

Music Relaxation Therapy Effectively Reduces Fatigue in Patients Under Hemodialysis

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ABSTRACT

Background: Patients with chronic failure must undergo hemodialysis for life. One of the things that patients can feel during hemodialysis is fatigue. Fatigue can be managed with relaxation therapy using music.

Objective: This study aims to examine the effect of music therapy on fatigue in patients undergoing hemodialysis.

Methods: This type of research is a quasi-experimental design with a pretest and posttest nonequivalent control group. A sample of 42 patients was taken using a total sampling technique, divided into control and intervention groups. The intervention using natural sound music therapy was given for 30 minutes. The instrument uses a headset, mp3, standard operating procedures, and a Functional Assessment of Chronic Illness Therapy (FACIT) Fatigue Scale questionnaire. Bivariate test using Paired T-Test and Independent T-Test.

Results: The control group showed a p-value of 0.000. These results indicate a difference in fatigue as evidenced by an increase in the score at the posttest of 14.27. There was a decrease in the fatigue score in the intervention group by -34.73 and $p < 0.001$. The difference in the posttest between the control and intervention groups was $p < 0.001$.

Conclusion: Music therapy is effective in reducing fatigue in patients undergoing hemodialysis. Music can be a relaxation therapy option for patients with chronic failure.

KEY WORDS

chronic kidney disease, fatigue, music therapy

INTRODUCTION

The number of sufferers of Chronic Kidney Failure (CKD) is increasing and causing severe health problems. The incidence of CKD in the United States is estimated at 37 million¹⁾. The number of CKD sufferers from 1990 to 2017 was 697.5 million²⁾. CKD was ranked 12th as the highest cause of death in 2017; it is known that 1.2 million CKD patients died³⁾. The number of CKD sufferers in Indonesia also shows that the data is increasing yearly. A total of 25,446 new CKD patients in 2016 increased to 30,831 in 2017⁴⁾. The incidence of CKD rose from 1.8 million to 3.8 million in 2018⁵⁾.

CKD is incurable, and the primary treatment is hemodialysis for life⁶⁾. One of the things that patients can feel during hemodialysis is fatigue⁷⁾. Fatigue is an unpleasant feeling felt by individuals in the form of fatigue, weakness and reduced energy. Fatigue is the main complaint submitted by patients undergoing hemodialysis. The incidence of fatigue in hemodialysis patients reaches 60-97%. Several factors cause fatigue in dialysis patients, namely anaemia and hemodialysis dependence⁸⁾.

Kidney damage can result in the disruption of the formation of the hormone erythropoietin. Erythropoietin is responsible for the production of erythrocytes⁹⁾. The reduced value of red blood cells results in a decrease in the amount of oxygen and nutrients throughout the body. Hypoperfusion causes patients to experience severe fatigue (fatigue), anorexia, sleep problems, and activity disorders¹⁰⁾. Poor nutritional status can exacerbate malaise and fatigue. CKD patients may develop ure-

mia, a triggering factor for digestive disorders such as reduced appetite, nausea, and vomiting. It causes loss of protein and decreased energy for the skeleton. Hemodialysis patients depend on machines for their lives, impacting their psychological condition. Patients can become depressed and result physical disorders such as fatigue, rest and sleep problems, and decreased motivation for daily activities¹¹⁾.

Fatigue, if not treated quickly, can impact physiological and psychological functions¹²⁾. Hemodialysis patients who experience fatigue can cause decreased concentration, emotional disturbances, and malaise. Patients also experience a decrease in the ability to perform daily activities. The worst effect is that the patient will experience a reduced quality of life¹³⁾. Interventions in the form of relaxation can be given to patients who experience fatigue. Relaxation techniques are in patients with disorders of the sympathetic nervous response. Relaxation stimulates the parasympathetic nerves, reducing muscle tension, dilating blood vessels, and reducing fatigue. One of the relaxation therapies that can be given to overcome fatigue is music therapy.

Soothing music causes a comfortable and calm sensation for the listener and is psychologically effective in reducing fatigue. Music therapy can use several choices of types of music, such as classical music. Previous studies have shown that giving classical music a frequency between 300-930 Hz and 50-70 dB causes a calming effect on a person. Nurses must pay attention to several things, such as the type of music selection, and the volume provided must be safe so that maximum results are achieved. In addition, nurses can help create a comfortable and safe atmosphere so that the process of providing music therapy runs smoothly¹⁴⁾.

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Based on a preliminary study conducted by researchers on January 14, 2020, data on the number of hemodialysis patients from January to March 2020 was obtained from as many as 42 people. There were 25 male patients and 17 female patients. The results of interviews with officers in the hemodialysis room were received; so far, there has never been any treatment for hemodialysis patients who experience fatigue. The results of interviews with five hemodialysis patients all said they experienced fatigue before, during, and after hemodialysis. When experiencing fatigue, there is no treatment other than choosing to sleep and rest. Based on this background, the authors are interested in researching the effect of music therapy on the fatigue of CKD patients who are undergoing hemodialysis.

METHODS

Study Design

This research is quasi-experimental with a nonequivalent control group pretest and posttest design. The study was carried out 2-18 June 2020 at the Hemodialysis Unit of the Lindimara Waingapu Christian Hospital, East Nusa Tenggara, Indonesia.

Samples

The population is 42 patients with CKD. The researcher divided the sample into a control group and an intervention group. The control group did not get any treatment, and the intervention group got music therapy. Samples were taken using total sampling with the number of each group as many as 21 people. The sample was determined according to the inclusion criteria: a minimum Hb of 13 g/dl, age 26-55 years, at least three months undergoing hemodialysis, and liking music. Exclusion criteria were Patients with hearing loss and seizures.

Instruments

Instruments for music therapy consist of headsets, MP3 players, music, standard procedures, and observation sheets. The music provided is natural sound music with a frequency of 300-930 Hz and is played with 50-70 dB. Fatigue levels were measured using a questionnaire modified from the Functional Assessment of Chronic Illness Therapy (FACIT) Fatigue Scale questionnaire by Tennant. Fatigue that is assessed consists of two aspects: symptoms of fatigue and social activities. The questionnaire consists of 13 statements with five answer choices. The value given to each account is a range of 0-4. The lowest fatigue value is 0, and the highest is 52. The questionnaire has been carried out with content validity with a value of 0.87, which means that the questionnaire is feasible to use.

Data Collection

The independent variable is music therapy, and the dependent variable is the fatigue score. Music relaxation therapy stimulates brain perception in intradialytic patients by providing melodious natural music using MP3 and a headset with a prone sleeping position and duration of 30 minutes and one time of administration. Fatigue level is a state change from a more vital state to a weaker state experienced by hemodialysis patients at RSK Lindimara Waingapu. Fatigue level consists of two aspects, namely aspects of physical symptoms and social elements, which are carried out by two activities: pretest and posttest. Pretest fatigue level is the level of fatigue measured 5 minutes before the intervention. Posttest fatigue level is the level of fatigue measured using a questionnaire 5 minutes after the intervention.

The data collection process was carried out during the intradialytic phase of the patient. Each respondent was given their own set of music therapy. The patient listens to music provided through an mp3 player during the therapy process. The researcher was assisted by four assistants who were nurses on duty in the hemodialysis room. Before data collection, the assistant received an explanation of the entire research process and signed an agreement as an assistant.

Data Analysis and Ethical Consideration

Respondents received an explanation of the research fundamentals, which consisted of the objectives, benefits, and research processes. The

researcher explains what can and cannot be done during the intervention process. Respondents signed informed consent as a sign of their willingness to be involved in the research process. Respondents also received an explanation about the right to resign during the research process. The research was conducted after obtaining ethical approval from the Ethics Commission of the University of Respati Yogyakarta with the number 108.3/FIKES/PL/IV/2020 and research permission from the Director of the Lindimara Waingapu Christian Hospital, East Nusa Tenggara. The normality test using Shapiro Wilk showed that the data were normally distributed ($p > 0.05$). Bivariate test using Paired T-Test and Independent T-Test.

RESULTS

Characteristics of Respondents and Changes in Patient Fatigue

Table 1 shows that the majority of respondents are male (54.8%), elderly (76.2%), and working in the private sector (31.0%). In the control group, the fatigue score for women, the elderly, and the occupation of civil servants was greater both at the pretest and posttest. The control group showed increased fatigue scores in all respondents' characteristic variables. Men experienced a higher increase in fatigue than women (19.8 > 6.0). Elderly and private occupations are known to increase more than others.

Table 1 also shows that the pretest data for women, the elderly, and civil servants showed the highest average fatigue scores. In the intervention group, all categories of variables experienced a decrease in fatigue scores. Women experienced a more significant reduction in posttest fatigue than men (36.9 > 32.9). The elderly also experienced a more substantial decrease in fatigue than adults (36.3 > 31.5). Patients who work as civil servants experienced the most significant reduction in fatigue compared to other occupational categories (48.3%).

Effect of Music Relaxation Therapy to Reduces Fatigue in Patients Under Hemodialysis

Table 2 shows an increase in the fatigue score in the control group by 14.27. The bivariate test obtained $p < 0.001$ indicates a difference in the value of fatigue between the pretest and post-test, the increase in patient fatigue evidence this difference. The intervention group showed a decrease in the fatigue score after the intervention was given by 34.73. The bivariate test showed $p < 0.001$, meaning that providing music therapy affected the fatigue of patients undergoing hemodialysis. The fatigue homogeneity test of patients in the control group and intervention at the pretest was obtained at $p > 0.230$. The result shows the fatigue value of the two groups is homogeneous. The difference test between the control and intervention groups showed $p > 0.002$. The result proves that the fatigue of the patients in the group that was not given music therapy was different from the group that was given music therapy. The difference in the average fatigue score is 47.16.

DISCUSSION

Gender and age are risk factors that can cause CKD. Men are at greater risk of suffering from CKD related to lifestyle, hormones, and work¹⁵. The results of the study support previous studies which stated that most CKD patients were male¹⁶. The study results are not in line with Harris & Zhang¹⁷, which state that gender is not associated with the incidence of CKD. Old age has a role in the progression of CKD¹⁸. The study results align with previous studies, which stated that the incidence of CKD is higher in old age compared to the young^{19,20}.

Females experience more fatigue than males. Women talk more about illnesses and problems they experience, so it is easy to know the occurrence of fatigue²¹. The results of this study differ from those of Yulianti *et al.*²², who found that gender was not associated with the incidence of fatigue in CKD patients undergoing hemodialysis. Degenerative factors increase the incidence of fatigue. Increasing age can result in reduced organ function and psychosocial effects of chronic disease, a physical condition that declines in old age leading to fatigue. The study results align with Maesaroh *et al.*²³, and there is a relationship between age and fatigue in CKD patients. Older patients show more

Table 1: Characteristics of Respondents and Changes in Fatigue of Hemodialysis Patients (N = 42)

Variables		Skor Kelelahan <i>Pretest-Posttest</i>					
		Σ f(%)	Min	Max	Mean	Δ Mean	SD
Gender Control Group	Men	11 (52,4)	21-48	47-52	30,9-50,7	19,8	8,9-1,5
	Women	10 (47,6)	42-49	48-52	45,0-51,0	6,0	2,0-1,3
Gender Intervention Group	Men	12 (57,1)	12-6	50-9	37,1-4,3	-32,9	15-2,8
	Women	9 (42,9)	15-0	51-5	39,9-3,0	-36,9	13-1,6
Age Control Group	Adult	7 (33,3)	21-48	48-52	36,3-49,7	13,4	7,8-1,3
	Elderly	14 (66,7)	21-34	48-52	36,5-50,8	14,3	9,9-1,4
Age Intervention Group	Adult	3 (14,3)	17-0	48-9	37,6-4,3	-31,5	15-3,4
	Elderly	18 (85,7)	12-0	51-7	39,4-3,1	-36,3	14-2,0
Occupation Control Group	No	6 (28,6)	42-49	48-52	45,0-50,8	5,8	2,2-1,3
	Farmer	3 (14,3)	21-48	47-52	33,8-50,2	16,4	11-1,8
	Private civil servant	8 (38,1)	24-50	31-52	27,3-51,3	24,0	3,3-1,0
	Civil servant	5 (23,8)	45-52	45-52	45,0-52,0	7,0	4,1-5,2
Occupation Intervention Group	No	6 (28,6)	15-0	47-5	37,3-3,0	-34,3	15-2,2
	Farmer	6 (28,6)	29-3	49-3	49-3,0	-46,0	2,7-3,5
	Private civil servant	5 (23,8)	12-3	49-9	31,2-5,0	-28,3	14-2,4
	Civil servant	4 (19,0)	19-1	51-2	50,0-1,7	-48,3	1,0-0,6

Δ = Difference posttest-pretest; Max = maximal; Min = minimal; SD = Standard Deviation

Table 2: Effect of Music Relaxation Therapy to Reduces Fatigue in Patients Under Hemodialysis (N = 42)

Variables	Control Group				Intervention Group			
	Pretest Mean \pm SD	Posttest Mean \pm SD	Δ Mean	p [†]	Pretest Mean \pm SD	Posttest Mean \pm SD	Δ Mean	p [†]
Fatigue	36,53 \pm 9,88	50,80 \pm 1,37	14,27	< 0.001	38,40 \pm 13,6	3,64 \pm 2,32	-34,73	< .001
Homogeneity test of fatigue pretest among control-intervention group p = 0.230								
The Mean Difference of fatigue posttest between control and intervention group (-47.16, p0.002*)								

p = p-value; SD = Standard Deviation; Δ = Difference posttest-pretest; [†]Tested using Paired T-Test; *Tested using Independent T-Test

fatigue than younger patients.

Research by Maesaroh *et al.*²³⁾, states that the patient's work is related to the incidence of patient fatigue. Patients who do not work experience more fatigue than patients who work. This study has a difference; previously, there were only two categories of work, namely working and not working, while this study divided the patient's work into four categories. The study's results do not support this; this study shows that housewife patients score lower fatigue than those who work.

Hemodialysis or dialysis is a therapy for patients with CKD. Hemodialysis helps replace kidney function to clean and remove waste metabolites and toxic substances from the body. Patients with CKD undergo hemodialysis 2-3 times per week with a duration of 4-5 hours. Dependence on hemodialysis programs can cause physical and psychological fatigue in patients²⁴⁾. Fatigue is one of the common symptoms found in clients with chronic diseases. The patient's fatigue condition disrupts aspects of his life. Disturbances that can occur include decreased concentration, sleep disturbances, emotional disturbances, disturbances in daily activities, and malaise. Disorders can reduce the quality of life of hemodialysis patients¹³⁾.

Music relaxation therapy intervention can be given to hemodialysis patients. This study proves that the results in the control group increased fatigue scores, while the intervention group experienced a significant decrease in fatigue scores. Music therapy effectively reduces patient fatigue²⁵⁾. The difference lies in the sample; the previous study used patients undergoing radiotherapy, while this study was on hemodialysis patients. The music therapy given is also different; previous studies used three choices of music and several meeting sessions, while this study used natural sound music and was given one treatment.

Music is the form of sound stimulation that forms vibrations in the body's senses and emotions. A person can respond well physically and psychologically after being given music therapy. The effect will increase the activity of the body system and the activities of the glands involved²⁶⁾. Music affects the part of the brain that regulates emotions^{27,28)}. Music is involved in regulating dopamine²⁹⁾, and changes in the body's serotonin, oxytocin, and cortisol levels³⁰⁾. Based on this, music has a therapeutic effect due to the response given by the patient when receiving

ing music therapy.

This study supports the research of Sariati *et al.*³¹⁾ that music therapy and aromatherapy effectively reduce fatigue in hemodialysis patients. The difference in terms of the type of research uses a systematic review by reviewing journals that are appropriate to the topic, while this study provides direct intervention to patients. Other studies mention that music therapy effectively treats CKD patients³²⁾. In contrast to this study, previous studies investigated the effect of music therapy on hemodialysis patients' vital signs and anxiety.

This study has limitations, such as a noisy environment affecting patients' concentration when listening to music. Researchers overcome this by providing headsets that are used by patients one by one. Before playing music, the researchers also adjusted the volume so that it was comfortable for the patient.

CONCLUSION

The results showed that the majority of patients undergoing hemodialysis experienced fatigue. Music therapy using natural sounds effectively reduces fatigue in hemodialysis patients. The implementation of music therapy is easy, cheap, and safe so that it can be done as an intervention for managing hemodialysis patients. In addition to natural sounds, music therapy can use the type of music according to the patient's taste and smartphone media.

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CONFLICT OF INTEREST

There was no conflict of interest in this study.

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