



New Trends and Issues Proceedings on Humanities and Social Sciences



Issue 7 (2017) 139-153

ISSN:2547-8818

www.prosoc.eu

Selected Paper of 8th World Conference on Psychology, Counseling and Guidance, (WCPCG-2017), 28-30 April 2017 Grand Park Lara Convention Center, Lara – Antalya, Turkey

The Effects of Music Therapy on Anxiety and Pain Symptoms of Children With Cancer

Guncel Masarogullari^{a*}, Kingston University, London, Penrhy Road, Kingston upon Thames, Surrey KT1 2EE, UK

Suggested Citation:

Masarogullari, G. (2017). The Effects of Music Therapy on Anxiety and Pain Symptoms of Children with Cancer. *New Trends and Issues Proceedings on Humanities and Social Sciences*. [Online]. 07, pp 139-153. Available from: www.prosoc.eu

Selection and peer review under responsibility of Prof. Dr. Marilyn Campbell, Queensland University of Technology, Australia

©2017 SciencePark Research, Organization & Counseling. All rights reserved.

Abstract

Although music therapy is well documented in medical settings, the effects of the music therapy has not been well established yet. This study aimed to investigate the effectiveness of the music therapy on anxiety, and pain symptoms of children with cancer. Participants (aged ranged 6-16) were randomly allocated to one of two music therapy groups: 1) earphones with classical music, no choice (n = 20) or 2) earphones with classical music, free choice (n = 20) and a control group (n = 20) (earphones without music). In all groups, children listened to music (or the white noise) for 10 minutes before the chemotherapy. All of the symptoms were measured before the music therapy, during the chemotherapy (after the music therapy), and after the chemotherapy. State Trait Anxiety Inventory for Children (STAI-C), and Wong-Baker Faces Pain Rating Scale was used to measure the anxiety, and pain scores of the children. One-Way ANOVA and Mixed ANOVA analysis were used to analyse the effectiveness of the music. Results showed that the anxiety level of children decreased significantly in the music groups during and after the chemotherapy. However, music therapy did not affect the pain level of children

Keywords: Music therapy, anxiety, pain, cancer;

* ADDRESS FOR CORRESPONDENCE: **Guncel Masarogullari**, Kingston University, London, Penrhy Road, Kingston upon Thames, Surrey KT1 2EE, UK

E-mail address: guncelmasarogullari@gmail.com/ Tel: +44 20 8417 9000

1. Introduction

1.1. Cancer in Childhood

Uncontrolled growth and spread of abnormal cells constitutes a group of disease which is named as cancer (Hadley, 1996; Queensland Cancer Fund, 1994; as cited in Daveson, 2001). Genetic factors are more effective in childhood cancers than adulthood cancers. Genetic factors include inherited mutation, hormonal reasons and immune system disorders. In addition, some of the environmental factors leads to the cancer which are chemical, radiation, and viruses (Soyuer & Sitti, 2011).

The international Classification of Diseases for Oncology (ICD-O) divide into twelve major groups of childhood cancers which are 'leukaemia, lymphomas, brain and spinal tumours, sympathetic nervous system tumours, retinoblastoma, kidney tumours, liver tumours, bone tumours, soft-tissue sarcomas, gonadal and germ-cell tumours, epithelial tumours, and other and unspecified malignant neoplasm'(Stiller, 2004).

The total incidence rate of cancer is in the range between 110 and 150 per million (Yuku, 2006), and only about 0.5% of all cancers are seen in children under the age of 15 (Stiller, 2004). The annual incidence of the childhood cancers in Cyprus, Israel (Jew), Israel (Arabic), Egypt, Jordan, Italy, Spain, France, and Turkey is respectively 170, 133.3, 119.9, 130.9, 114.8, 158, 137.9, 135.6, and 115.6. The incidence in Europe and USA is respectively 130.9 and 153.3 (Soyuer & Sitti, 2011).

In developed countries, cancer is the major health problem and it is the number two diseases killer of people when combined all ages (Micheli, et al. 2002). Although, it is the second most common of death for the general population, cancer is ranked at the first disease which is cause of death of children from late infancy through early adulthood (Bleyer, 1990). Research showed that 20 per cent of all death between 1 and 14 years old children is related to the childhood cancers (Smith & Phillips, 2012).

Cancer affects patients' physiological and psychological functions (Kruse, 2003). Both the diagnosis and treatments which are chemotherapy, radiation therapy and lumbar puncture treatment, affect patients' psychological and physiological symptoms (Nguyen, Nilsson, Hellstrom & Bengtson, 2010). Most children with cancer report pain as a physiological symptom (Woodgate & McClement, 1998). In addition, pediatric oncology research indicated that cancer leads to intense anxiety (psychological symptom) (Hockenberry-Eaton, Diloriao & Kemp, 1995). Similarly, researcher found that the quality of life in children with cancer decreased in the months following diagnosis (Eiser,C., Eiser, J. R. & Stride, 2005). Deng, and Cassileth (2005) suggested complementary therapies such as music therapy, or relaxation techniques, can improve patients' psychological and physiological symptoms when using them with chemotherapy or radiotherapy. Some researchers showed that during the treatment (chemotherapy) patients' procedural-related pain or anxiety increase and patients could not tolerate these side effects, so complementary therapies are very important in the treatment of the cancer (Curtis, Krech & Walsh, 1991).

1.2. Chemotherapy

Chemotherapy refers to any chemical or drug treatment in treating any disease. By using chemotherapy, malignancy is aimed to be cured by using chemotherapeutic agents. The chemotherapy was developed for the treatment of the cancer such as leukaemia (Houlston, 2008). Although the chemotherapy treatment dramatically have been increased the survival rate of the children who suffer from the cancer, it has a number of physiological and psychological side effects

(Keller, 1995). 'Nausea, vomiting, pain, hair loss, skin irritation, immune system damage, and exhausting' can be given as examples of the physiological side effects of chemotherapy. Also, anxiety, depression and anger are some of the most psychological side effects of the chemotherapy (U.S. Department of Health and Human Services, 1994; as cited in Kruse, 2003).

1.3. Anxiety in Children with Cancer

Anxiety is a reflection to the threat, and huge number of cancer patients is anxious, because this disorder is threatening (Stark, Kiely, Smith, Velikova, House & Selby, 2002). In addition, anxiety is shown as a symptom or as a syndrome in the child population (Legrand, McGue, & Iacono, 1999). Palpitation and sweating can be given as examples of the anxiety symptoms. Uneasiness and restlessness are some characteristics of the anxious behaviours. Also, thinking patterns change depending on the anxiety, and these symptoms ensue as an apprehension, worry and poor concentration. In addition, some physical symptoms manifest along with anxiety such as vomiting, nausea, and fatigue. Moreover, anxiety can be adaptive for cancer patients, but in some certain situations it can be non-adaptive (Stark, House, 2000). The maladaptive anxiety affects the cancer treatments negatively. Therefore, in treating cancer patients, it is important to understand the nature of the anxiety (Sherbourne, Wells & Judd; as cited in Stark, et al., 2002).

Childhood cancer treatment can continue from 6 months to 3 years. This period of time depends on the phase of the illness and the type of the cancer (Childhood Cancer Foundation, 2010; as cited in Wu, Sheen, Shu, Chang & Hsiao, 2012). Chemotherapy treatment is very aggressive treatment and has several side-effects such as nausea, anxiety, vomiting, and hair loss. In addition to the side effects of the chemotherapy, the long duration of the hospitalization and the long term treatment affect the patients negatively and they leads some problems such as anxiety (NCCN, 2006; as cited in Pandey, Sarita, Devi, Thomas, Hussain & Krishnan, 2006). Anxiety is seen in different types in cancer patients such as before the treatment and during the treatment (Sarita, 2004; as cited in Pandey, et al., 2006). In other words, treatment administration is an important factor of stress in children with cancer (Katz, Kellerman & Siegel, 1980), and these procedural related treatments (e.g., chemotherapy) may lead to anxiety on children with cancer (Lanider & Tse, 2010). Especially, chemotherapy, bone marrow aspiration and lumbar puncture treatment manifest anxiety in a paediatric cancer (Katz, et.al., 1980). In one study, researchers collected data from 89 parents of children who suffered from cancer. They found severe anxiety level in the %24.7 of children (Yilmaz, Muslu, Tas, Basbakkal & Kantar, 2009). In addition, Costello and her colleagues (1988) indicated that the prevalence of the anxiety disorder on children with cancer whose age ranged between 7 and 11 was %8.9.

1.4. Pain in Children with Cancer

Cancer elicits a significant pain on children. In the paediatric cancer population, pain can be classified into three categories which are related to the diseases itself (e.g., brain tumour), treatments (e.g., chemotherapy) and treatment procedures (e.g., lumbar puncture) (Miser & Miser, 1989). Thus, not only disease but also the treatment procedures, diagnosis, and the side effects of treatments cause the pain on child population (Forgeron, Finley & Arnaut, 2005). According to the World Health Organization, the pain level of children with cancer should be measured regularly; analgesics should be given them regularly according to their pain levels. In addition, WHO suggested that the non-pharmacological interventions should be used to decrease the children's pain symptoms. In other words, some situational factors (e.g., chemotherapy treatments) exacerbate the patients' pain so, non-pharmacological interventions can help to reduce the pain if they modify to the specific

situational factors. In addition, although, drugs are the first choice to control the pain in the paediatric cancer patients, non-pharmacological interventions (e.g., behavioural methods) should be used together with drugs to reach better result (McGrath, 1996).

Although, parents should managed their children's pain related to the treatment, surgery and diseases itself (Forward, Brown & McGrath, 1996), Forgeron and his colleagues (2005), indicated that parents have insufficient knowledge about both the pharmacological (e.g., paracetamol) and non-pharmacological (e.g., relaxation techniques) treatments to cope with their children's pain. Only a few parents use a medication at home to manage their children's pain. The huge proportion of the families does not know any medication, so they take their children to the hospital to receive medication. Also, data showed that non-pharmacological treatments were not known by the families.

Ljungman and his colleagues (1999) found that the pain related to the chemotherapy treatment is more intense and problematic than the pain which is caused by itself of the cancer. In addition, they indicated that children's pain (at least %75) is related to the iatrogenic origin. In other words, in the paediatric population, two thirds of the pain is related to the treatments or procedural treatments contrary to cancer itself. Although, treatment leads to more severe pain than cancer itself, the pain level can change during the treatment process. In one study, pain problems of patients whose age ranged between 13 and 18, was investigated during the treatment (1 month after the diagnosis) and three months after the final treatment. Researcher found that patients had greater pain problem at the beginning of the treatment and at the end of the treatment than between this treatment process (Callissendorff-Selder & Ljungman, 2006).

1.5. Music Therapy

Music has an important place in human life. People use music in all aspects of their life such as religious celebration, and socialization. (Horden, 2000; as cited in; Kirby, Oliva & Sahler, 2010). In addition, music develops the communication, and mood of people in all age groups (Sears, 1964; Hodges, 1996; as cited in; Kirby, et al., 2010). Music is used as a therapy in the wide range area such as paediatric oncology hospitals. It provides benefits to the oncology paediatric patients in the psychosocial, educational and physical aspects. The definition of the Music therapy is that 'using music to help achieve a specific change in behaviour, feeling, or physiology' (McCloskey & Bulechek, 2000; as cited in; Lin, Hsieh, Hsu, Fetzer & Hsu, 2011). Music therapy can be used as an 'active music therapy' and 'passive music therapy'. In the active music therapy, patients actively sing or play instruments with therapist. However, in the passive music therapy, patients are not active, they only listen to the recorded music or listen to the live music which is played by the therapist (Aldridge, 1994).

1.6. The Effects of Music Therapy on Psychological and Physiological Symptoms of Children with Cancer

Music therapy is valid therapeutic treatment for the children with cancer. It is used to decrease children's anxiety and pain levels and developed their quality of life and communication with their families (Bailey, 1985; Aaronson, 1989; as cited in; Aldridge, 1994). For example, pharmacological drugs (e.g., analgesics) which are using to reduce the pain in the paediatric oncology departments, these drugs have some adverse effects and they are not sufficient to resolve the whole pain problem of children with cancer. Therefore, researchers suggested that music therapy can decrease the reliance on medications and help children to tolerate their pain (Kirby, et al., 2010).

In one research the effects of passive music therapy (with earphones) on pain and anxiety in children with cancer was investigated during and after the lumbar puncture cancer treatment. The results showed that pain and anxiety level of children in the experiment group decreased significantly during and after the treatment when compared with control group (Nguyen, et al., 2010). In another study, Chen, Wang, Shih, and Wu (2013) demonstrated that when using 15 minutes recorded music therapy before the radiotherapy, the state anxiety levels of the patients with cancer decreased significantly more than patients who only rested 15 minutes before the radiotherapy. However, researcher measured the anxiety levels of patients only before the music therapy and after the 15 minutes of the music therapy or rest, not during and after the radiotherapy. Similarly, in another study, researchers used music therapy for 30 minutes in the experiment group and the control group only rest in their bed during 30 minutes to investigate the effects of music therapy on cancer patients. They found significantly less pain after the music therapy in the music group than control group (Huang, Good & Zauszniewski, 2010).

Some researchers investigated the effects of music therapy (1 hour) and verbal relaxation (30 minutes) on chemotherapy related anxiety of patients with cancer. They found that although both music therapy and verbal relaxation decrease patients' post-chemotherapy anxiety, music therapy was more effective than the relaxation technique and control group (Lin, et al., 2011). O'Callaghan, Sexton, and Wheeler (2007) used case study method to investigate the effects of the music therapy on three paediatric outpatients before the cancer treatment. This study showed that in two cases the music therapy leads to decrease the need of the anxiolytics medication which decreases the anxiety. Thus, the anxiety level of children is reduced after the music therapy. In the other case, the preparation time of the radiotherapy reduce with the music therapy.

Admitted to the hospital or going to the hospital may be distressful for children with cancer and this circumstance can affect their psychological (e.g., anxiety) and physiological (e.g., pain) symptoms. In the research, three different music therapy techniques (listening, composition, and orff-based) was used to evaluate the effects of music on the anxiety and pain levels of the hospitalized children with cancer. Results showed that after the music therapy the anxiety and pain levels of hospitalized children reduced significantly. However, researcher did not find any significant differences between the therapy techniques and they did not use control group (Colwell, Edwards, Hernandez & Brees, 2013). Similarly, another research showed that the anxiety level of the hospitalized paediatric patients decreased significantly after the music therapy. However, researchers did no use control group in this study like previous study (Barrera, Rykov & Doyle, 2002).

According to the systematic review and meta-analysis music therapy decreased the anxiety and pain levels of patients. Seven high quality randomized controlled studies indicated the music therapy significantly reduces the anxiety levels of patients measured by Self-Rating Anxiety Scale. Two moderate quality randomized controlled studies which used Hamilton Anxiety Scale and eight moderate quality randomized studies which was used State-Trait Anxiety Inventory found that music therapy affect positively the patients anxiety (Zhang, Wang, Yao, Zhao, Davis, Walsh, & Yue , 2012). Although systematic review indicated that the music therapy significantly decreases the anxiety and pain level in the perioperative settings (Nilsson, 2008), some researchers found different results. In one study, researchers investigated the effects of music videos on the anxiety compared with standard treatment of colposcopy using female adolescent patients, and they could not find significant differences between the music group and standard group in self-reported pain (Rickert, Kozlowski, Warren, Hendon & Davis, 1994).

There are some inconsistencies related to the methodology of passive music therapy. The effects of the music applied which based on children's preference or listening standard music is not clear enough on the psychological and physiological symptoms of children suffering from cancer. Some studies indicated that the effects of music did not change even if the type of music was preferred by patients or a specific music is given to them (Nilsson, 2008). However, other studies supported that the effectiveness of the music therapy increases when patients selected the music instead of the fixed music (Evans, Tsao & Zeltzer, 2008; as cited in Kirby et al., 2010). Similarly, Leardi et al. (2007) compared the patient-selected music group and pre-chosen selected music group and they found that the psychological and physiological symptoms of children with cancer decrease significantly when they selected the music instead pre-chosen music (as cited in Nguyen et al., 2010).

1.7. Limitations of Previous Research

Although music therapy is well documented in medical setting, the effects of the music therapy have not been well established yet because of a number of methodological weaknesses (Chetta, 1981; Fagen, 1982; as cited in Kirby et al. 2010; Barrera, Rykov, & Dolye, 2002, Nilson, 2008). There is not common research methodology in the music therapy research and because of using different research materials and methods of assessment the results could not be replicated (Aldridge, 1994). In addition, in some studies, music therapy design was not conducted in a randomized control trial. Therefore, the results do not represent the evidence of the effectiveness of the music therapy on children with cancer (Barrera, et al. 2002; Nilsson, 2008). Furthermore, some researchers used non-validated questionnaires to measure the effects of the music therapy. In addition, control group (e.g. headphone without music) was not used in some studies to compare the scores of experimental group with baseline scores (Klassen, Liang, Tjosvold, Klassen & Hartling, 2008). The other methodological limitation of these studies to compare the results is that some studies only measured children psychological and/or physiological symptoms before and after the cancer treatments, but not measured their symptoms during the treatment (Chen, et al., 2013). Some studies evaluated children's symptoms only before and after the music therapy (Barrera, et al., 2002). Chen and his colleagues (2013) suggested to evaluate the effectiveness of the music therapy, researcher should measure the children's symptoms before, during, and after the treatment.

1.8. The Aims of the Present Research and Hypotheses

There are a number of inconsistencies in the previous research related to the effectiveness of the music therapy. Although, the effects of music on pain and anxiety were researched, only a few studies had high quality methodology (Zhang, et al., 2012). Also, there is not any common methodology in the music therapy research and researchers suggested that children's symptoms should be measured pre, during, and after the treatment to evaluate the effectiveness of the music (Chen, et al., 2013). Therefore, in the present study, the data collected before the music therapy, after the music therapy (during chemotherapy), and after the chemotherapy using randomized control trial to investigate the effectiveness of the music therapy on children.

Therefore, the aim of the present research is to examine the effects of the music therapy on anxiety, and pain symptoms of children with cancer. This study aimed to investigate the following hypotheses:

Hypothesis 1.

The music therapy received in the chemotherapy waiting room will reduce the levels of the pain symptoms of children significantly more than the control group.

Hypothesis 2.

The music therapy received in the chemotherapy waiting room will reduce the levels of the anxiety symptoms of children significantly more than the control group.

2. Methods

2.1. Design

The present study is a randomized control trial and between subject design. Participants were randomly allocated to one of two music therapy groups: 1) earphones with classical music, no choice or 2) earphones with classical music, free choice and a control group (earphones without music). In all groups, children listened to music (or the white noise) for 10 minutes before the chemotherapy.

The independent variable is the music therapy which included three levels: control group (no music), pre-chosen music, and child preference music. The dependent variables were anxiety, and pain.

2.2. Participants

Participants were recruited to the experiment from the Child Oncology/Haematology Department of Dr. Burhan Nalbantoglu Hospital in Cyprus, the Ege University Hospital in Izmir, Ankara University Hospital in Ankara and Dr. Sami Ulus Education and Research Hospital in Ankara in Turkey. There were 60 participants, consisting of 33 girls (%55), and 27 boys (%45). All participants were from Cyprus and Turkey and spoke the Turkish language. The age ranged from 6 to 16 (Mean age =10.05, SD = 3.26). All participants suffered from childhood cancer which are osteosarcoma, leukaemia, brain tumour, lymphoma, medulloblastoma, Wilms tumour, eving sarko, germinom, ovarian cycst, malignant melanoma, neuroblastoma, and neurofibromatosis. Each child was receiving chemotherapy treatment. Participation in the study was voluntary.

2.3. Materials

2.3.1. Questionnaires (see Appendix A for full questionnaires).

2.3.2. The state subscale of the State Trait Anxiety Inventory for Children (STAI-C)

The STAI-C is a self-report questionnaire consisting of 20 questions to assess the intensity of children moment anxiety (e.g., I feel; very calm, calm, not calm) (Spielberger, 2013). The lowest score indicates no anxiety and the highest score shows greater anxiety (Julian, 2011). Ozusta (1995), found good test-retest reliability and good validity of the Turkish version of the STAI-C inventory on the Turkish sample. This scale is used before the music therapy, during the chemotherapy, and after the chemotherapy in order to determine changes of children's actual levels of anxiety intensity.

2.3.3. Wong-Baker Faces Pain Rating Scale

Faces pain scale consists of six faces that measure the pain of three year old children and older. The six faces are rated on a scale from 0 to 5, and every face is described with verbal definition (e.g., 0 = very happy, 1 = hurts just a little bit, 2 = hurts a little bit more, 3 = hurts even more, 4 = hurts a whole lot, 5 = hurts as much as you can image) (McCaffery, 2002). Researchers found that high test-retest reliability and high validity of this scale on the paediatric patients (Keck, Gerkenmeyer, Joyce & Schade, 1996).

2.4. Procedure

Children participated in the experiment in a private and isolated rooms for privacy reasons and to minimize the confound variables at the hospital. Parents signed a consent form and information sheet. After that verbal information was given to the children in age-appropriate language before the experiment. In every stage of the experiment children were asked by the researcher whether they want to continue participating in the study or not.

There were four stages in the experiment. In the first stage, children who were in the control group, pre-chose music therapy group, and free choice music therapy group, were interviewed using the Wong-Baker Faces Pain Rating scale, and Stait-Trait Anxiety Inventory for Children (only state anxiety subscale) in order to record children's pain, and anxiety levels. In the second stage, the music therapy was executed for 10 minutes before the chemotherapy. Participants who were in the control group, used earphones without music for 10 minutes before the chemotherapy treatment. In one of the music therapy group, children listened to the pre-chosen classical music (The Spring piece of Vivaldi) with earphones for 10 minutes. In the second music therapy group, children listened to a classical music which were chosen by children (1-Schumann, Symphony No. 3 "Rhenish", 2-Johann Sebastian Bach, Violin Concertos BWV 1042, 3- Gustavo Dudamel, Dvorak - Symphony no. 9 - 4th movement - Allegro con fuoco, 4-Beethoven-5ª Sinfonia) with earphones for 10 minutes.

After the music therapy, the chemotherapy treatment resumed. In this stage, participants were interviewed using the Wong-Baker Faces Pain Rating scale, and Stait-Trait Anxiety Inventory for Children (only state anxiety subscale) in order to record children's pain and anxiety levels during the chemotherapy treatment. This stage lasted on average 10 minutes for each child.

In the final stage of the experiment, after the chemotherapy, all participants were interviewed using the Wong-Baker Faces Pain Rating scale, and Stait-Trait Anxiety Inventory for Children (only state anxiety subscale).

2.5. Ethical Consideration

This research was given a full ethical approval from the Psychology Ethics Committee at Kingston University London (Ethics Reference Number: 1314/CHA/8). Written informed consent and information letter are given to the parents or guardians of children. Participants were informed about the study before the experiment and were fully debriefed after the experiment.

3. Results

3.1.Hypothesis 1. (Music therapy will reduce the levels of pain significantly more than the control group)

The means and standard deviations are shown in Table 1. It is shown that before the music therapy, participants in the pre-chosen group had more pain ($M = 1.050, SD = 1.099$) as compared to control group ($M = 0.600, SD = 0.820$) and patient selected group ($M = 0.400, SD = 0.753$) respectively. During the chemotherapy (after the music therapy for 10 minutes) the pain level was higher at control group ($M = 1.150, SD = 1.531$) than pre-chosen group ($M = .700, SD = 1.081$) and patient-selected group ($M = .300, SD = .656$). Although after the chemotherapy the pain level increased in each group, the pain level is the lowest still in the patient-selected group ($M = .550, SD = 1.316$) when it is compared with pre-chosen group ($M = 1.100, SD = 1.209$) and control group ($M = 1.450, SD = 1.791$).

Table 1. Means (M) and Standard Deviations (SD) for the pain level of children from before, during and after the chemotherapy for control group, pre-chosen and patient-selected music groups

Participant Group	Before_Treatment_Pain		During_Treatment_Pain		After_Treatment_Pain	
	M	SD	M	SD	M	SD
Control	.600	.820	1.150	1.531	1.450	1.791
Pre-chosen	1.050	1.099	.700	1.080	1.100	1.209
Patient-selected	.400	.753	.300	.656	.550	1.316

One-way ANOVA analysis yielded that during the chemotherapy, the music therapy did not affect the pain level of the children with cancer significantly, $F(2, 57) = 2.75, p > .05$. A Levene's test indicated that during the chemotherapy, assumption of homogeneity of variance has been violated, $F(2, 57) = 6.036, p < .05$. Also, there was not significant effect of music therapy on the level of pain after the chemotherapy, $F(2, 57) = 1.93, p > .05$. A Levene's test demonstrated that after the chemotherapy the assumption of homogeneity of variance has been met, $F(2, 57) = 2.178, p > .05$.

A 3 (Therapy Group: Control, Pre-chosen, and patient selected) by 3 (Time: Before, During, and After) Mixed ANOVA was used to analysis the data. The Levene's test showed that the assumption of homogeneity of variance has been met for the pain level from both the before the treatment, $F(2, 57) = 1.74, p > .05$ and after the treatment, $F(2, 57) = 2.18, p > .05$ procedures. However, a Levene's test for the equal variances has been violated for pain level from the 'during' $F(2, 57) = 6.04, p < .05$, the treatment procedure. Mauchly's test indicated that the assumption of sphericity had been violated, $X^2(2) = 8.03, p < .05$. The results showed that there was a significant main effect of the time of the treatment (before, during, and after) on the pain level, $F(1.76, 100.56) = 3.24, p < .05, \eta^2 = .05$. Thus, when the other variables were ignored, pain level was different for before, during, and after treatment groups. Benferroni post hoc test revealed that there was a significant differences between 2 (during the treatment) and 3 (after the treatment), $CI_{95} = -.61$ (lower) $-.02$ (upper), $p < .05$. All other comparisons are non-significant. The main effect of the group (therapy) was not significant on the pain level, $F(2, 57) = 2.49, p > .05, \eta^2 = .08$, indicating that pain level was not different for control, pre-

chosen and patient selected therapy groups, when the other variables were ignored. In addition, there was not significant interaction between time of the treatment and therapy group, $F(3.53, 100.56) = 1.98, p > .05$, indicating that the pain level of different treatment time (before, during, after) was not different for control, pre-chosen and patient selected therapy groups.

Hypothesis 2. (Music therapy will reduce the levels of anxiety significantly more than the control group)

The means and standard deviations are shown in Table 2. It can be seen that before the music therapy, the anxiety level of participants in the pre-chosen group ($M = 38.900, SD = 7.107$) and control group ($M = 34.700, SD = 6.342$) was similar and lower than the patient selected group ($M = 34.450, SD = 5.633$). During the chemotherapy (after the music therapy for 10 minutes) the anxiety level was higher at control group ($M = 37.500, SD = 6.056$) than pre-chosen group ($M = 32.750, SD = 7.032$) and patient-selected group ($M = 30.250, SD = 4.929$) respectively. After the chemotherapy the anxiety level is the lowest in the patient-selected group ($M = 30.400, SD = 5.632$) when compare it with pre-chosen group ($M = 34.650, SD = 6.619$) and control group ($M = 36.100, SD = 6.568$).

Table 2. Means (M) and Standard Deviations (SD) for the anxiety level of children from before, during and after the chemotherapy for control group, pre-chosen and patient-selected music groups.

Participant Group	Before_Treatment_Anxiety		During_Treatment_Anxiety		After_Treatment_Anxiety	
	M	SD	M	SD	M	SD
Control	34.700	6.342	37.500	6.056	36.100	6.568
Pre-chosen	38.900	7.107	32.750	7.032	34.650	6.619
Patient-selected	34.450	5.633	30.250	4.929	30.400	5.632

One-way ANOVA analysis showed that listening music for 10 minutes significantly affect the anxiety level of children during the chemotherapy, $F(2, 57) = 7.37, p = .001$. A Levene’s test showed that during the chemotherapy, the assumption of homogeneity of variance has been met, $F(2, 57) = .671, p > .05$. In addition, after the chemotherapy, the results showed that anxiety level was significantly affected by the music therapy, $F(2, 57) = 4.44, p < .05$, and Levene’s test indicated that after the chemotherapy the assumption of homogeneity of variance has been met, $F(2, 57) = 1.360, p > .05$.

Benferroni post hoc test revealed a significant difference during the chemotherapy in the anxiety levels between control group and pre-chosen group, $CI_{95} = .017$ (lower) 9.482 (upper), $p < .05$, and control and patient selected groups, $CI_{95} = 2.517$ (lower) 11.982 (upper), $p = .001$. There was not any significant difference between pre-chosen and patient selected music groups ($p > .05$). After the chemotherapy, Benferroni post hoc test showed a significant difference in the anxiety levels between control group and patient-selected group, $CI_{95} = .793$ (lower) 10.606 (upper), $p < .05$. No other comparisons were significant (all $ps > .05$).

A 3 (Therapy Group: Control, Pre-chosen, and patient selected) by 3 (Time: Before, During, and After) Mixed ANOVA was used to analyse the data. The Levene’s test showed that the assumption of homogeneity of variance has been met for the anxiety level in each case; before $F(2, 57) = .920, p >$

.05, during $F(2, 57) = .671, p > .05$, and after $F(2, 57) = 1.360, p > .05$ the treatment. Mauchly's test indicated that the assumption of sphericity had been met, $\chi^2(2) = 3.57, p > .05$. The results showed that there was a significant main effect of the time of the treatment (before, during, and after) on the anxiety level, $F(2, 114) = 8.17, p < .001, \eta^2 = .13$. Thus, when the other variables were ignored, anxiety level was different for before, during, and after treatment groups. Benferroni post hoc test revealed that there was a significant differences between 1 (before the treatment) and 2 (during the treatment), $CI_{95} = 1.04$ (lower), 3.9 (upper), $p = .001$, and 1 (before the treatment) and 3 (after the treatment), $CI_{95} = 1.10$ (lower), 3.5 (upper), $p < .001$. The other comparison is non-significant. There was a significant main effect of the therapy on the anxiety level, $F(2, 57) = 3.80, p < .05, \eta^2 = .12$; indicating that anxiety level was different for control, pre-chosen and patient selected therapy groups, when the other variables were ignored. In addition, there was a significant interaction between time of the treatment and therapy group, $F(4, 114) = 8.20, p < .001$, indicating that the anxiety level of different treatment time (before, during, after) was different for control, pre-chosen and patient selected therapy groups.

4. Discussion

The present study showed that music therapy decreased children anxiety levels. The effects of music therapy will be discussed in this section.

Hypothesis 1 was not supported. Thus, people in the music groups had not significantly less pain during the chemotherapy (after music therapy), and after the chemotherapy than the control group. Furthermore, pain level of children was significantly increased between during and after the treatment, regardless the therapy group. This finding supported by Clarck et al. (2008) who indicated that pain scores did not decrease significantly in the music group than in the control group after the radiotherapy. Similarly, Rickert, et al. (1994) did not found any significant differences during and after the colposcopy procedure in the passive music group when it is compared with control group. However, some studies found contrary findings. Huang et al. (2010) found the pain level decreased significantly in the music group more than the control group. However, music therapy was used before the treatment in the previous research, and in the present study, music therapy used only 10 minutes. These results may be affected by the duration of the music. In addition, the inconsistencies in the literature can occur using different procedure by different researcher. For example, Huang, et al. (2010) only measured patients' pain levels before and after the music therapy without including any cancer treatment. Therefore, findings can be affected by the different procedures. U.S. Department of Health and Human Services (1994) mentioned that pain is one of the side effects of chemotherapy (as cited in Kruse, 2003). Thus, the idea can occur that the cancer treatment reduces the distractive effects of music, and when the duration of the music increase, the distractive effects of music therapy may increase.

Hypothesis 2 was supported; music therapy reduced the anxiety levels of children significantly. Similarly, previous research has indicated that music therapy reduces the patients' chemotherapy-induced anxiety levels significantly more than the no music group (Lin et. al., 2011). Findings of the present study also showed that during the chemotherapy (after the 10 minutes music therapy) children's anxiety level decreased significantly in both pre-chosen and patient selected music groups more than the control group. However, after the chemotherapy only patient-selected music reduced the anxiety level of children. Thus, this results indicated that patient-selected music is more effective than the pre-chosen music, and this result consistent with the previous study (Evans, et al., 2008; as cited in Kirby, 2010). The music might be helpful in gaining control of undesirable situation and

provide them feeling of being in an intimate environment, and choosing their own music can increase the self-control. As a result of this, the distraction effects of the music may increase (Nguyen, et al., 2010), and this idea may be cause of the findings of the present research. However, some researchers did not find any significant differences between patient-selected music and pre-chosen music (Nilsson, 2008).

5. Limitations and Strengths

Data was collected using self-report questionnaires and children may not reflect their real symptoms. In addition, data collected from both children and adolescents whose age ranged between 6 and 16. This case may affect the study because of different developmental stage of the participants. Furthermore, data are heterogeneous which includes different cancer types and stages which affect the intensity of the chemotherapy, so these results could not be generalized to all of the cancer population. In addition, the duration of the music therapy did not manipulated in this study. It was used only 10 minutes but different durations may cause different results.

However, this study has several strengths. Firstly, data collected from children before the music therapy, during the chemotherapy (after 10 minutes music therapy) and after the chemotherapy. Children's anxiety and pain levels measured during the chemotherapy, so the duration of the music therapy was measured. The other strength of the study is related to the therapy groups. It included control, pre-chosen and patient selected music groups. By this way, the effectiveness of music therapy was investigated and whether the pre-chosen or patient selected music therapy is more effective was examined. Literature includes a lot of inconsistent results related to the pre-chosen and patient selected music. This study shed light on the literature because in both groups the music style were same so music type was eliminated, and results showed that although music therapy was effective, the duration of the music therapy is more effective in the patient selected group. Further research should investigate the optimal duration of the music therapy.

References

- Aldridge, D. (1994). An overview of music therapy research. *Complementary Therapies in Medicine*, 2(4), 204-216.
- Barrera, M. E., Rykov, M. H. & Doyle, S. L. (2002). The effects of interactive music therapy on hospitalized children with cancer: A pilot study. *Psycho-Oncology*, 11 (5), 379-388.
- Bleyer, W. A. (1990). The impact of childhood cancer on the united states and the world. *A Cancer Journal for Clinicians*, 40 (6), 355-367.
- Callisendorff-Sselder, M. & Ljungman, G. (2006). Quality of varies with pain during treatment in adolescents with cancer. *Upsala J Med Sci*, 111 (1), 109-116.
- Chen, L., Wang, T. Shin, Y. & Wu, L. (2013). Fifteen-minute music intervention reduces pre-radiotherapy anxiety in oncology patients. *European Journal of Oncology Nursing*, 17, 436-441.
- Clark, M., Isaacks-Downton, G., Wells, N., Redlin-Frazier, S., Eck, C., Hepworth, J. & Chakravarthy, B. (2006). Use of preferred music to reduce emotional distress and symptom activity during radiation therapy. *Journal of Music Therapy*, XVII (3), 247-265.
- Colwell, C. M., Edwards, R., Hernandez, E. & Brees, K. (2013). Impact of music therapy interventions (listening, composition, orff-based) on the physiological and psychological behaviors of hospitalized children: A feasibility study. *Journal of Pediatric Nursing*, 28 (3), 249-257.

- Costello, E. J., Costello, A. J., Edelbrock, C., Burns, B. J., Dulcan, M. K., Brent, D. & Janiszewski, S. (1988). Psychiatric disorders in pediatric primary care: Prevalence and risk factors. *Archives of General Psychiatry*, 45(12), 1107-1116.
- Curtis, E.B, Krech, R. & Walsh, T. D. (1991). Common symptoms in patients with advanced cancer. *Journal of Palliative Care*, 7(2), 25-29.
- Daveson, B. A. (2001). Music therapy and childhood cancer: Goals, methods, patient choice and control during diagnosis, intensive treatment, transplant and palliative care. *Music Therapy Perspectives*, 19(2), 114-120.
- Deng, G. & Cassileth, B. R. (2005). Integrative oncology: Complementary therapies for pain, anxiety, and mood disturbance. *CA Cancer J Clin*, 55 (2), 109 –116.
- Eiser, C., Eiser, J. R. & Stride, C. B. (2005). Quality of life in children newly diagnosed with cancer and their mothers. *Health and Quality of Life Outcomes*, 3 (29), 1-5.
- Forgeron, P. A., Finley, A. & Arnaut, M. (2005). Pediatric pain prevalence and parents' attitudes at a cancer hospital in Jordan. *Journal of Pain and Symptoms Management*, 31 (5), 440-448.
- Forward, S. P., Brown, T. L. & McGrath, P. J. (1996). Mothers' attitudes and behavior toward medicating children's pain. *Pain*, 67(2), 469-474.
- Hockenberry-Eaton, M., Dilorio, C. & Kemp, V. (1995). The relationship of illness longevity and relapse with self-perception, cancer stressors, anxiety, and coping strategies in children with cancer. *Journal of Pediatric Oncology Nursing*, 12(2), 71-79.
- Houlston, A. (2008). Principles of Chemotherapy. In F. Gibson & L. Sloanes (Eds.), *Cancer in children and young people* (pp. 3-5). West Sussex, England: Hoboken, Willey.
- Huang, S. T., Good, M. & Zauszniewski, J. A. (2010). The effectiveness of music in relieving pain in cancer patients: a randomized controlled trial. *International journal of nursing studies*, 47(11), 1354-1362.
- Julian, L., J. (2011). Measures of Anxiety: State-Trait anxiety inventory (STAI), beck anxiety inventory (BAI), and hospital anxiety and depression scale-anxiety (HADS-A). *Psychological Measures*, 63, (11), 467-472.
- Katz, E. R., Kellerman, J. & Siegel, S. E. (1980). Behavioral distress in children with cancer undergoing medical procedures: Developmental considerations. *Journal of Consulting and Clinical Psychology*, 48 (3), 356-365.
- Keck, J. F. K., Gerkenmeyer, J. E., Joyce, B.A. & Schade, J.G. (1996). Reliability and validity of the faces and word descriptor scales to measure procedural pain. *Journal of Pediatric Nursing*, 11 (6), 368-375.
- Keller, V. E. (1995). Management of nausea and vomiting in children. *Journal of Pediatric Nursing*, 10 (5), 280-286.
- Kirby, L. A., Oliva, R. & Sahler, O. J. Z. (2010). Music therapy and pain management in pediatric patients undergoing painful procedures: A review of the literature and a call for research. *Journal of Alternative Medicine Research*, 2 (1), 7-16.
- Klassen, J. A., Liang, Y., Tjosvold, L., Klassen, T. P. & Hartling, L. (2008). Music for pain and anxiety in children undergoing medical procedures: a systematic review of randomized controlled trials. *Ambulatory Pediatrics*, 8(2), 117-128.
- Kruse, J. (2003). Music therapy in United States cancer settings: Recent trends in practice. *Music Therapy Perspectives*, 21(2), 89-98.
- Yuku, K. T. K. (2006). Onkoloji 2006. *Hacettepe Universitesi Onkoloji Enstitusu Yillik Sempozyumu*, 23-25.
- Landier, W. & Alice, M. T. (2010). Use of complementary and alternative medical interventions for the management of procedure-related pain, anxiety, and distress in pediatric oncology: an integrative review. *Journal of pediatric nursing*, 25(6), 566-579.

- Legrand, L. N., McGue, M. & Iacono, W. G. (1999). A twin study of state trait anxiety in childhood and adolescence. *Journal of Child Psychology and Psychiatry*, 40 (6), 953-958.
- Lin, M. F., Hsieh, Y. J., Hsu, Y. Y., Fetzer, S. & Hsu, M. C. (2011). A randomised controlled trial of the effect of music therapy and verbal relaxation on chemotherapy-induced anxiety. *Journal of clinical nursing*, 20(7-8), 988-999.
- Ljungman, G., Gordh, T., Sorensen, S. & Kreuger, A. (1999). Pain in paediatric oncology: interviews with children, adolescents and their parents. *Acta paediatrica*, 88(6), 623-630.
- McCaffery, M. (2002). Choosing a faces pain scale. *ProQuest Science Journals*, 32, (5), 68.
- McGrath, P. A. (1996). Development of the world health organization guidelines on cancer pain relief and palliative care in children. *Journal of Pain and Symptoms Management*, 12 (2), 87-92.
- Micheli, A., Mugno, E., Krogh, V., Quinn, M. J., Coleman, M., Hakulinen, T., ... & EUROPREVAL Working Group. (2002). Cancer prevalence in European registry areas. *Annals of Oncology*, 13(6), 840-865.
- Miser, A. W. & Miser, J. S. (1989). The treatment of cancer pain in children. *Pediatric Clinics of North America*, 36(4), 979-999.
- Nguyen, T. N., Nilson, S., Hellstrom, A. & Bengston, A. (2010). Music therapy to reduce pain and anxiety in children with cancer undergoing lumbar puncture: A randomized clinical trial. *Journal of Pediatric Oncology Nursing*, 27 (3), 146-155.
- Nilsson, U. (2008). The anxiety and pain reducing effects of music interventions: A systematic review. *Aorn Journal*, 87 (4), 780-807.
- O'Callaghan, C., Sexton, M. & Wheeler, G. (2007). Music therapy as a non-pharmacological anxiolytic for paediatric radiotherapy patients. *Journal of Medical Imaging and Radiation Oncology*, 51(2), 159-162.
- Ozusta, S. (1995). Cocuklar icin durumluk surekli kaygi envanteri uyarlama gecerlik ve guvenirlik calismasi. *Turkish Journal of Psychology*, 10 (34), 32-44.
- Pandey, M., Sarita, G. P., Devi, N., Thomas, B. C., Hussain, B. M., & Krishnan, R. (2006). Distress, anxiety, and depression in cancer patients undergoing chemotherapy. *World Journal of Surgical Oncology* 4 (68), 1-5.
- Rickert, V. I., Kozlowski, K. J., Warren, A. M., Hendon, A., Davis, P. (1994). Adolescents and colposcopy: The use of different procedures to reduce anxiety. *American Journal of Obstetrics and Gynecology*, 170 (2), 504-508.
- Smith, H. & Phillips, B. (2012). Childhood Cancer. *Innov AIT*, 5 (10), 595-603.
- Soyuer, F. & Sitti, S. (2011). Children with cancer and physical activity/Kanserli cocuklar ve fiziksel aktivite. *Dicle Medical Journal*, 38 (4), 526-529.
- Spielberger, C., D. (2013). State-Trait anxiety inventory for children group report. *Mind Garden*, 1-9.
- Stark, D. P. H., & House, A. (2000). Anxiety in cancer patients. *British Journal of Cancer*, 83 (10), 1261-1267.
- Stark, D., Kiely, M., Smith, A., Velikova, G., House, A. & Selby, P. (2002). Anxiety disorders in cancer patients: Their nature, associations, and relation to quality of life. *Journal of Clinical Oncology*, 20 (14), 3137-3148.
- Stillier, C. A. (2004). Epidemiology and genetics of childhood cancer. *Oncogene*, 23(38), 6429-6444.
- Woodgate, R. & McClement, S. (1998). Symptom distress in children with cancer: The need to adopt a meaning-centered approach. *Journal of Pediatric Oncology Nursing* 15(1), 3-12.
- Wu, L., Sheen, J., Shu, H., Chang, S. & Hsiao, C. (2012). Predictors of anxiety and resilience in adolescents undergoing cancer treatment. *Journal of Advanced Nursing*, 69, (1), 158-166.

Masarogullari, G. (2017). The Effects of Music Therapy on Anxiety and Pain Symptoms of Children with Cancer. *New Trends and Issues Proceedings on Humanities and Social Sciences*. [Online]. 07, pp 139-153. Available from: www.prosoc.eu

Yilmaz, H. B., Muslu, G. K., Tas, F., Basbakkal, Z. & Kantar, M. (2009). Parental views regarding symptoms in children with cancer and recognition of cancer-related fatigue. *The Journal of Turk Oncology*, 24 (3), 122-127.

Zhang, J. M., Wang, P., Yao, J. X., Zhao, L., Davis, M. P., Walsh, D. & Yue, G. H. (2012). Music interventions for psychological and physical outcomes in cancer: a systematic review and meta-analysis. *Supportive Care in Cancer*, 20(12), 3043-3053.