JF, Vignoud L, Chanques G, Robleda G, et al. Determinants of procedural pain intensity in the intensive care unit. The Europain® study. Am J Respir Crit Care Med. 2014; 189(1):39-47.
[11] Harvin JA, Kao LS. Pain management in the surgical ICU patient. Curr Opin Crit Care. 2020; 26(6):628-33.
[12] White PF, Kehlet H. Improving postoperative pain management: what are the unresolved issues? J Am Soc Anesthesiol. 2010; 112(1):220-5.
[13] Seo Y, Lee H-J, Ha EJ, Ha TS. 2021 KSCCM clinical practice guidelines for pain, agitation, delirium, immobility, and sleep disturbance in the intensive care unit. Acute Crit Care. 2022; 37(1):1-25.
[14] Gelinas C, Arbour C, Michaud C, Robar L, Côté J. Patients' and ICU nurses' perspectives of non-pharmacological interventions for pain management. Nurs Crit Care. 2013; 18(6):307-18.
[15] Khalil NS. Critical care nurses' use of non-pharmacological pain management methods in Egypt. Appl Nurs Res. 2018; 44:33-8.
[16] Korkut S, Ülker T, Çidem A, Şahin S. The effect of progressive muscle relaxation and nature sounds on blood pressure measurement skills, anxiety levels, and vital signs in nursing students. Perspect Psychiatr Care. 2021; 57(4):1782-90.
[17] Bauer M. Auricular point acupressure: A complementary medicine treatment for pain management. Pain Manag Nurs. 2024; 25(2):e152-e3.
[18] Abbasi Tadi S, Saberi M, Akbari H. Effect of acupressure at shenmen acupoint on the sleep quality of nurses in emergency departments and intensive care units. Complement Med J. 2021; 10(4):380-95.
[19] Hamlacı Y, Yazici S. The effect of acupressure applied to point LI4 on perceived labor pains. Holist Nurs Pract. 2017; 31(3):167-76.
[20] Yeh ML, Chang YC, Huang YY, Lee TY. A randomized controlled trial of auricular acupressure in heart rate variability and quality of life for hypertension. Complement Ther Med. 2015;23(2):200-9.
[21] Rahgoi A, Mohammadzadeh Zarankesh S, Kasaeizadeghan SS, Naghibeiranvand M. Effect of classical music on physiological characteristics and observational and behavioral measures of pain in unconscious patients admitted to intensive care units. Complement Med J. 2021; 10(4):368-79.
[22] Lin CL, Hwang SL, Jiang P, Hsiung NH. Effect of music therapy on pain after orthopedic surgery—a systematic review and meta-analysis. Pain Pract. 2020; 20(4):422-36.
[23] Khatooni N, Kolahi M. Nature music and human. Popular Sci. 2020; 10(2):115-40.
[24] Kia Z, Allahbakhshian M, Ilkhani M, Nasiri M, Allahbakhshian A. Nurses' use of non-pharmacological pain management methods in intensive care units: A descriptive cross-sectional study. Complement Ther Med. 2021; 58:102705.
[25] Begum MR, Hossain MA. Validity and reliability of visual analogue scale (VAS) for pain measurement. J Med Case Rep Rev. 2019; 2(11).
[26] Richard-Lalonde M, Gélinas C, Boitor M, Gosselin E, Feeley N, Cossette S, et al. The effect of music on pain in the adult intensive care unit: a systematic review of randomized controlled trials. J Pain Symptom Manag. 2020; 59(6):1304-19.e6.
[27] Mosavi M, Bahramnejhad F, Ghorbani B. Using verbal music or nature sound music to control pain and anxiety of patients at the end of life. In: Nuom S, editor. The first national conference of art and health. Neishabour: Neishabour University of Medical Sciences; 2017.
[28] Safdari A, Khazaei S, Biglarkhani M, Mousavibahar SH, Borzou SR. Effect of acupressure on pain intensity and physiological indices in patients undergoing extracorporeal shock wave lithotripsy: a randomized double-blind sham-controlled clinical trial. BMC Complement Med Ther. 2024; 24(1):55.
[29] Shady RHA, Seada AIA, Mostafa MF. Effectiveness of acupressure in the reduction of pain and anxiety among patients with open thoracotomy. Am J Nurs Res. 2020; 8(2):182-91.
[30] Daihimfar F, Babamohamadi H, Ghorbani R. A comparison of the effects of acupressure and music on venipuncture pain intensity in children: a randomized controlled clinical trial. Pain Res Manag. 2024; 2024(1):2504732.
[31] Bauer BA, Cutshall SA, Anderson PG, Prinsen SK, Wentworth LJ, Olney TJ, et al. Effect of the combination of music and nature sounds on pain and anxiety in cardiac surgical patients: a randomized study. Altern Ther Health Med. 2011; 17(4).
[32] Wan Q, Wen F-Y. Effects of acupressure and music therapy on reducing labor pain. Int J Clin Exp Med. 2018; 11(2):898-903.