The effect of music therapy on donor anxiety in blood donation

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A- Conception and study design; B - Collection of data; C - Data analysis; D - Writing the paper; E - Review article; F - Approval of the final version of the article; G - Other (please specify)

ABSTRACT

Purpose: The purpose of this research was to investigate the music therapy (MT) effect on blood donation anxiety and vital signs of participants.

Materials and Methods: The study is a simple blind, controlled, randomized clinical trial. Participants were allocated by means of randomized controlled sampling. The study was performed in the blood donation centre of an University Hospital in Izmir, Turkey. The study was carried out in 60 participants, 30 randomized to the experimental group and 30 randomized to the control group. The control group was given routine attention, and the experimental group was given an MT intervention. The anxiety levels were measured by means State Anxiety Inventory (SAI) of pre and post questionnaires by a blinded investigator.

Results: Vital signs of donors were measured pre and post intervention. There were statistical differences between the control and experimental group in heart rate, breath rate, systolic and diastolic blood pressures measured pre and post intervention. A significant difference was found before and after the application in the anxiety score after MT (p < .05).

Conclusions: The music therapy application was accepted and evaluated positively by the participants for decreasing the anxiety of the donors before donation. Including the music therapy to the nurse care, applied routinely for the donors of the blood donation, is recommended.

Keywords: Music therapy, blood donation, donor anxiety

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INTRODUCTION

Blood transfusion is used commonly as a lifesaving therapy. The only source of the blood transfusions is the blood and blood products collected via blood donation from the healthy donors. Many countries around the World are facing a decline in the number of blood donors [1-4]. It is important to find methods to ensure adequate numbers of donors are available to blood banks. While the ratio of the volunteer donors is up to 5% of the population in the developed countries, this ratio is currently at 1.5% in Turkey [5,6]. Ratio of voluntary blood donations to population in developed countries. While it is 5-10%, this rate is around 2.3% in Turkey [10].

Some of the reasons for not donating blood are fear of needle, fears related with medical procedures, fear of seeing blood, and fears like passing out during blood donation [7,8]. In the research conducted by Dongen et al. (2012) it was found that the anxiety levels are higher on the average before and after the donation in women than men and it was stated out that women experience more serious unwanted effects [9,11]. There are researches on the factors which affect, encourage or prevent volunteerism on the blood donation in the world literature. Among them, fear of blood loss, infectious disease risk and anxiety related with giving blood have a substantial importance [5,12,13].

The donor experience anxiety during blood donation. Anxiety has an effect on both mental and physiological symptoms [7]. In a research conducted by France et al. (2004) the positive relationship between anxiety before donation and symptoms after the donation were taken into account and it was concluded that if the anxiety of the donor, giving blood for the first time, is decreased, this can increase the probability of next donation [10,13].

In the recent years, it is stated that there is a close relationship between music and healthcare functions and music is an important means which decreases the heart rate, body temperature and breathing rate, enabling relaxation, changing the pain sensation of the patient, and distracting him/her. Music therapy enables relaxing and distraction with the effect of the tempo and rhythm on the hypothalamic and limbic system. It is known that these systems decrease the activity of the neuroendocrine system and sympathetic nerve system. Decreased neuroendocrine activity decreases corticotropine secretion (adrenocorticotropine, ACTH) and the response to stress. The decrease in the sympathetic activity decreases the blood pressure, heart rate and breathing rate and enables relaxation [14].

Music therapy is developed professionally with praxis and models different from each other. Using music, in a sense covering positive feelings and adequate relaxation, was studied commonly by the researchers [15]. Music therapy is a branch of healthcare where it is decided to use the music in various conditions physically, functionally, psychologically and educationally and which is used for assisting the treatment of physiological and psychological effects of a disease or incapacity [16]. The therapeutic effect of music is being accepted in the rehabilitation field of medicine. It is seen that it is used in the management of discomfort and pain during the treatment and in surgery and of the other invasive diagnosis and treatment procedures in most of the literature data related with the efficiency of the music [17].

The researchers studied the situations where music decreases anxiety and enables relaxation as delivery [18,19], endoscopic interventions such as colonoscopy and broncho-scropy [20,21] medical treatment [15,17,23,24,28] patients who stays in the mechanical ventilation support [25]. The experiences the blood donors gain in the first blood donation have important effect on making them regular blood donors. As much as the negative effects in the first donation decrease, the probability that the blood donors come for the next blood donation increases [26,27].

MATERIALS AND METHODS

This research was planned as a single blind, randomized controlled experimental, clinical study. The research was conducted with the donors applied for blood donation to the blood center of a university hospital in western Turkey during 2017-2018 years. One of the methods decreasing anxiety is the music therapy which is one of the alternative and aftercare treatment methods. It is important to decrease the anxiety of the blood donors with respect to the increase in the probability of coming for the next blood donation of the blood donors to the extent that the ratio of volunteered donor is very low and the negative effects in the first donation are decreased. Starting from these reasons, it is targeted to evaluate the effect of the music therapy applied to the donors who makes blood donation on the anxiety and vital signs in this research.

The sample space of the research was consisted of the donors who applied for blood donation to the blood center, who accepted to participate in the research and who are compatible with the sample selection criteria of the research. The size of the sample space was calculated via power analysis. In the calculation made, it was found out that it is required to take 30 donors to each group with a difficulty value of 0.80 and error level of 0.05. In the individual information form, developed by the researcher, there are questions related with the donors, which consist of five questions in total as the age, gender, education level, marital status of the donor and which donation of the
donor. To the individual monitoring form, the hemodynamic values, consisting of systolic blood pressure, diastolic blood pressure, pulse rate, and breathing rate, measured just before starting the music therapy of the patient and at the end of the music therapy are recorded.

**Data Collection Method and Tools**

When the research was started, a participant who has the same gender and age was included in the control group for each donor included the application group. Therefore, the groups were selected by using the simple randomization technique via the random grouping method according to the age and gender and a balance was formed between the groups.

The donors in the application and control groups, who are compatible with the restrictions of the research, were filled the individual information form. The vital signs of the donors in the application and control groups (systolic blood pressure, diastolic blood pressure, pulse rate and breathing rate) were measured and recorded in the individual monitoring form. The state anxiety inventory was applied to the donors consisting of the application group and to the donors consisting of the control group before starting applying the music therapy in order to determine the effect of the music therapy on the anxiety.

The flute work, which was determined by the music and rhythm expert and which as a relaxation effect, was listened to the donors in the application group for 10 minutes via MP3 player with earphone just after the recording procedure. No music was listened to the donors in the control group. Music with this beat was chosen because it has a positive emotional effect on people, and classical music was chosen because it has the most relaxing effect. The actual piece chosen was Bach’s 19 trio sonatas on flute. Bach’s music has a unique polyphonic harmony and balanced melody and is of a quality that appeals to the emotions.

Music therapy was applied for 10 minutes, since the invasive procedure of blood transfusion took 10 minutes. To provide standards in the research, the choice of music was not left to donors and classical music, which is known to have a therapeutic effect was used in the study (24, 25). After the music therapy, the status anxiety inventory was applied to the donors in the application and control groups and vital signs (systolic blood pressure, diastolic blood pressure, pulse rate, and breathing rate) were measured and recorded in the individual monitoring form.

**The Individual Information Form**

In the individual information form, developed by the researchers, there are questions related with the patients, which consist of five questions in total as the age, gender, education level, marital status of the donor and which donation of the donor. To the individual monitoring form, the hemodynamic values, consisting of systolic blood pressure, diastolic blood pressure, pulse rate, and breathing rate, measured just before starting the music therapy of the patient and at the end of the music therapy are recorded.

**State Anxiety Inventory**

Anxiety were evaluated by the STAI is a self-evaluation questionnaire that includes short expressions. This scale was initially developed to inspect anxiety in healthy adults and was then approved by subsequent trials for upper secondary school students and individuals with psychiatric and physical disorders. Spielberger et al. tested the reliability of the original form in three dimensions. The scale was adapted and standardized into Turkish by Oner and Le Compte [29,30]. In the State Anxiety Inventory (SAI), individuals need to define how they feel at a specific moment or under circumstances and express their feelings considering the current situation. The reliability of STAI was assessed by test–re test method and the internal consistency and test homogeneity were calculated by Kuder Richardson 20 formula, and in the present study, this value of the STAI was 0.72.

**Data Analysis**

The statistical analysis of the data collected in the research was done in the IBM SPSS 22.0 (SPSS Inc., Chicago, IL, USA) statistics package software. In the data analysis, the distribution of the introductory information related with the individuals was given as number and percentage. For the data indicating normal distribution, the statistical significance level was selected as $\alpha = 0.05$. The paired student t-test was applied in order to evaluate the difference in the state anxiety inventory, systolic blood pressure, diastolic blood pressure, pulse rate, and breathing rate in the patients included in the MT and control groups before and after the music.

**Ethical considerations**

To conduct the study, written permission was obtained from the participants and approval from the Scientific Research Ethics Committee of Ege University (İzmir, Turkey; Approval Number: E.4851). Participation in the study was voluntary and could withdraw from the study at any time.

**RESULTS**

There is no statistically significant relationship between the application and control groups with respect to age groups, gender, marital status, education level and blood donation number of the participants of the research ($p>0.05$) (Table 1).
The effect of music therapy on donor anxiety in blood donation

Table 1. Distribution of individuals in the application and control groups according to descriptive characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Practise Group</th>
<th>Control Group</th>
<th>Total</th>
<th>$\chi^2$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Say1</td>
<td>%</td>
<td>Say1</td>
<td>%</td>
<td>Say1</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-29</td>
<td>10</td>
<td>50.0</td>
<td>10</td>
<td>50.0</td>
<td>20</td>
</tr>
<tr>
<td>30-39</td>
<td>10</td>
<td>50.0</td>
<td>10</td>
<td>50.0</td>
<td>20</td>
</tr>
<tr>
<td>40-49</td>
<td>10</td>
<td>50.0</td>
<td>10</td>
<td>50.0</td>
<td>20</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>15</td>
<td>50.0</td>
<td>15</td>
<td>50.0</td>
<td>30</td>
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<tr>
<td>Male</td>
<td>15</td>
<td>50.0</td>
<td>15</td>
<td>50.0</td>
<td>30</td>
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<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>15</td>
<td>46.9</td>
<td>17</td>
<td>53.1</td>
<td>32</td>
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<tr>
<td>Single</td>
<td>13</td>
<td>52.0</td>
<td>12</td>
<td>48.0</td>
<td>25</td>
</tr>
<tr>
<td>Widowed</td>
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<td>66.7</td>
<td>1</td>
<td>33.3</td>
<td>3</td>
</tr>
<tr>
<td>Education level</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First school</td>
<td>3</td>
<td>42.9</td>
<td>4</td>
<td>57.1</td>
<td>7</td>
</tr>
<tr>
<td>Secondary school</td>
<td>2</td>
<td>33.3</td>
<td>4</td>
<td>66.7</td>
<td>6</td>
</tr>
<tr>
<td>High school</td>
<td>9</td>
<td>42.9</td>
<td>12</td>
<td>57.1</td>
<td>21</td>
</tr>
<tr>
<td>Academy</td>
<td>16</td>
<td>61.5</td>
<td>10</td>
<td>38.5</td>
<td>26</td>
</tr>
</tbody>
</table>

*Fisher’s absolute chi-square test

A paired student t-test was applied in order to compare the state anxiety levels before and after the music therapy in the application and control group. It was found out that the score average is 45.10±10.19 before the music therapy in the application group, the score average is 28.23±4.40 after the music therapy and this difference is a statistically significant difference ($t=9.320; p<0.05$). It was seen that the state anxiety of before music therapy was higher compared with the after music therapy in the application group. The score average before the music therapy was found as 37.56±10.85 and score average after music as 31.13±9.22 compared with the control group and it was found out that this is a statistically significant difference ($t=4.300; p<0.05$) (Table 2).

Table 2. Vital sign and anxiety levels measured before and after MT in the application and control group

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Pretest</th>
<th>Posttest</th>
<th>$\chi^2$*</th>
<th>$P$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(M±SD)</td>
<td>(M±SD)</td>
<td>(M±SD)</td>
<td>(M±SD)</td>
</tr>
<tr>
<td>Anxiety level</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MT Group</td>
<td>45.10±10.19</td>
<td>28.23±4.40</td>
<td>9.320</td>
<td>0.000</td>
</tr>
<tr>
<td>Control Group</td>
<td>37.56±10.85</td>
<td>31.13±9.22</td>
<td>4.300</td>
<td>0.01</td>
</tr>
<tr>
<td>Systolic Blood Pressure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MT Group</td>
<td>131.56±11.77</td>
<td>114.63±21.45</td>
<td>4.536</td>
<td>0.01</td>
</tr>
<tr>
<td>Control Group</td>
<td>126.93±15.22</td>
<td>118.37±12.10</td>
<td>5.973</td>
<td>0.01</td>
</tr>
<tr>
<td>Diastolic Blood Pressure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MT Group</td>
<td>79.03±9.77</td>
<td>73.70±8.67</td>
<td>6.345</td>
<td>0.01</td>
</tr>
<tr>
<td>Control Group</td>
<td>77.23±9.14</td>
<td>74.53±9.14</td>
<td>1.990</td>
<td>0.05</td>
</tr>
<tr>
<td>Pulse rate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MT Group</td>
<td>86.76±7.98</td>
<td>78.40±5.10</td>
<td>9.115</td>
<td>0.01</td>
</tr>
<tr>
<td>Control Group</td>
<td>82.87±10.29</td>
<td>77.37±10.29</td>
<td>7.584</td>
<td>0.01</td>
</tr>
<tr>
<td>Breathing rate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MT Group</td>
<td>25.33±2.00</td>
<td>21.40±1.50</td>
<td>11.609</td>
<td>0.01</td>
</tr>
<tr>
<td>Control Group</td>
<td>22.57±2.65</td>
<td>20.20±1.68</td>
<td>5.308</td>
<td>0.01</td>
</tr>
</tbody>
</table>

* Paired student t-test

In the application group, it was found out that systolic blood pressure score average, the score averages before the music therapy and after the music therapy are statistically significant differences ($t=4.536; p<0.05$). It was seen that the systolic blood pressure of before the music therapy is higher compared with the one after the music therapy. It was found out that diastolic blood pressure score average,
the score averages before the music therapy and after the music therapy are statistically significant differences (t=6.345; p<0.05). It was seen that the diastolic blood pressure of before the music therapy is higher compared with the one after the music therapy. It was found out that the pulse rate score average before the music therapy and score averages after the music therapy are statistically significant differences (t=9.115; p<0.05). It was seen that the pulse rate of before the music therapy is higher compared with the one after the music therapy. It was found out that the breathing rate score average before the music therapy and score averages after the music therapy are statistically significant differences (t=11.609; p<0.05). It was seen that the breathing rate of before the music therapy is higher compared with the one after the music therapy (Table 2).

In the control group, it was found out that systolic blood pressure score average, the score averages before the music therapy and after the music therapy are statistically significant differences (t=5.973; p<0.05). It was seen that the systolic blood pressure of before the music therapy is higher compared with the one after the music therapy. It was found out that diastolic blood pressure score average, the score averages before the music therapy and after the music therapy are statistically significant differences (t=1.990; p<0.05). It was seen that the diastolic blood pressure of before the music therapy is higher compared with the one after the music therapy. It was found out that the pulse rate score average before the music therapy and score averages after the music therapy are statistically significant differences (t=7.584; p<0.05). It was seen that the pulse rate of before the music therapy is higher compared with the one after the music therapy. It was found out that the breathing rate score average before the music therapy and score averages after the music therapy are statistically significant differences (t=5.308; p<0.05). It was seen that the breathing rate of before the music therapy is higher compared with the one after the music therapy (Table 2).

DISCUSSION

The most important problem related with the blood donation is the inadequacy in the volunteered blood donor number. A lot of wrong knowledge, attitude, behavior, belief, and fears related with blood donation may prevent blood donation volunteerism. The first step in the organization of regular blood donation starts with the blood bank doctor and personnel make a good memory at the end of the donation. Some of the reasons for not donating blood are fear of needle, fears related with medical procedures, fear of seeing blood, and fears like passing out during blood donation [11,27]. It was indicated that the fainting out, dizziness, experienced by some donors, are related with the decrease in the probability of blood donation afterwards [28].

In a research made by France and Ditto (2006), it was found out that the medium level reactions like agitation, sweating, paleness, chilling sensation, weakness sensation, nausea, depending on blood donation are developed and additionally more severe reactions like vomiting, blacking out, spasm and passing out are developed in the donors. It was found out that the ratio of developing unwanted symptoms is higher in women and individuals with low body mass index (p<0.05). In a research done by Khorshid and Birgili, it was found out that the ratio of the individuals making blood donation for the first time is 53.9% [7]. In a research done with healthy, adult donors, applied to mobile blood clinics, it was found out that passing out is developed more in women and the ones experiencing less blood donation [13].

It was found out by Üğraş et al. (2018) that the anxiety of the patients decreases as a result of making the patients listening the type of the music they select, who are in the pre-operative stage [22]. It was found out by Ko et al. (2017) that music decreases the anxiety of the patients as a result of making the patients listening the type of the music they select, who wait in the colonoscopy and endoscopy room before colonoscopy [20]. In a study done in patients passing through minor surgery with local anesthesia, music therapy was applied to the patients during the procedure and it was found out that the music decreases the anxiety of the patients [17]. In a compilation, where 25 researches were evaluated in total, it was concluded that the music decreases the anxiety [15]. It was found out that the music therapy is an efficient nursing attempt, decreasing the physiological effects of anxiety in the intensive care patients who are in the mechanical ventilation support [25].

Study Limitations

Music therapy was applied for 10 minutes, since the invasive procedure of blood transfusion took 10 minutes. To provide standards in the research, the choice of music was not left to donors and classical music, which is known to have a therapeutic effect [24,25], was used in the study. This is a limitation of the study. Because heart rate, respiratory rate, systolic blood pressure, diastolic blood pressure, oxygen saturation of donors were recorded from a monitoring device which recorded all the results. In order to generalize the results, the research should be repeated on different samples. According to the results of this research where it was found out that it has positive effect on decreasing the anxiety of the donors when music therapy is applied before blood donation, it is recommended that music therapy is included in the nursing care applied routinely in the blood donation donors.
CONCLUSIONS

In conclusion, it was found out that, when music therapy is applied before blood donation, the music therapy decreases the systolic blood pressure, diastolic blood pressure and breathing rate values, of the physiological symptoms of anxiety, of the donors, however doesn’t affect the pulse rate. It is important that the nurses are aware of the anxiety experienced by the donor during invasive procedures. Because of this the nurses are needed to have knowledge on non-pharmacological methods with low evidence level, for minimizing the anxiety. This research has contributed to the literature on the non-pharmacological methods used for eliminating anxiety. Finally it’s recommended that Nurses should include music therapy in the routine care of donors on blood donation. Further research is needed to explore the effect of the duration and kind of music sessions to be used on blood donation.

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Conflict of interest
The authors declare that they have no conflict of interest

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