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The Effect of Music on Fatigue and Anxiety of Patients Undergoing Hemodialysis

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Abstract

Introduction: Chronic renal failure is largely asymptomatic complication, which requires dialysis as a time process to control it. On the other hand, due to the high prevalence and progressive maladaptive nature, its progress should be prevented. In addition to various physiological changes, it changes the mental, psychological, and social aspects of patients. Fatigue and anxiety are common nursing diagnoses of patients undergoing hemodialysis. Employment of music as a complementary therapy and an uncomplicated, low-cost, and pleasurable method can be a nursing practice to reduce such complications. The current study aimed at investigating the effect of listening to music on anxiety and fatigue in patients undergoing hemodialysis.

Methods: The current clinical trial was conducted on 25 patients as a group randomly selected to participate in the study. Patients listened to music for 30 minutes three times per week, 12 sessions a month, during hemodialysis sessions. Data were collected using three questionnaires: a researcher-made demographic information questionnaire, Beck anxiety inventory (BAI), and fatigue severity scale (FSS). Data were collected by a researcher based on interviewing method. Data were expressed as means ± standard deviation (SD). Data were statistically analyzed with SPSS version 20. The paired t test was used to compare before and after intervention mean values between the groups. The level of significance was < 0.05.

Results: The mean anxiety score of the patients before intervention was 19.6%, indicating a moderate level of anxiety and the mean anxiety score was 14.48% after intervention. The mean fatigue score decreased from 36.8 to 31.2, and remained at moderate levels of fatigue. The reductions were significant ($P < 0.05$).

Conclusions: The results of the current study showed that the employment of music as a complementary therapy was effective on reducing the anxiety and fatigue of patients undergoing hemodialysis and utilizing it along with other therapeutic interventions is recommended.

INTRODUCTION

The chronic renal disease is a global dilemma due to its high prevalence, progressive maladaptive nature, and mostly asymptomatic until the end phases of failure, and also association with fatal cardiovascular diseases and ultimately high cost of care and treatment of the patients [1]. The number of patients undergoing dialysis until the end of 2015 in the world was about 2,820,000 million people of which 89% were undergoing hemodialysis. These statistics in Iran until 2015 was reported 29,100 people, of which 27,500 people (94%) were undergoing hemodialysis. With respect to the average growth of 4%-5% of patients in Iran consistent with the world growth, it is predicted that this method endures as the most important therapeutic method in Iran (Dialysis calendar 2016). Hemodialysis, despite much advancement in technology, yet does not change the natural trend of underlying disease. Moreover, it coincides with some complications and causes

physiological stresses such as nausea, vomiting, fatigue, cramp, and psychosocial stresses such as uncertainty about the future, losing job, financial problems, reduction of sexual ability, etc. [2]. The nature of disease, continuous dialysis and the need for change in the lifestyle, involve most of the patients in the psychosocial problems, and anxiety as a common psychiatric disorder is observed therein [3]. In the studies by Kanani, Afkand, and Moradi, patients` anxiety was analyzed by the Spielberger questionnaire and their state anxiety scores were 46.9, 48.8, and 46.44, respectively, which indicated high levels of anxiety. This complication has negative effects on the self-care of patients and upon avoiding to follow the diet therapy, complications such as liquids productiveness, muscles cramp, high blood pressure, anemia, etc. that result in increased illness, repeated hospitalizations, low quality of life, and increase of costs are observed. Currently, benzodiazepines are used to treat the anxiety of this group of patients and considering the side effects and dependence to the drug, utilization of less harmful policies in the complementary medicine seems necessary [4]. Recently, in the health and treatment systems, the employment of alternative and complement therapies is highly recommended to prevent the medicinal effects [2]. Fatigue is one of the common complaints of patients with chronic renal failure (CRF) that is appeared insidiously with power reduction and the tendency to sleep, and more than half of patients experience moderate to severe levels of fatigue. In the studies conducted by Biniaz and Tavakoli, fatigue was assessed by fatigue multifactor scale and the mean score of fatigue was reported 65.39 and 61, which demonstrated the high fatigue level, whilst, stability and intensification of fatigue results in depression, and physical and mental weakness [5, 6]. One of the non-medicinal interventions that can be implemented by the nurses and is accepted desirably by the patients is the employment of music as an accessible, low-cost, uncomplicated, and nonaggressive therapy [7]. Various studies focused on effectiveness of music on improvement of harassing symptoms [7, 8]. As mentioned above, the CRF has high prevalence and hemodialysis is the most common method to reduce the disease symptoms that yet involves the patients in problems such as anxiety and fatigue. Whereas one of the nursing purposes is providing the comfort for the patients, the author as a dialysis nurse intended to analyze the effect of music therapy as an uncomplicated and safe intervention on the anxiety and fatigue of patients undergoing hemodialysis. Authors hope that the results of the current study help to identify an intervention to meet the “patients comfort”.

METHODS

The current clinical trial was conducted on a group of patients in Hasheminezhad Hospital, affiliated to Iran University of Medical Sciences, Tehran, Iran in 2016. The population thereof consisted of all patients with CRF filed with that hospital, and underwent hemodialysis. The samples were included in the study using simple random sampling and sortation method; therefore, the group qualified for the study units participated in the sortation, and in case of willingness to participate in the study, was considered as sample. In case of unwillingness, other samples were selected again among the population to complete the respective sample size. The sample size was calculated using the following formula, and based on the confidence level of 0.95, power of 0.8, and effect size 0.8;the sample size was set to 25 subjects.

$$n = \frac{2(Z_{1-\frac{\alpha}{2}} + Z_{1-\beta})^2}{\Delta^2} + 1$$

$$n = \frac{2(1.96 + 0.84)^2}{0.8^2} + 1$$

Age over 16 years, diagnosis of CRF, and need for dialysis by the attended physician, history of dialysis for six months, full awareness of the study objectives, willingness to listen to music during analysis, no audition problem and history of mental problems requiring medicinal therapy, and no disabling physical disorders were the inclusion criteria. The patients that refused dialysis in the hospital under study or needed to use drugs due to severity of anxiety and fatigue in order to overcome these complications, or were not willing to continue cooperation with the research were excluded from the study. The data in the current study were collected using a questionnaire and its questions were asked through interview from the study subjects. The instruments were as follows:

A researcher-made questionnaire to assess demographic characteristics and clinical information including 18 items; its scientific reliability was confirmed by content validity and the scientific confidence with test-retest and coefficient correlation of 81%.

Beck anxiety inventory (BAI) including 21 items that each item or term reflects one of the anxiety symptoms, which means mental or physical symptoms and fear. The questions are scored based on a four-option Likert scale when 0 means lack of anxiety, and 3 denotes severe anxiety. The total score ranges 0 to 63; to interpret the obtained total score, 0-7 means lack of anxiety, 8-15 mild anxiety, 16-25 moderate anxiety, and 26-63 severe anxiety.

Fatigue severity scale (FSS) is the standard instrument and one of the most widely-used scales in the world. It contains nine items and specifically assesses the fatigue outcome according to all functional and welfare factors; it is scored based on a seven-point scale (from 1, the lowest to 7, the highest rate). Minimum score is 9 and maximum score is 63. Scores 9-18 indicate low fatigue, 18-45 fatigue, and above 45 denote high fatigue. Reliability of BAI was accepted in the studies by Leobach and Fydrich, and fatigue in the studies by Heidari and Farahani.

After obtaining the required permissions from university and approval of officials in the Deputy of Iran University of Medical Sciences, the researcher was introduced to the managers and officials of Hasheminezhad Hospital. At first, the names of eligible patients were written on a small papers based on the files in the hemodialysis ward, and put into a cap, and the name of 25 persons were taken out randomly at the presence of one of the personnel of the ward.

The study objectives, procedure, and observations to be complied were explained to the subjects and each of them signed the informed consent letter to participate in the study. In case of unwillingness to participate in the study, the name of another person was taken out of the cap and the said steps were repeated for him. In addition, when a patient withdrew from the study, the above steps were repeated in order to replace another person and finally 25 subjects enrolled in the study. The questionnaire information was obtained through asking questions from patients and written down on paper. The patients received music therapy during a one-month analysis in 12 sessions (three days a week) each 30 minutes, and melodies containing classic and modern music (Rain of love song by Naser Cheshmazar, Aramesh Dar Roya, and two other motivating compositions by Dr. Earned Stein) were provided to them.

A headphone was provided to each subject, but some preferred to listen to music without headphones. The subjects were yet persuaded to listen to music at home. Their anxiety and fatigue was measured before listening to music and after the 12th session of listening to music using the abovementioned questionnaires. The obtained data were analyzed with SPSS using paired samples *t* test and standard deviation (SD).

RESULTS

Demographic characteristics and clinical information of the study subjects are provided in table 1 and 2; and summary of the results of anxiety and fatigue scores investigated by BAI and FSS before listening to music (Table 3) indicated that 28% had no anxiety, 20% mild anxiety, 32% moderate anxiety, and 16% had severe anxiety. After the implementation of music therapy program, 24% had no anxiety, 36% mild anxiety, 28% moderate anxiety and 16% had severe anxiety (Fig 1).

Determination and comparison of anxiety of patients undergoing hemodialysis before and after the music therapy (Table 3) indicated that the mean value of anxiety before listening to music was 19.6 ± 15.66 (SD). The mean after music therapy reached 14.84 ± 12.41. A significant relationship was observed in the anxiety score before and after music therapy based on the data obtained from BAI, using paired samples *t* test and $P < 0.05$. Listening to music was effective to reduce anxiety in patients receiving therapy during hemodialysis. About fatigue, before beginning the music therapy, 12% had low fatigue, 48% moderate fatigue, and 40% high fatigue. After completion of music therapy, 16% had low fatigue, 52% moderate fatigue, and 32% high fatigue (Fig 1). According to the contents of Table 3, the mean value of fatigue before starting music therapy was 36.8 ±16.44, which after the end of music therapy reached 31.2 ± 14.63. A significant relationship was observed in fatigue score before and after music therapy based on the data obtained from FSS, using paired samples *t* test. In fact, implementation of music was effective in the reduction of patients' fatigue.

DISCUSSION

The current study aimed at determining the effect of listening to music on anxiety and fatigue of patients undergoing hemodialysis referred to Hasheminezhad Hospital of Tehran, in 2016. Data analysis indicated that after implementation of music therapy to the study subjects, the mean value of anxiety and fatigue significantly reduced. Fatigue as a common disabling symptom is reported in many patients undergoing hemodialysis, and results of the current study showed that 12% of the patients undergoing hemodialysis had low fatigue, 48% moderate fatigue, and 40% high fatigue, which were consistent with the results of the study by Biniaz that indicated 81.6% of subjects experienced some degrees of fatigue and 30.7% had severe fatigue.

In the study by Tavakoli, the mean fatigue before hemodialysis were 61 ± 12.24, which demonstrated high fatigue in patients undergoing hemodialysis. The fatigue seems to be a real and serious problem in patients undergoing hemodialysis. Nahamin analyzed the demographic variables affecting fatigue in 60 patients undergoing hemodialysis and indicated that the age, educational level, and disease period significantly affected fatigue. In the study by Tavakoli, 65.9% of the subjects were over 61 years old, and Hadadian also observed the highest fatigue in age group above 45 years. Upon aging, due to the physiological changes, higher levels of fatigue are observed, but in the current study, the average fatigue symptoms were observed in the age group 31-40 years that showed reduction in the age of being affected by failure, and the new finding that the fatigue does not necessarily depend on the old age, and other factors such as spiritual and mental factors were also effective. In the current study, 68% of the subjects had high school diploma that was close to the results of the study by Tavakoli in which 54.5% had high school diploma, but not consistent with the results of the study by Taheri Kharameh, in which most of subjects were illiterate. People with lower educational level were probably less familiar with fatigue reduction mechanisms. The longest history of hemodialysis in the current study was from five to nine years observed in 40% of the subjects. In the study by Khoshnazar, the mean history of hemodialysis was six years that was three years in the study by Zarurati. According to the results, people with shorter history of hemodialysis had less time to adaptto the current conditions, and probably

experienced more fatigue. One of studies on utilization of complementary medicine to investigate the effect of fatigue was provided by Shaer Moghadam aimed at analyzing the effect of reflective massage of hand palm on the fatigue intensity of patients receiving hemodialysis. Accordingly, fatigue score of the intervention group before the intervention was 51.61, which reached 27.34 after the intervention, and a significant difference was observed between the measures. Also, Zarurati in a study entitled "The Effect of Music Therapy on Comfort and Vital Signs" indicated that this method can be used to increase the comfort and stabilization of vital signs. Anxiety as a deterrent and maladaptive factor is assumed as a resistance to therapeutic methods. In a study, most people (32%) had moderate anxiety and 16% had severe anxiety, which showed high prevalence of anxiety among patients undergoing hemodialysis. Moradi in a study on the effect of acupressure on the anxiety of patients undergoing hemodialysis indicated that following the pressure on the exact points the mean score of anxiety significantly reduced and form 42.26 reached 46.44, which showed the effectiveness of music therapy. Kanani in a study on the effect of aromatherapy with orange essential oils showed a significant reduction in trait anxiety score from 46.9 to 35.9 [9].

Table 1: Distribution of Demographic Variables among the Study Participants

Variable	Percent	Frequency
Gender		
Female	52	13
Male	48	12
Age, yr		
30-20	12	3
40-31	28	7
50-41	24	6
60-51	24	6
70-61	12	3
Marital status		
Single	60	15
Married	20	5
Widow	8	2
Divorced	12	3
Educational level		
Illiterate	0	0
Middle school	4	1
High school	68	17
University	28	7
Job status		
Officer	12	3
Worker	8	2
Pensioner	0	0
Self-employed	16	4
Disabled	1	1
Unemployed	12	3
Housewife	48	12
Housing status		
Leasing	36	9
Private	64	16
Organizational	0	0
Insurance status		
SSO	68	17
Complementary	32	8
Protection system		
Husband/wife	4	1
Child	4	1
Sister and brother	20	5
Parents	40	10
Spouse and child	20	5
Second degree family	0	0
Independent	12	3

Table 2: Distribution of Disease Variables among the Study Participants

Variable	Percent	Frequency
History of renal failure		
Less than 1 year	12	3
2-4	32	8
5-9	40	10
10-20	16	4
Vascular access		
Wrist fistula	4	1
Permanent breast Shaldon catheter	16	4
Cervical Shaldon catheter	20	5
Artificial arm vessel	12	3
Arm fistula	48	12
Underlying disease		
Hypertension	32	8
Diabetes	28	7
Polycystic kidney	8	2
Kidney stone	16	4
Cold	12	3
Unknown cause	4	1
History of transplantation		
Yes	28	7
None	78	18
Impact of dialysis on the quality of life		
Yes	8	2
None	92	23
Impact of disease on economic status		
On income	20	5
On working place	36	9
Adequacy of income	52	13

Table 3: Data Analysis of Anxiety and Fatigue before and after Music Therapy

Variable	After	Before	Statistical Tests
Anxiety			T = 4.61, Df = 24, Sig = 0.000
Mean	14.84	19.6	
Standard Deviation	12.41	15.66	
Fatigue			T = 6.98, Df = 24, Sig = 0.000
Mean	31.2	36.8	
Standard deviation	14.63	16.44	

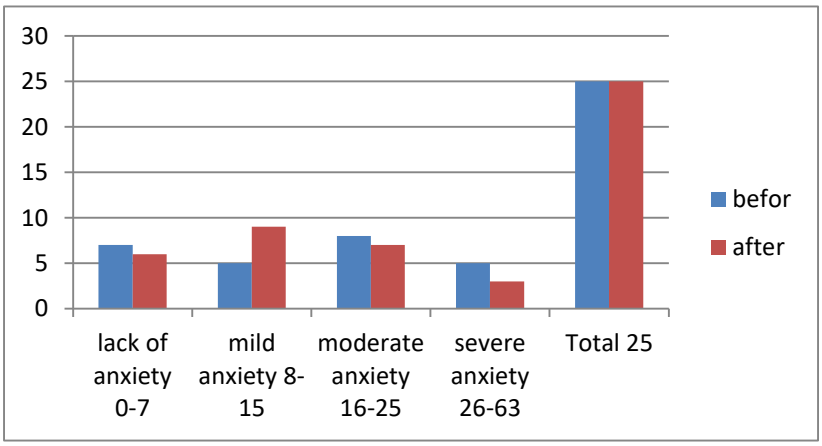

Figure 1: Distribution of Anxiety before and after Music Therapy in the Study Participants

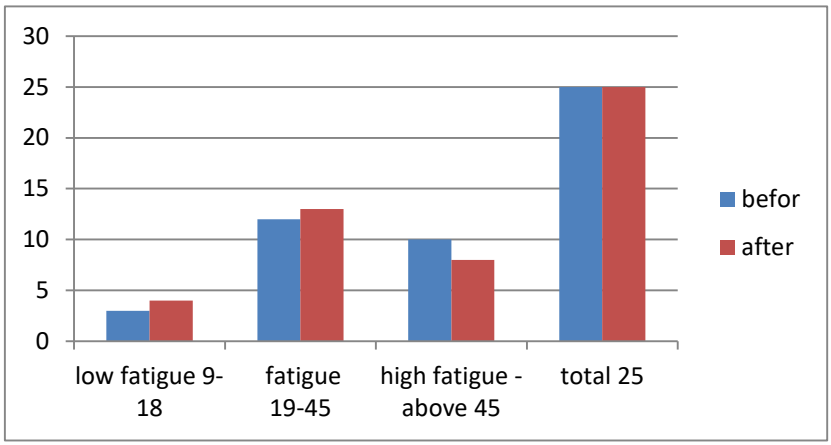

Figure 2: Distribution of Fatigue before and after Music Therapy in the Study Participants

Afkand in a study on the effect of multi-dimensional psychiatric rehabilitation care on the anxiety of patients undergoing hemodialysis reported similar results and the score dropped from 48.4 to 42.57 [10]. Tayebi also studied the effect of Hata Yoga on the stress, anxiety, and depression of patients undergoing hemodialysis, and showed that the stress score in the intervention group significantly decreased from 11.26 to 10.1, and Tayebi in another study reported the reduction of anxiety in follow-up care compared with that of before intervention. Summary of the current study showed that before implementation of music therapy, mean value of anxiety was 19.6 and after 12 sessions of music therapy, it reduced to 14.84 in the study subjects. This difference was significant and consistent with the results of the abovementioned studies. Results of the current study and similar studies indicated positive effect of music on anxiety and fatigue of patients undergoing hemodialysis, and since one of the nursing purposes is to provide the comfort for patients, employment of complementary therapies affects this relationship. Thus, it is recommended to teach diagnostic methods of anxiety and fatigue and techniques to overcome them to the nurses, since music therapy as an uncomplicated, low-cost, and pleasurable method for the patients is one of the complementary therapies and all patients can use it in order to reduce the main symptoms of disease. This matter laterally affects the symptoms that have indirect association with the sadness and provide better physical and psychiatric conditions for patients' health. It is hoped that introduction of music therapy as a sedating therapy to reduce complications can be a small step towards improvement of the quality of life of Iranian patients.

APPRECIATION

The article was extracted from a Master's thesis in nursing with ethics code IR.IAU.TMU.REC -1395.272 and IRCT (Iranian Registry of Clinical Trials) code 20180115038384N1.Hereby, the author appreciates the contribution of all people involved in the approval and implementation of the study, Mr. Ebrahimi and patients undergoing hemodialysis in Hasheminezhad Hospital of Tehran that helped to implement the study.

Conflicts of Interest

There is no conflict of interest to be declared.

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