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Effect of Music Therapy and Distraction Cards on Anxiety among Hospitalized Children with Chronic Diseases

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Abstract

Background: Hospitalization is recognized as a frightening and stressful experience for children. These negative consequences are intensified when children experience a frequent number of hospitalizations. In this regard, various non-pharmacological approaches have been introduced to reduce these negative consequences, one of which is playing and listening to music.

Aim: The present study aimed to determine the effect of music therapy and distraction cards on the anxiety of hospitalized children with chronic diseases.

Method: This randomized clinical trial was performed on 83 children with chronic diseases aged 8-12 years who were hospitalized in Akbar Pediatric Hospital in Mashhad, Iran. The participants were assigned to three groups, namely cards, music, and cards + music groups. The intervention which involved listening to favorite music and playing with distraction cards was performed on two consecutive days (duration=20 minutes). Data collection tools included the Spence Children's Anxiety Scale and demographic characteristics questionnaire. Data were analyzed in SPSS software (version 22) using descriptive and inferential statistics.

Results: In the current study, the mean scores of children's anxiety in the groups of music, cards, and cards + music after the intervention were reported as 54.8 ± 20.1 , 42.7 ± 15.0 , and 51.3 ± 15.5 , respectively. Moreover, the ANOVA results demonstrated a significant difference in this regard ($P=0.038$). In addition, the Wilcoxon test results were indicative of a significant difference between the cards ($P=0.013$) and cards + music ($P=0.015$) groups regarding the three subscales of anxiety before and after the intervention.

Implications for Practice: Playing with distraction cards decreased anxiety and fear in children to a greater extent, as compared to music therapy. Therefore, the active distraction method can be a practical approach to reduce anxiety and fear in hospitalized children.

Keywords: Anxiety, Chronic disease, Distraction, Fear, Hospitalized child, Music therapy

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Introduction

Children experience hospitalization at least once during their lifetime since they are exposed to various diseases due to their delicate bodies (1). In fact, disease and hospitalization are among the first serious challenges facing children (2). Hospitalization has been recognized as a traumatic and stressful experience for children since the 1960s (3). Hospitalization undoubtedly exerts profound effects on children's life (4) since the unfamiliar atmosphere of hospitals provokes fear and discomfort in children. In addition, in their first years of life, children are more vulnerable to disease and hospitalization which can be ascribed to two reasons: First: stress and mental pressure reflects a series of changes in children's natural state of health, and second: children are usually equipped with less adaptive mechanisms to relieve their stress (5).

Significant advances in technology and medicine over the past few decades have considerably reduced mortality among children with chronic or debilitating diseases (6, 7). Anxiety and fear are the most common emotional response of children to hospitalization. These negative feelings are associated with such adverse effects as prolonged recovery time, pain, infection, and the need for sedatives (3). Based on some studies, hospitalization provoked negative emotions (e.g., fear and anxiety) in 66.6% of children (8). Hospitalization anxiety damages the children's cognition, disrupts their psycho-biological development and cognitive evolution, and decreases their self-esteem (9-11). In addition, permanent anxiety in children is followed by parental anxiety (12), which in turn take their toll on children. Moreover, increased anxiety reduces the ability of parents to help their children (13). In this regard, Davidson et al. (2012) reported that 30-70% of family members experienced anxiety and depression for months or years after the hospitalization of their patients (14).

It is essential to foster effective coping strategies for children who experience hospitalization and encourage them to focus on fun and sports activities. In addition, attempts should be made to create a warm and supportive home-like environment in hospitals (15). Non-pharmaceutical methods such as cartoons, videos, games, and music have recently attracted more attention due to the high percentage of hospitalized children and the complications of hospitalization and pharmaceutical methods. In addition, distraction is the primary technique in non-pharmaceutical interventions (16), which must be age-tailored and appealing to children in order to be effective (17).

Nurses play a significant role in the management of patients' anxiety since they spend much more time with patients in clinical centers. In doing so, they are in the best position to alleviate anxiety and can use non-pharmaceutical treatments to reduce anxiety in patients (18). Hospitalized children need proper nursing support and intervention in order to minimize the negative effects of anxiety. In this regard, efficient support methods must be developed for children and their families (2). Playing is an important source of relaxation and pleasure for children. Through playing, children recognize themselves, their environment, and their surroundings. In addition, children benefit from various physical, social, educational and therapeutic values by playing. Hospitalization does not eliminate the necessity of playing, rather it highlights this need since playing can reduce stress in patients and help patients work through stressful situations (1). According to Donna: "playing is one of the most important aspects of a child's life and is the most effective way to relieve stress and reduce anxiety and fear" (19). In another study conducted by Mola et al. (2001), playing reduced fear in hospitalized children (1).

In the same vein, music can be considered a part of patient care which can be implemented in nursing measures as an effective intervention. In addition, music can be used as a non-invasive treatment to alleviate pain and anxiety, increases a sense of calmness and body safety, and decreases blood pressure, pulse, and breathing (20). According to Almerud and Petersson (2003), music stimulates endorphin secretion by affecting the brain and stimulating alpha waves which results in relief of pain and anxiety (21). Listening to music releases endorphins in the brain, thereby alleviating negative emotions and pain. In addition, music is a great comfort to people in a state of illness and discomfort (22). In a study performed by Rabiee et al. (2007) on the effect of music on the rate of anxiety among hospitalized children, a significant decrease was detected in participants' anxiety after playing music (3).

Distraction with cards was found to be an active method to distract children and reduce their anxiety in a study conducted by Nejla (2014) and Aydin (2017) (23, 24). In general, the most effective distraction method is not well-recognized despite the differences in these methods. However, all methods distract children to some extent (25). In several studies, the use of music during a treatment

process extensively reduced anxiety and fear (26). On the other hand, some other studies did not determine such an effect (27).

Studies performed on the effect of music on anxiety and fear have yielded contradictory results. Moreover, cultural, social, and economic differences are noticeable in Iran, as compared to other countries. In addition, to the best of our knowledge, no research has so far been conducted in Iran on the effect of music and distraction cards on anxiety and fear in hospitalized children with chronic diseases. With this background in mind, the present study aimed to determine the effect of music therapy and distraction cards on anxiety in hospitalized children with chronic diseases in order to reduce the destructive effects of anxiety on children after hospitalization.

Methods

This randomized clinical trial included three groups and was performed on 83 children with chronic diseases aged 8-12 years who were hospitalized in Akbar Pediatric Hospital in Mashhad, Iran. The subjects were selected by allocation concealment with distributing closed envelopes to three groups of cards (N=25), music (N=29), and cards + music (N=29). The participants were selected by convenience sampling. The inclusion criteria entailed: 1) no need for a surgery, 2) no fever or pain during the intervention, 3) a proper mental state and consciousness, 4) non-use of anxiolytics based on the instructions recorded in the child's medical record, 5) a diagnosed chronic disease, 6) no hearing impairment, and 7) no developmental delay and mental retardation based on clinical status and level of education. On the other hand, exclusion criteria included: 1) the occurrence of special medical conditions that prevent the intervention, 2) lack of cooperation of children and their parents with the researcher, and 3) discharge of children before the end of the intervention.

Before the commencement of the study, the approval was obtained from the Regional Ethics Committee of Mashhad University of Medical Sciences and the research deputy of the university. Thereafter, in cooperation with the head, the research-educational deputy, and nursing services manager of Akbar Pediatric Hospital, the researcher referred to pediatric wards 2, 3, and 4. The sampling process was initiated after becoming acquainted with head nurses and explaining the research objectives. The current study included hospitalized children with chronic diseases aged 8-12 years who met the inclusion criteria. Firstly, written consent was obtained from children's parents and the children who obtained a mean anxiety score below 27 in the state-trait anxiety inventory (STAI) by Spielberger received the intervention. Initially, the children were assigned to three intervention groups using the sealed envelope method. The intervention was carried out for 20 minutes every day while children were in a comfortable position in their beds. It is worthy to note that the administration was scheduled in order not to interfere with the daily medical routine.

In the music therapy group, the children listened to some music of their interest through headphones. It is noteworthy that the pieces of music were licensed by the ministry of Islamic culture and guidance and approved by the clinical psychologist and play therapist of children. In the distraction cards group, five-eight-cm cards were used, each containing a different image and shape. Firstly, children carefully looked at the cards and asked the researcher about them, followed by interactive playing for a minimum of 20 minutes. On the other hand, the third group included a combination of music therapy and distraction cards. The Spence Children's Anxiety Scale (SCAS) was administered to children (before and after the intervention on the first and second days, respectively).

In the current study, the sample size was determined using the means comparison formula in two groups. In addition, the SCAS (children's version) was applied to evaluate the participants' anxiety levels. This scale which encompasses 45 items is scored based on a Likert scale. In addition, 38 items are related to six subscales of separation anxiety, social phobia, obsessive-compulsive disorder (OCD), panic disorder- agoraphobia, generalized anxiety disorder, and fear of social damage. The other six questions that were positive query terms were designed to reduce the negative bias of the answers and were not calculated in the overall figure. The overall scale score is obtained from the sum of the subscale scores. According to the SCAS, the subscales of fear of open spaces, fear of physical damage, and social fear express fear, whereas the scales of separation anxiety, OCD, and general anxiety assess children's anxiety level. In this regard, the higher scores are indicative of a more serious problem in that subscale (28).

The SCAS is a standard tool which has been applied to assess anxiety and fear in children in numerous studies inside and outside the country. In addition, the scale has the necessary credibility

and its content validity has been previously confirmed. The reliability of the tool was obtained at 0.90 and 0.60-0.82 for general anxiety and the subscales, respectively (29). In the present study, the reliability of the SCAS was confirmed rendering the Cronbach's alpha of 0.85 using the internal consistency method.

Data were analyzed in SPSS software (version 22) using the Shapiro-Wilk test (to evaluate the normal distribution of the quantitative variables), the one-way analysis of variance (to compare the three groups in terms of normal quantitative variables), the Kruskal-Wallis test (to compare the groups in terms of non-normal quantitative variables and ranked variables), and Chi-square (to compare the groups regarding the nominal variables). In addition, paired t-test (for normal variables) and Wilcoxon test (for non-normal variables) were used for intragroup tests.

Results

As evidenced by the obtained results, the mean age of hospitalized children with chronic diseases was measured at 9.6 ± 1.4 years. In terms of gender, 57.8% of the subjects were female and the rest were male. According to Chi-square and Kruskal-Wallis test, the three groups were homogeneous in terms of age ($P=0.823$), gender ($P=0.976$), place of residence ($P=0.395$), type of disease ($P=0.242$), level of education ($P=0.662$), birth order ($P=0.305$), maternal level of education ($P=0.969$), paternal level of education ($P=0.466$), household dimension ($P=0.888$), history of hospitalization ($P=0.212$), frequency of hospitalization ($P=0.437$), and family history of depression ($P=0.454$). Moreover, about two-thirds of the participants had a history of previous hospitalization, except for the current situation which was indicative of chronic disease.

The comparison of mean anxiety score in children before and after the intervention based on Wilcoxon test results was suggestive of a significant difference among the three groups regarding the anxiety level measured before and after the intervention ($P < 0.001$). On the other hand, the Kruskal-Wallis test demonstrated no significant difference in terms of the mean and standard deviation of the subscale of children's anxiety before ($P=0.760$) and after ($P=0.204$) the intervention. Nonetheless, the results of the paired t-test revealed a significant difference in the music group after the intervention ($P=0.031$). In addition, the Wilcoxon test indicated a significant difference between the groups of cards ($P=0.013$) and cards + music ($P=0.015$).

The mean and standard deviation of three subscales of children's fear suggested a significant difference among the three groups before ($P=0.049$) and after ($P=0.008$) the intervention. On the other hand, the paired t-test results demonstrated no significant difference in the music group after the intervention ($P=0.576$). Nevertheless, a significant difference was observed in the cards + music group ($P=0.008$) after the intervention in this regard. Moreover, the Wilcoxon test results denoted no significant difference in the cards group ($P=0.158$). Given the significance of the three subscales of

Table 1. Comparison of homogeneity of underlying variables in three groups of hospitalized children

Gender	Group			Test result
	Music N (%)	Cards N (%)	Music + Cards N (%)	
Female	17 (58.6)	14 (56.0)	17 (58.6)	P=0.97 Chi-square
Male	(4/41) 12	(0/44) 11	(4/41) 12	
Type of disease				P=0.24 Chi-square
Rheumatoid arthritis	12 (41.4)	8 (32.0)	7 (24.1)	
Diabetes	2 (6.9)	7 (28.0)	7 (24.1)	
Other	15 (51.7)	10 (40.0)	15 (51.7)	
Birth order				P=0.30 Kruskal-Wallis test
The first	17 (58.6)	10 (40.0)	18 (62.1)	
The second	9 (31.0)	12 (48.0)	8 (27.6)	
The third and higher	3 (10.3)	3 (12.0)	3 (10.3)	
Age (year)	9.7 ± 1.4	9.6 ± 1.5	9.5 ± 1.4	P=0.82 Kruskal-Wallis test
Hospitalization order	3.2 ± 3.1	2.6 ± 2.9	3.0 ± 4.2	P=0.43 Kruskal-Wallis test

Table 2. Mean and standard deviation of anxiety score of children before and after the intervention

Children's anxiety score	Group		
	Music (N=29)	Music (N=29)	Music (N=29)
	Mean±standard deviation	Mean±standard deviation	Mean±standard deviation
Before the intervention	57.5±19.6	50.8±13.8	57.9±14.7
After the intervention	54.8±20.1	42.7±15.0	51.3±15.5
Test result (intergroup)	P=0.01 Paired t-test	P=0.003 Paired t-test	P<0.001 Paired t-test

Table 3. Mean and standard deviation of three subscales of anxiety (SCAS) in children before and after the intervention

Three subscales of children's anxiety	Group			Group
	Music (N=29)	Music (N=29)	Music (N=29)	
	Mean±standard deviation	Mean±standard deviation	Mean±standard deviation	
Before the intervention	25.3±10.6	22.4±7.7	23.6±8.8	P=0.2760 Kruskal-Wallis test
After the intervention	23.7±10.8	18.0±7.8	21.4±8.0	P=0.204 Kruskal-Wallis test
Test result (intergroup)	T=2.3, df=28 P=0.031 Paired t-test	Z=02.5 P=0.013 Paired t-test	Z=-2.4 P=0.015 Paired t-test	

Table 4. Mean and standard deviation of three subscales of fear (SCAS) before and after the intervention

Three subscales of children's fear	Group			Test result (intergroup)
	Music (N=29)	Cards (N=25)	Cards+Music (N=29)	
	Mean±standard deviation	Mean±standard deviation	Mean±standard deviation	
Before the intervention	19.8±9.4	15.4±6.4	20.6±7.6	P=0.049 One-way ANOVA
After the intervention	19.4±9.1	12.5±8.2	17.6±8.7	P=0.008 Kruskal-Wallis test
Test result (intergroup)	P=0.57 Paired t-test	P=0.15 Wilcoxon	P=0.008 Paired t-test	

children's fear before the intervention, the ANCOVA was applied to evaluate the difference among the three groups after the intervention, which demonstrated no difference in this respect (P=0.268).

Discussion

The results of the present study denoted a significant difference between the cards group and the other two groups in terms of children's fear and anxiety. These indexes were also significant in the cards + music group. In terms of children's anxiety, the results were indicative of a significant decrease in the mean anxiety score of the cards group after the intervention, compared to the cards + music group. Moreover, an intergroup comparison revealed a significant decrease in the general anxiety of children in the cards and cards + music groups after the intervention, compared to before the intervention. Rodgers and Dunsmuir (2015) carried out a study to determine the effect of an emotional support program on anxiety levels in school-age children. After the intervention, the overall anxiety level was significantly low in the intervention group, compared to the control group (30). The emotional support program used in the mentioned study included the cognitive, behavioral, and psychological dimensions. In the latter dimension, the researchers used sports and game therapy programs. Rabiee et al. (2007) evaluated the effect of music on the rate of anxiety among hospitalized children.

They concluded that the mean anxiety score of children in the intervention group significantly decreased, in comparison to the control group (4). In this regard, the results of the mentioned studies were consistent since it is believed that meeting the children's needs to develop relationships is at the core of music therapy (31).

In their study, Aydin et al. (2016) assessed the effect of music therapy and distraction cards on pain relief during phlebotomy in children. In the mentioned study, no significant difference was observed between the groups (music therapy, distraction cards, and simultaneous use of music therapy and distraction cards) in terms of anxiety level (24).

In this regard, the results are inconsistent with our findings, and this discrepancy can be ascribed to differences in sample size, tools applied to assess children's anxiety, and the inclusion criteria. In a research carried out by Aydin on 50 healthy children who referred for outpatient phlebotomy at the hospital, pain and anxiety were dependent variables of the mentioned plan.

Khalili et al. (2017) conducted a study on the effect of children's preparation for hospital admission on fear in elementary school-aged children in Iran Hospital. They detected a decline in participants' fear after hospitalization due to performing a preparation program (cartoon) (32), which is in line with our results. Similar to music therapy, watching favorite programs is recognized as a distraction method which was applied in the present research due to its positive impacts on coping with fear. Rogers (2015) attributed considering the adaptation pattern, the alteration of fear and physiological parameters to physiological adaptation to the treatment process which is fostered by music (33). In addition, playing cards was another distraction method applied in the current research which exerted a more significant impact on the decrease of children's fear, compared to the inactive method (music). This is mainly due to the fact that active techniques engage and entertain children to a greater extent (30).

In 2013, Zarei et al. conducted a study to determine the effect of story-telling on physiological anxiety, worry, and social anxieties in hospitalized school-age children. The results of the mentioned study demonstrated no significant difference in the rate of social anxiety on the first and sixth days. Nonetheless, the comparison of anxiety's subscales showed a significant difference in the intervention group on the first and sixth days (34). In this regard, the results of the mentioned study are in accordance with our findings. This consistency can be ascribed to the duration of the intervention and play therapy.

In both studies, the intervention continued for 20-30 minutes. Similar to playing cards or a combination of cards and music, story-telling therapy involves face-to-face and interactive communication with children which might result in decreased social anxiety. In 2014, Canbulat et al. conducted research entitled "the efficacy of distraction methods on procedural pain and anxiety by applying for distraction cards and kaleidoscope in children". They found that distraction with cards and kaleidoscope reduced pain and anxiety during phlebotomy, compared to the control group. However, distraction cards led to a higher decrease in participants' anxiety, compared to kaleidoscope (23). In this respect, our findings are in line with the results of the mentioned study. Both of these studies used distraction cards, which is an active distraction method and can help alleviate anxiety in children by entertaining them.

Talebi et al. carried out a study (2014) entitled "comparison of the effectiveness of educative storybooks and face-to-face education on anxiety of hospitalized children". In this study, a significant difference was observed between visual conceptual map and face-to-face method groups after familiarization program (13) which is consistent with our findings. This agreement between the results might be due to the fact that face-to-face interaction is required in playing with distraction cards. Children have a greater opportunity to express their fears and potential anxieties after the establishment of communication. On the other hand, music therapy may improve the psychosocial, physiological, and emotional integration of individuals and decrease their anxiety levels (4). Therefore, the alleviation of anxiety in cards and the cards + music groups is not far-fetched.

Some of the major drawbacks of the present study included the difference of fear and anxiety in children, individual differences, and personal interests of children in terms of music and games, difference in social level in establishing communication with parents and children, and communicating with children with different cultures and dialects (e.g., Kurd and Baluch).

Implications for Practice

The obtained results were indicative of the positive effect of interactive or active (playing cards) and

inactive (music therapy) distraction on the anxiety and fear of hospitalized children with chronic diseases. Therefore, distraction and directing children's attention can be of great help to nurses in pediatric wards to create an opportunity to relieve pain and reduce anxiety and fear in children during treatment procedures.

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Conflicts of Interest

The authors declare that they have no conflict of interest regarding the publication of the current article.

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