Oliveira PP, Rodrigues AB, Onofre PSC et al.

The use of music in cancer patients with chronic pain

ABSTRACT

Objective: to identify the effects of music on pain relief, from the perspective of cancer patients with chronic pain. Method: this descriptive, exploratory, quantitative and qualitative study was conducted with individuals with cancer and chronic pain. Music sessions were held during three days. At the beginning and end of each session, the patients were interviewed and the numeric pain rating scale was administered. The research project had been previously approved by the Research Ethics Committee of the Hospital, Protocol No. 07/601, CAAE 0052.0.028.000-07. Results: all individuals reported a reduction of chronic pain with the music sessions. Before the first music session, the respondents reported disbelief in this form of non-pharmacological therapy. Conclusion: after the music sessions, the respondents reported having obtained pain relief, as well as relaxation, evocation of personal memories and the temporary oblivion of problems.

Descriptors: Neoplasias; Pain; Musicotherapy.

RESUMO


RESUMEN

Objetivo: conocer los efectos de la música sobre el alivio del dolor, desde la perspectiva de pacientes con cáncer con dolor crónico. Método: estudio descriptivo, exploratorio, cuantitativo y cualitativo, con personas con cáncer y dolor crónico. Se aplicaron tres sesiones de música durante tres días. Al principio y al final de cada sesión, se realizaron la entrevista y la aplicación de la escala numérica del dolor. El proyecto de investigación fue aprobado por el Comité de Ética en Investigación del Hospital (protocolo número 07/601; CAAE 0052.0.028.000-07). Resultados: hubo una reducción del dolor crónico en todos los pacientes. Antes de la primera sesión de música, los encuestados refirieron sentir incredulidad en relación a esta forma de terapia no farmacológica. Conclusión: después de las sesiones de música, los pacientes declararon haber obtenido alivio del dolor, relajación, evocación de recuerdos personales y el olvido de los problemas. Descriptores: Neoplasias; Dolor; Musicoterapia.
INTRODUCTION

Pain is considered one of the most common and feared symptoms of cancer. The pain associated with cancer can lead to a variety of symptoms, both physical and emotional, including changes in sleep, fatigue and depression.\(^1\)\(^-\)\(^3\)

The perception of and reaction to pain vary among individuals with the same disease location and extent and may cause different degrees of suffering. The response to a painful stimulus is therefore individual and depends on the physical and emotional states of the person in pain. Thus, the pain is not only induced by noxious stimuli, but also associated with individual characteristics, such as mood, symbolic meanings attributed to the sensory phenomenon, and cultural and emotional aspects.\(^4\) According to the literature, there are several therapies to control chronic pain. These include massage, application of heat, acupuncture, music therapy and distraction techniques.\(^5\)

Music therapy is the field of medicine that studies the influence of sound on the human being. It has the aim of opening channels of communication, producing therapeutic, psycho-prophylactic and rehabilitative effects on the individual and on society.\(^6\)

When a sound reaches the brain, it acts in the limbic system (the center of emotions), specifically in the amygdaloid complex. In a situation of stress, fear or sadness, the amygdaloid complex sends a message to the hypothalamus. The hypothalamus then releases corticotropin-releasing hormone to the pituitary gland, which in turn releases adrenocorticotropic hormone (ACTH) into the bloodstream. ACTH circulates in the bloodstream until it reaches the adrenal glands, which then release cortisol. Changes in the pattern of cortisol secretion were found to be associated with depression, psychological stress and physiological stress, such as hypoglycemia, fever, trauma, surgeries, fear, pain, physical exercise or extreme temperatures.\(^7\)\(^-\)\(^9\)

At the same time, cortisol inhibits other functions, notably insulin secretion, which causes glucose released by the liver to be available for muscle consumption to escape or face a threat. Music activates the auditory cortex, reducing the activity of the amygdaloid complex and inhibiting the whole chain of reactions. Cortisol stops being released and the person calms down.\(^10\)

The physiological effects of music involve sensory, hormonal and physiomo-motor reactions, such as changes in metabolism, release of adrenaline, regulation of respiratory rate, changes in arterial blood pressure, fatigue and muscle tone reduction, and increase in the threshold for sensory stimuli, improving attention and concentration.\(^11\)

Music therapy activities, besides being highly rewarding and complete, causing a catharsis, also stimulate our sensitivity, putting us in direct contact with our emotions and establishing a bond that leads to better social integration and living.\(^10\)\(^,\)\(^11\)

Several studies show the combination of the knowledge and practical use of music in health care with medical practices, the field that came to known as music therapy, especially since the XX century.\(^7\)\(^,\)\(^9\) In nursing practice, music has been identified as a complementary therapeutic tool in the management and control of acute and chronic pain. The first Music Therapy program was developed in 1977 at a palliative care service of the Royal Victoria Hospital. Its aim was to meet the needs of individuals that could not be met by therapeutic efforts nor by their families. This therapy encompassed mental/psychological, social, physical and spiritual dimensions.\(^9\)

The motivation for this research originated because it is an area which holds great potential for nursing care. In Brazil, the use of music therapy is not a common practice. There are only a few reports in the literature on the subject. This practice is mostly used by oncology nurses in the United States of America (USA). Given that many cancer patients experience treatment-related side effects, including pain, alternative therapies can be used as an adjuvant analgesic.

Thus, it is important that nurses start using music therapy for relief of...
emotional, physical and behavioral states. It helps patients turn off the pain, put pain out of their minds for a moment by listening to the rhythm of the music. This improves the mood of hospitalized persons and reduces the consumption of analgesics. Thus, the aim of this study is:

- To identify the effects of music on pain relief, from the perspective of cancer patients with chronic pain.

**METHOD**

This quantitative and qualitative study was conducted at an oncology unit of a general private hospital in Brazil. The study sample was composed of ten individuals with cancer who had chronic pain, were older than 20 years, had no music education, were mentally aware and oriented, able to respond verbally to questions of the study and agreed to participate in the study by signing the Informed Consent Form.

The study was only implemented after approval of the research project by the Research Ethics Committee of the hospital where the data were collected (CAAE 0052.0.028.000-07 and Protocol 07/601). Data collection was carried out from November through March 2011.

The data were collected through personal interviews, using a semistructured interview guide which had been developed by the authors of this study. These interviews had open questions, were recorded in digital media, had an average duration of 40 minutes and were later transcribed and analyzed.

Prior to the interviews, the medical records of all individuals participating in the study were reviewed regarding age, sex, disease, frequency and intensity of pain, and the prescription of analgesic drugs and adjuncts to pain control. Next, we performed the numerical pain rating scale. According to this scale, zero represents no pain and ten represents an excruciating pain. Mild pain ranges from 1 to 3; moderate pain from 4 to 6; and severe from 7 to 9.11

Three music sessions were held for each subject in three non-consecutive days. Three different classical songs were used for the respective days. They had been previously chosen and selected by consensus of all interviewees. On the first day, we played Dvorak’s Serenade for Strings in E major. On the second day, participants requested Johann Strauss’ Blue Danube waltz. Finally, on the third day, we played Vivaldi’s concertos. All music sessions were held in the patient’s room, using a radio with CD player at a moderate volume level (40-60 decibels), which corresponds to the noise level of a normal conversation. The accompanying persons were allowed to remain in the room during the session. At the end of each session, the patients were once again interviewed and the numeric pain rating scale was administered.

The student T test was used for the correlation between pain scores before and after the music sessions. The significance level was considered to be 0.05 (or 5%).

After the interviews were transcribed, the data were analyzed by using the content analysis technique, in which the researcher interprets the subjective descriptions using techniques to find content in the reports of the study subjects.12 The content analysis method is characterized by three main steps: pre-analysis, exploration of the material and the processing of results (inference and interpretation). The pre-analysis is the organization phase. It aims at operationalizing and systematizing ideas. The exploration of the material is the next step. In this stage, the analysis itself is performed, through coding, categorization and quantification of the information. Categorization facilitates the analysis of the information, and helps find a meaning. In this study, we used semantic categorization, i.e. grouping according to subject.12

Content analysis aims to reveal a profound significance, a stable meaning. It is defined as a set of techniques for the analysis of communications, which places great value on accuracy as a way of not getting lost in the heterogeneity of its object. It is valued as a possibility of providing accurate and objective techniques that are sufficient to guarantee the discovery of true meaning.12
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The use of music in cancer patients with chronic pain was studied to determine its effects on pain relief. After the transcription and reading of the transcripts, answers were coded for theme content. The definition of units of meaning provided an approximation of the reality experienced by cancer patients with chronic pain and the effects of music on pain relief. Three units of meaning were identified: one before the music sessions and two after the music sessions.

Table 1 refers to the individuals’ characteristics, type of tumor and the analgesic drug used. Most subjects were females (60%), aged 60–80 years (60%) and had primary tumor with bone metastasis (30%). The analgesic drug class used by most individuals was that of strong opioids (45%), followed by weak opioids (30%). Patients also made use of nonsteroidal anti-inflammatory drugs (15%) and adjuvant medications for pain control (10%).

Table 1. Distribution of subjects according to sex, age, tumor type and analgesic drug classes used. São Paulo (SP), 2011.

<table>
<thead>
<tr>
<th>Sample characterization</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>4</td>
<td>40</td>
</tr>
<tr>
<td>Female</td>
<td>6</td>
<td>60</td>
</tr>
<tr>
<td>Age (years)</td>
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<td></td>
</tr>
<tr>
<td>20–40</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>41–60</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>61–80</td>
<td>6</td>
<td>40</td>
</tr>
<tr>
<td>Tumor type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary tumor with bone metastasis</td>
<td>3</td>
<td>30</td>
</tr>
<tr>
<td>Primary tumor with metastasis to the Central Nervous System</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>Giant cell cancer of the spinal column + sternum + thorax + lung</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>Single primary tumor (breast, prostate)</td>
<td>3</td>
<td>20</td>
</tr>
<tr>
<td>Acute Myeloid Leukemia</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>Analgesic classes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strong opioida</td>
<td>9</td>
<td>45</td>
</tr>
<tr>
<td>Weak opioidb</td>
<td>6</td>
<td>30</td>
</tr>
<tr>
<td>Non-steroidal anti-inflammatory drugs</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>Adjuvant medications</td>
<td>2</td>
<td>10</td>
</tr>
</tbody>
</table>


The following table shows the pain scores of cancer patients before and after the music sessions according to the numeric pain rating scale. There was a reduction in the pain scores after the music sessions in 100% of cases (Table 2).

Table 2. Pain scores of cancer patients according to the numeric pain rating scale. São Paulo (SP), 2011.

<table>
<thead>
<tr>
<th>Cancer patients</th>
<th>Pain score before the 1st music session</th>
<th>Pain score after the 1st music session</th>
<th>Pain score before the 2nd music session</th>
<th>Pain score after the 2nd music session</th>
<th>Pain score before the 3rd music session</th>
<th>Pain score after the 3rd music session</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>8</td>
<td>2</td>
<td>6</td>
<td>4</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>02</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>03</td>
<td>4</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>04</td>
<td>4</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>05</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>06</td>
<td>7</td>
<td>3</td>
<td>5</td>
<td>0</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>07</td>
<td>7</td>
<td>3</td>
<td>5</td>
<td>0</td>
<td>8</td>
<td>2</td>
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<tr>
<td>08</td>
<td>4</td>
<td>1</td>
<td>6</td>
<td>0</td>
<td>5</td>
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<td>09</td>
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<td>1</td>
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<td>4</td>
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<tr>
<td>10</td>
<td>8</td>
<td>2</td>
<td>5</td>
<td>1</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>

There was a reduction in pain intensity from baseline after the music session. We can see that patients had moderate to severe pain before the music session (interviewees 01, 03, 04, 05, 06, 07, 08, 09 and 10), and obtained a reduction in pain scores after the music sessions in 100% of cases (Table 2).
We can be seen in Table 3 that the p-value were lower than 0.05 (or 5%) in all cases, i.e., there was a statistically significant decrease in pain intensity ratings after the music session.

The units of meaning obtained from the data collected through the interviews performed before and after the music sessions are shown next.

Before the music sessions

1st Unit of meaning: Reporting disbelief in music as an adjunct therapy for relieving pain before the music sessions.

Before the first music session, the subjects reported not believing in music as relieving pain before the music sessions.

- I don't believe in alternative therapies. Does pain really exist? (laughs). (interview 4)
- As incredible as it seems, I’m not feeling pain anymore. (interview 9)
- I found it great, I traveled in my thoughts, I remembered the songs they played in my niece's wedding. (interview 1)
- I love waltz, I remembered the trip I took to Vienna. (interview 2)
- The music has the same effect as morphine, it seems that you took away the pain from inside me. (interview 3)
- My pain practically disappeared. (interview 4)
- It's so good to feel lighter, peaceful, with nothing tormenting your mind like pain. I felt no pain at all. (interview 4)
- I feel more relaxed, sleepy. While the music was playing I completely forgot about my problem. (interview 5)
- I feel more relaxed, my problem disappeared. (interview 7)

2nd Unit of meaning: Discovering the potential of music in the treatment of pain.

The subjects reported belief in the effects of music after the music sessions.

- I didn't want to receive the medication, because I believe it will get better after this music session. (interview 6)
DISCUSSION

Music therapy was chosen as an intervention strategy because it involves the encounter with the Other. Health care is the primary goal of this therapy and its benefits have already been recognized in hospital humanization.

The majority of cancer patients with chronic pain who had been hospitalized during the three months of research were female. This is a usual finding in studies conducted in Brazil, where there is a higher proportion of women than men, especially in old age. However, if we take into account the diseases studied, the male/female ratio depends on the type of cancer.\textsuperscript{13,14}

Most participants were aged 60 years or older, which is consistent with the literature. The increase in the number of chronic diseases in aging populations occurs because there is an increased risk of incidence of several diseases, either due to the biological process itself or due to long periods of exposure to pathogens.\textsuperscript{14,15} Thus, the development of chronic diseases and conditions of old age cause a change in the profile of persons who seek health care services.\textsuperscript{14,15}

As for the tumor types, there was a mix of types, namely: primary solid tumors, solid tumors with metastases, and leukemia. This finding is in line with the literature, which states that cancer-related pain affects approximately 50\% of patients in all stages of the disease and around 70\% of individuals with advanced disease. Cancer pain may be due to the primary tumor or its metastases, the anticancer therapy or the research methods. In some individuals, it may also not be related to the neoplasia.\textsuperscript{2,16}

All patients were using medications for pain relief. Treatment with analgesic and adjuvant medications is the most common therapy. The preferential use of oral administration of drugs at pre-established times and not under demand is recommended. Studies propose the use of non-steroidal anti-inflammatory analgesics, weak opioids and strong opioid, in this sequence, for pains of increasing intensity. Adjuvant medications (antidepressants and anticonvulsants, etc.) can be used together with analgesic drugs.

The persons who participated in this study had been having pain for a prolonged period of time. Considering the devastating impact that pain can have on one’s life, one must assume that the degree of disability caused by pain was significant. The severity of patients’ suffering is revealed by the finding that all respondents were in pain at the time of the interview. This suggests that many of the patients felt prolonged or constant pain. We found that 75\% of patients with metastatic cancer were in constant pain or felt pain during half of the day. In the case series of Bringman et al.\textsuperscript{15}, 20\% of patients with newly diagnosed neoplasias (in the last 6 months) had pain every day, with episodes lasting at least 1 hour.\textsuperscript{15}

The pain scores show that all patients were in pain before the three music sessions. Most of them had moderate to severe pain. After the three music sessions, all patients reported a reduction in pain intensity, which then ranged from mild to absent. Only one individual had, in the second music session, a reduction in the numeric scale score from 6 to 4, remaining with moderate pain. These findings are congruent with other studies, which also showed the contribution of music in reducing pain.\textsuperscript{3,18-9}

With regard to the sound and musical universe of respondents, an inclusion criterion in this study was not being musicians/ having music education, because musicians usually listen to music differently than non-musicians. The former tend to do it analytically, which may interfere with the effects of music on the listener. All patients selected the same musical style, i.e., classical music. It is noteworthy that the study was conducted in a private hospital, whose...
clientele is predominantly individuals of high socio-economic strata. In addition, most of them Jewish ancestry. The homogeneous music repertoire chosen was found to be helpful in this study.

The respect for the musical preference, i.e., the music an individual prefers to listen to, is advocated by music therapists11,11 who have a different approach from that used by nurses in daily life due to the absence of a comprehensive discography in the hospital environment. We will not discuss here which of the two is the best approach to be used. We simply mention those practices that we consider appropriate to be included in the scope of our activities. We focus more on the relationship music/listener, regardless of their musical preferences, i.e. what is in the music and the feelings that it awakens in the listener. The musical preference in passive listening brings another contradictory issue from the therapeutic point of view: the ISO principle (ISO comes from the Greek word 'isos' and means equal). This principle should be carefully evaluated when the therapeutic use of music is proposed. The ISO principle, which can be classified into gestaltic, cultural, individual or universal, is a dynamic concept that summarizes the notion of the existence of a sound or set of sounds that characterize or individualize each human being, condensing sound archetypes11,13 that may be contained in classical music, particularly in Great Musical Works, in the case of the universal ISO.

According to this principle, the states of mind of an individual can be changed through music. To do so, for example, to minimize the anxiety of an individual, he should listen to a more agitated song, which should then be gradually replaced by a slower rhythm in order to favor a state of relaxation. This is configured in Hevner's Mood wheels, which features eight mood qualities and is composed by adjectives that are related but differ from one another. If used systematically, it can lead to the smooth transition from one mood quality to the other11. If, hypothetically, this was the goal of the therapy, letting the individual choose the repertoire - depending on his/her preferred musical style - could conceal a certain state of mind, make its diagnosis difficult, or even fail to meet the real needs of the person. This did not happen in this study because all subjects chose erudite music, i.e. universal ISO.

The issue a person's control over the environment, which inevitably imposes itself, can be solved by offering predetermined musical selections. In this context, the individual may choose a song (having, in a way, his preference respected) among those defined by the nurses. Songs to which they have greater knowledge about their effects and the treatment to which they should be used in each clinical situation.

The meaning units identified show that there was a significant reduction in chronic pain in the interviewees. Before the first music session, the respondents reported disbelief in this form of non-pharmacological therapy. It is known that people with chronic pain undergo several pharmacological and non-pharmacological treatments and that this type of pain is often difficult to control. These individuals may show disbelief in alternative therapies because they are still not widespread or used frequently. Many health professionals also do not use this form of therapy, probably because they do not feel prepared to do it.

The use of music therapy sessions resulted in partial or complete pain relief. Some respondents were able to sleep better, were more relaxed and calm, while others reported that the music evoked personal memories. Studies on the effect of music on people with pain concluded that muscle relaxation, decreased pain perception, more restful sleep and empowerment of the individual to collaborate with treatment can be reached by the use of music.15-18

The findings of the statistical and discourse analyses (according to Bardin) were complementary. Music therapy made it possible to work with the connections of feelings, symbols and stories. Every ‘moment’ of music therapy is unique, marked by its differences and similarities, and this feature allows us to perceive the leading role played by the patients during
the process of choosing the songs that will listened to. This aspect showed to be relevant to the positive results obtained in this study.

It is important to stress that the control of chronic pain involves not only the use of non-pharmacological therapies. The use of pharmacological therapies are of essential importance, as recommended by the World Health Organization (WHO). The WHO guidelines for pain control - the analgesic ladder - state that: for mild pain (step 1), non-opioids (aspirin, paracetamol and other nonsteroidal anti-inflammatory drugs - NSAIDs) should be used; for moderate pain (step 2), weak opioids associated with non-opioids and adjuvant therapies are indicated; for severe pain (step 3), strong opioids together with non-opioids, weak opioids and/or adjuvant therapies should be used.19

It is important to highlight that, before the first music session, all the subjects in this study did not believe in the effects of music, but agreed to continue to participate because they experienced pain relief after the music sessions. After the last music session, the subjects reported that they were able to feel the beneficial effect of music and started to believe in music as an effective therapy.

One of the limitations of this study was the small sample, because individuals with chronic pain are usually admitted to the oncology unit for a short period of time. Nevertheless, they all met the criteria stipulated in the methodology. The results of this study were limited to one hospitalization and the study was performed in a single hospital in Brazil. These factors limit the generalizability of the results for cancer patients with chronic pain. Another limitation of the study was that the assessment of patients did not include the measurement of vital signs before and after the music sessions. However, these limitations do not invalidate the study. The results found encourage the conduction of further studies with a larger sample and for a longer period of time, as well as with a more detailed measurement of adherence criteria for a possible confirmation of our preliminary results.

The data presented here indicate that music therapy may be a potential adjuvant therapeutic approach in the treatment of chronic pain in cancer patients. Additionally, music therapists can be inserted in multidisciplinary treatment programs offered to these patients, since music therapy contributes to the pain control and, consequently, to the improvement in the quality of life of individuals with chronic pain.

**CONCLUSION**

This study allowed us to verify that music with well-defined formal structures have the potential to evoke images of musically unstructured sound material. We found that, after the music sessions, the respondents reported having obtained pain relief, as well as relaxation, evocation of personal memories and the temporary oblivion of problems. There was a significant reduction in the pain intensity ratings of all subjects after the music sessions.

Although we are aware of the limitations of our study, our findings allow us to infer that listening to classical music, particularly the ones mentioned in this study, may constitute a possible way for the establishment of criteria for the use of music in nursing.

The contribution of this study was to point out that music therapy is another adjuvant option for pain control. We suggest that further studies are conducted on this subject to assess a bigger number of subjects and evaluate in greater depth the use of music as an adjuvant therapy to medications.

**REFERENCES**


The use of music in cancer patients with...