

Is Music Effective for Pain Relief in Burn Victims?

ORIGINAL

Lidiane Souza Lima¹, Viviane Oliveira de Sousa Correia²,
Tycianne Karoline Garção Nascimento²,
Bárbara Jeane Pinto Chaves³, José Rodrigo Santos Silva⁴,
José Antonio Barreto Alves⁵, Daniele Vieira Dantas⁶,
Maria do Carmo de Oliveira Ribeiro⁶

- 1 Nurse. Master at the Federal University of Sergipe.
- 2 Nursing Academic at the Federal University of Sergipe (UFS).
- 3 Nurse. Specialist in Public Health Management and Organization; Maternal, Neonatal and Infant Nursing; Occupational Nursing; Family Health.
- 4 Statistician. PhD in Biometry and Applied Statistics.
- 5 Nurse. PhD in Health Science the Federal University of Sergipe (UFS).
- 6 Nurse. Post-PhD Scholar of the Higher Education Personnel Improvement Coordination (Capes).

Abstract

Objective: To describe the effect of music on pain of burn victims during the dressing change.

Methods: Applied, descriptive, exploratory and quantitative research held in a Burn Treatment Unit from October 2015 to April 2016. The study included 16 burn victims who were divided in three groups: A: patients heard music before dressing; B: patients hear music during dressing; C: patients did not hear music.

Results: The average age was 31.8 years (\pm 14.1) and most of the subjects were male. Lower limbs and trunk were the most affected parts of the body, especially with second-degree burns and which affected an average of 15.8% (\pm 11.5) of the body surface. There was a predominance of gospel music (50.0%). The music reduced the average heart rate and oxygen saturation, but did not change ventilatory rate. There was a decrease in the average of pain intensity in groups GB ($p = 0.0505$) and GC ($p = 0.0055$). During the dressing, the burning was unanimous characteristic for all subjects, in the same manner as verbal reports was the form of manifestation.

Conclusion: Music proved to be a simple and effective resource in controlling pain in burn victims.

Contact information:

Lidiane Souza Lima.

Address: 1699, Gonçalo Rollemberg Leite Ave., Edifício Barcelona. Apartment 801. Neighborhood: Luzia. Zip Code: 49045-280. Aracaju/Se. **Tel:** (79) 99999-0670.

 lidi_lima88@hotmail.com

Keywords

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Introduction

Pain is an unpleasant experience associated with actual or potential tissue damage [1] and it is a frequent symptom in burn victims [2-4]. In this case, the pain originates from the tissue damage itself, from

the subsequent inflammatory process [2-3] and procedures for the treatment of wounds [4-8]. So, dressing changes are important sources of pain and are considered the most painful time of treatment [4-5,8]. Moreover, pain also relates to post-traumatic stress and other emotional disorders [5].

Despite the scientific advances of recent years, the control of pain of burn victims is still inadequate [2-4, 9]. Mismanagement of pain decreases treatment adherence and trust in the health team, in addition to increasing the perception of pain, incidence of chronic pain [2-4, 10], depression and suicide ideas [3, 11].

In this perspective, a multidisciplinary approach is essential in the treatment of pain due to burns [4, 9, 11]. It is noteworthy that the isolated drug therapy is inadequate to control pain in this type of trauma [7]. Therefore, no pharmacological therapies are recommended in American and European guidelines [10], since they act in different ways in the body. [9,12].

Due to the characteristics of the work process, the nursing staff spends more time near the patient, which gives them the possibility to better assess pain relief and apply techniques, pharmacological or not [13-14]. There are several possibilities for nursing interventions to control pain [15], among them the use of music [16-17].

Music has several applications as a complementary therapy [16,18-19], especially in the control of stress, anxiety and pain [16], and is a strategy for humanization of care [16-17]. This simple technique easily applied by professionals [20-21] helps regulating mood, depression and sleep and transmits sense of peace, relaxation, well-being, comfort, safety or decreased tension. [22-24].

Burn victims experience too much pain, discomfort and tension during dressing changes. Isolated pharmacological treatments are not able to control these unpleasant experiences, which explains the need to introduce new therapeutic modalities in the care for these patients. This justifies the importance of understanding the role of music in the management

of pain in this population. Thus, the objective of the study is to describe the effect of music on pain of burn victims during the dressing change.

Methods

This is an applied, descriptive and exploratory study with a quantitative approach and sampling by convenience, performed at the Burn Treatment Unit of a public hospital in northeastern Brazil, from October 2015 to April 2016.

Sample consisted of 16 burn victims who were among the first and third day of dressing change in the hospital beds. Changes had been performed by nursing staff without the use of local anesthetics. Inclusion criteria were participants aged 12 years or older, having score on the Glasgow Coma Scale was equal to 15 and making use of routine analgesia of the unit about thirty minutes before the exchange of the dressings.

Those with impaired verbal communication, cognitive or hearing impairment, burn in the ear, difficulty in understanding the visual numeric scale of pain measurement or in use of central nervous system depressants were excluded from the sample.

Patients were randomized in three groups: Group A (GA) - heard music for about thirty minutes before dressing; Group B (GB) - heard music during the dressing change for at least 30 minutes; Control Group (CG) - did not hear music. The songs used in this study were selected by the patients themselves and applied through individual headphones.

After the administration of analgesics, patients were asked about the presence of pain, its intensity and quality standard at that time; the heart and respiratory rate and oxygen saturation were also verified. The same questions were made soon after the end of the dressing change and, this time, they referred to the pain during and after the procedure. Physiological parameters were reassessed at the moment.

To evaluate pain and its manifestations, researchers used the visual numeric scale and the defining characteristics of the nursing diagnosis of acute pain, defined by the taxonomy II of the North American Nursing Diagnosis Association (NANDA)[25].

The results were presented in tables and interpreted based on descriptive statistics and on the following hypothesis tests: Wilcoxon and Kruskal-Wallis, both non-parametric tests used for comparison between two and three averages, respectively. Authors used the Fisher's exact test to compare categorical variables. It was adopted in this study, significance level of 5% ($p \leq 0.05$).

The study met the criteria set forth in Resolution 466/2012 [26] and was approved by the Research Ethics Committee of the Federal University of Sergipe under the CAAE No. 44587415.4.0000.5546. The participation of the subjects in the study was conditioned to prior consent through the Informed Consent Form.

Results

The overall average age of the study was 31.8 years (± 14.1) and changed between the research groups (GA) (x) 26.2, ± 13.4 , GB (x) 35.3, ± 13.9 ; CG (x) 32.0, ± 16.0), whereas average for the burned surface area (BSA) was 15.8% (± 11.5), with floating of 17.5% (± 3.5) in GA; 11.5% (± 4.0) in group GB; and 19.2% (± 18.2) in the CG.

Most subjects were male (62.5%) and there was no homogeneity in the number of representatives of each gender in the three groups. The most affected body segments were the lower limbs (68.8%) and the trunk (56.2%), but in the GA, the upper limbs (75.0%) predominated in relation to the trunk (50.0%) and in the CG, the segment head and neck (83.3%) stood out at the expense of the lower limbs (33.3%). Almost the entire sample (93.8%) had second-degree burns. Only one patient had record of varying degrees of burns - first and second (**Table 1**).

The musical preferences of the participants are concentrated mainly in the genres religious/gospel (50.0%), *sofrência*, which will be called "crying romantic pop", (37.5%) and *farró* (31.2%), although religious/gospel music has not been asked by any of the subjects of GA, nor *farró* by the CG members (**Table 1**).

Table 1. Gender, characteristics of the injuries and musical preferences of burn victims treated at the Burn Treatment Unit. Aracaju, Brazil, 2016.

Variables	GA		GB		CG		Total	
	n	%	n	%	n	%	n	%
Gender								
Female	0	0.0	2	33.3	4	66.7	6	37.5
Male	4	100.0	4	66.7	2	33.3	10	62.5
Part of the body affected								
Head and neck	2	50.0	0	0.0	5	83.3	7	43.8
Trunk	2	50.0	3	50.0	4	66.7	9	56.2
Upper limbs	3	75.0	2	33.3	3	50.0	8	50.0
Lower members	4	100.0	5	83.3	2	33.3	11	68.8
Genitalia	0	0.0	1	16.7	0	0.0	1	6.2
Depth of the injury								
1st degree	0	0.0	1	16.7	0	0.0	1	6.2
2nd degree	3	75.0	6	100.0	6	100.0	15	93.8
3rd degree	1	25.0	0	0.0	0	0.0	1	6.2
Musical genre								
Classic/Instrumental	0	0.0	0	0.0	1	16.7	1	6.2
Gospel/Religious	0	0.0	3	50.0	5	83.3	8	50.0
<i>Axé/Pagode/Samba</i>	0	0.0	2	33.3	0	0.0	2	12.5
Country	0	0.0	2	33.3	0	0.0	2	12.5
<i>Farró</i>	3	75.0	2	33.3	0	0.0	5	31.2
Crying romantic pop	2	50.0	3	50.0	1	16.7	6	37.5
Electronic music	0	0.0	0	0.0	1	16.7	1	6.2
Romantic/Brega	1	25.0	1	16.7	1	16.7	3	18.8

Table 2. Physiological parameters of burn victims in the period close to the completion of daily dressing. Aracaju, Brazil, 2016.

Variable	Before		During		After		After
	\bar{x}	\pm	\bar{x}	\pm	\bar{x}	\pm	
Group A							
Heart rate	98.8	21.7	-	-	94.8	10.1	1.0000 ^b
Ventilatory rate	15.8	3.9	-	-	16.5	3.4	0.7715 ^b
Oxygen Saturation	97.8	1.3	-	-	98.5	1.0	0.3529 ^b
Pain intensity	4.0	3.4	4.8	2.8	0.8	1.5	0.1255 ^a
Group B							
Heart rate	97.8	14.2	-	-	91.3	16.0	0.8723 ^b
Ventilatory rate	17.8	2.0	-	-	18.7	1.8	0.5105 ^b
Oxygen Saturation	94.0	6.0	-	-	95.2	6.1	0.6248 ^b
Pain intensity	2.0	1.9	5.7	2.9	1.7	1.9	0.0505 ^a
Group C							
Heart rate	98.0	12.0	-	-	104.3	16.5	0.6304 ^b
Ventilatory rate	15.7	2.8	-	-	16.5	2.3	0.5662 ^b
Oxygen Saturation	97.8	1.2	-	-	97.0	3.1	1.0000 ^b
Pain intensity	2.8	4.0	8.0	2.38	0.7	1.6	0.0055 ^a

^a: Kruskal-Wallis; ^b: Wilcoxon.

As for physiological parameters, in the the groups in which subjects were exposed to music, there was a reduction in the average heart rate when comparing the periods before and after the dressing. However, in the control group, this effect could not be observed. On the other hand, the average oxygen saturation increased in groups exposed to therapy with music and reduced in the unexposed group. The ventilatory rate behaved in a similar manner in all the subjects, i.e., there was an increase from the average value (**Table 2**).

In the period prior to the dressing, most participants reported feeling pain (62.5%), except in the CG, where the experience of pain was referred by only half of the sample. In contrast, in the period after the procedure, the pain was experienced by the minority of subjects (37.5%), except for GB, in which most of the subjects remained with pain

(66.7%). It is noteworthy that, during the procedure, there was unanimity of report of pain (**Table 3**).

Overall, the average pain intensity reduced, regardless of the research group, when comparing the periods before and after the dressing, although it had increased during the procedure. In the group exposed to music only before the dressing (GA), the reduction in pain intensity was not significant ($p = 0.1255$); however, there was statistical significance in the non-exposed group (CG) and in the one in which patients listened to music during the procedure ($p = 0.0055$ and $p = 0.0505$, respectively) (**Table 2**). Besides the average intensity of pain, it was possible to classify it as absent, mild, moderate and intense (**Table 3**).

Pain quality is a parameter with little variability between periods. The group that listened to music before the dressing (GA) and the one who did not hear music (CG) qualified it mainly as throbbing and burning, whereas pinch and burning were the expressions most used by patients who listened to music during dressing (GB). It is noteworthy that in the control group (CG), the characteristic burning was significantly associated with all periods of the study ($p = 0.118$) (**Table 3**).

It was observed that, different from quality, the forms of pain manifestations varied between periods, however self-report was present in all groups and periods. In addition to self-report, in the period before the dressing, facial expression (25.0%) and muscle stiffness (25.0%) stood out in GA. In GB, the relief position was the most observed manifestation (50.0%), while facial expression also stood out in the CG (33.3%) (**Table 3**).

During the dressing, regardless of the research group to which they belonged, all subjects expressed pain through verbal report. Facial expression also appeared frequently (GA: 50.0%; GB: 83.3%; CG: 100.0%). It is noteworthy that, in the period after the procedure, the relief position stood out especially in the groups GA (25.0%) and GB (50.0%) (**Table 3**).

Table 3. Pain characteristics in burn victims exposed and non- exposed and to music therapy before, during and after dressing. Aracaju, Brazil, 2016.

Variable	GA							GB							CG						
	Before		During		After		p-value*	Before		During		After		p-value*	Before		During		After		p-value*
	n	n	n	n	n	n		n	n	n	n	n	n		n	n	n	n	n	n	
Presence																					
No	1	25.0	0	0.0	3	75.0	0.2000	2	33.3	0	0.0	2	33.3	0.4706	3	50.0	0	0.0	5	83.3	0.0210
Yes	3	75.0	4	100.0	1	25.0		4	66.7	6	100.0	4	66.7		3	50.0	6	100.0	1	16.7	
Presence																					
Absent	1	25.0	0	0.0	3	75.0	0.5510	2	33.3	0	0.0	2	33.3	0.2300	3	50.0	0	0.0	5	83.3	0.0253
Mild	1	25.0	2	50.0	1	25.0		3	50.0	1	16.7	3	50.0		1	16.7	0	0.0	0	0.0	
Moderate	1	25.0	1	25.0	0	0.0		1	16.7	2	33.3	1	16.7		1	16.7	2	33.3	1	16.7	
Intense	1	25.0	1	25.0	0	0.0		0	0.0	3	50.0	0	0.0		1	16.7	4	66.7	0	0.0	
Quality																					
Throbbing	3	75.0	3	75.0	1	25.0	0.4545	0	0.0	0	0.0	0	0.0	1.0000	2	33.3	2	33.3	0	0.0	0.4706
Pinch	0	0.0	0	0.0	0	0.0	1.0000	2	33.3	1	16.7	1	16.7	1.0000	1	16.7	0	0.0	0	0.0	1.0000
Burning	1	25.0	2	50.0	1	25.0	1.0000	1	16.7	5	83.3	4	66.7	0.1104	1	16.7	5	83.3	0	0.0	0.0118
Not applicable	1	25.0	0	0.0	3	75.0	-	2	33.3	0	0.0	2	33.3	-	3	50.0	0	0.0	5	83.3	-
Quality																					
Verbal report	3	75.0	4	100.0	1	25.0	0.2000	4	66.7	6	100.0	4	66.7	0.4706	3	50.0	6	100.0	1	16.7	0.0210
Facial expression	1	25.0	2	50.0	1	25.0	1.0000	0	0.0	5	83.3	2	33.3	0.0181	2	33.3	6	100.0	0	0.0	0.0021
Relief position	0	0.0	0	0.0	1	25.0	1.0000	3	50.0	0	0.0	3	50.0	0.1492	1	16.7	0	0.0	0	0.0	1.0000
Muscle stiffness	1	25.0	1	25.0	0	0.0	1.0000	0	0.0	5	83.3	0	0.0	0.0021	0	0.0	3	50.0	0	0.0	0.0735
Not applicable	1	25.0	0	0.0	3	75.0	-	2	33.3	0	0.0	2	33.3	-	3	50.0	0	0.0	5	83.3	-

* Fisher's exact test

However, when comparing the three periods of research, in each group individually, no defining characteristics was influenced by the music in the GA. Nevertheless, listening to music during dressing change may have influenced the manifestation of pain through facial expression ($p = 0.0181$) and muscle stiffness ($p = 0.0021$) in GB. Moreover, the fact of not listening to music interfered in the demonstration of pain by verbal report ($p = 0.0210$) and facial expression ($p = 0.0021$) in GC.

Discussion

Pain is an important source of acute and chronic suffering for burn victims, family members and health professionals. It is often associated with delay in the recovery and in return to daily activities, which interferes in the economic life of the family and increases public spending as it prolongs hospital stay and increases the use of drugs from different categories. In this scenario, the control of pain through music, besides reducing hospital costs, can improve the quality of life of the subjects involved in this process, as it promotes distraction and interaction between staff, patient and family.

Unlike other types of trauma, in which pain tends to decrease over time and in the beginning of treatment, in burns, the dressing change causes considerable pain [4-5, 8, 10, 27-28]. Therefore, the pain from burns is one of the most difficult to treat [5]. According to the standards of this kind of pain, victims can experience it at home, while moving the affected area, during the procedure, in the postoperative period and may still have painful episodes worsened unexpectedly [2-3, 8].

Obviously, all burn victims experience pain in varying intensity, regardless of the size and depth of the injury. Multiple [29] and surface burns [10] tend to be more painful, whereas the region of head/face/neck, when affected, cause less pain [29]. In this study, most of the subjects were considered

averagely burned, had second-degree burn and the lower limbs and trunk were the body segments most affected.

Music is a non-pharmacological resource widely used for pain control and humanization of care in different health scenarios [16, 18-19, 21]. It is also a resource that considers the integrity and uniqueness of the being and encourages their active participation in the care process [30-31]. In this perspective, the decision-making on the type of music and best time for therapy is a shared responsibility between nurse and patient [32].

In this study, the musical preference corresponded mainly to the gospel genre. It is possible that the vulnerable health status has increased religious beliefs and propitiated such a choice. In contrast, the genres crying romantic pop and *fórró* also stood out, which can be justified by the Northeastern culture of participants.

It was noted that music was able to reduce the average heart rate and increase the average oxygen saturation in the exposed groups, but did not affect the ventilatory rate. Ghezalje (2015), in his study, found no statistical difference in heart rate between the exposed and unexposed groups, but did it for ventilatory rate [20]. It is common that patients in pain have dysfunction of vital signs such as tachycardia and tachypnea [33], but it is also possible that this association is not be true or is weak [34], which may explain the lack of statistical significance in this study.

When comparing the periods before and after the completion of dressing, regardless of exposure to music, there was inversion of the proportion of subjects with and without pain. In addition, the average pain intensity also decreased in all groups, even in GB, in which the majority of subjects remained in pain after the dressing. This reduction was significant in the group exposed to music during dressing (GB) and in that not exposed (CG). It is possible that the cleaning of the injury, such as removal of exudates and debris and the exchange of the covers

improve wound bed environment and protect the exposed nerve endings. This explains why the intensity of pain after dressing has decreased regardless of musical intervention.

Cole & LoBiondo-Wood (2014), in a systematic literature review, found evidence for the use of music as an adjunct in pain management among hospitalized patients [21]. Overall, the music is able to significantly reduce pain intensity in the exposed group [20, 35-36]. However, when comparing the groups (exposed and unexposed), the difference between them can be significant [20] or not [37-38].

During dressing change, the pain was considered moderate or intense by most subjects, but in the control group (CG) it stood out by statistical significance. This confirms the assumption that the dressing changes cause intense pain [4-5, 7-8], often similar to that in the time of trauma [7-8]. It is possible that exposure of nerve endings and the manipulation of inflamed tissues explain this.

Music has moderately influenced the perception of pain with respect to its characteristics. In this sense, "burning" was a common attribute in all research groups, in line with other studies [8, 39]. "Thin" [4] and "intense" [4, 28] are also expressions used to characterize pain in the burns, often accompanied by "itching" [39]. Professionals must understand and properly interpret the expressions used by patients to represent their pain.

Individuals may evidence pain in various ways [25]. In this study, despite subjects were listening to music, the main form found by them to express the pain was the verbal report, but facial expression, muscle stiffness and relief position also stood out according to the time of the research in relation to the dressing change. Grunting, crying, sleep disturbance and appetite change also characterize the pain in burn victims [15, 40-41]. Moderate to intense pain tend to be expressed by more obvious or emphatic characteristics. Verbal expression, facial expression and muscle stiffness are included in these characteristics.

It is worth mentioning that pain can interfere with the fulfillment of other human needs like sleep and physical mobility [15, 41], besides promoting a vicious cycle with anxiety [40-42], which in turn negatively influence the process of recovery and rehabilitation.

This study was limited by the sample size. In addition, due to the nature of the intervention and the participant's right to know the purpose of the research, masking was not feasible. Moreover, it was not possible to isolate the subject from intervention confounders, such as visual and verbal contact with nursing professionals who performed the dressing, which may perhaps have distracted the attention from the music.

Conclusion

Music proved to be a simple and effective resource in controlling pain in burn victims, since it assisted in the control of vital signs, in reversing the proportion of subjects with pain, when comparing the periods before and after the dressing change, and in reducing the average intensity of pain. However, music has partially influenced the characterization of pain, as well as ways to express it.

Pain deriving from burns, if not properly treated, can become chronic, which may cause great damage to the biopsychosocial and spiritual life of the victims for long periods. Therefore, it is essential to acquire new knowledge on ways to manage pain efficiently, which can prevent damage in the short and long term and improve the quality of life for burn victims.

There is a need of further studies to focus the use of music as a resource for pain relief in this population in order to consolidate the findings, improve ways to use it and ensure safety in the application thereof.

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