



Exercise Effect on Anxiety and Depression among Kidney Transplant Patients

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ABSTRACT

Objective: Kidney transplant patients experience high levels of mental tension, anxiety, and depression. This study was conducted to determine the effect of exercise on anxiety and depression among kidney transplant patients with new membership in Specific Patients and Transplant Sports Federation of Khuzestan, Iran in the year 2019. *Method:* This was a quasi-experiment study in which, 74 kidney transplant patients were selected as study respondents then randomly assigned to two exercises (test) and control groups (n=37). Respondents of the exercise group participated in an increasing sports program for ten weeks, 3 days per week within a 60-90 minutes session, while the control group's respondents did not participate in regular physical activity. Psychological information of patients was identified using the DASS21 Questionnaire. Descriptive statistics and independent t-test were used for statistical data analysis. *Finding:* There was no significant difference between the two groups in terms of demographic information ($p>0.05$). Data analysis indicated a significant difference ($P<0.05$) between mean scores of anxiety and depression among samples before and after intervention in the test group; while this difference was insignificant in the control group. *Conclusion:* Inexpensive, simple and joyful exercises lead to the improved living conditions of kidney transplant patients; in this case, an exercise program can be used to prevent psychological problems such as anxiety and depression as well as other chronic diseases among these patients.

Keywords: Exercise Activity, Anxiety, Depression, Kidney Transplant.

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INTRODUCTION

End-stage renal disease (ESRD) is one of the major problems of public health all around the

world imposing a heavy economic cost on society [1]. The prevalence rate of ESRD in the world is equal to 242 cases per 1 million people with an 8% increase annually [2]. The number of chronic renal failure patients in Iran has been

reported to 25000 patients; of them, 52.7% use hemodialysis and 45.5% use transplantation [3]. This is a dangerous disease and patients mostly prefer to do kidney transplantation to be survived because of various problems such as dependence on the dialysis device and high costs. Kidney transplant is one of the effective methods in treating chronic and advanced renal failure; however, patients face numerous problems after kidney transplantation surgery despite its various benefits [4]. Kidney transplantation not only has some advantages but also leads to various complications and disadvantages causing mental and social problems for a patient. The prevalence of mental disorders before transplantation reported to 11.1% and 36.1% 2 months after transplantation. Depression and anxiety are more common among renal patients [5]. According to a study conducted by Dziubeka *et al.* about depression among 47899 kidney receivers during 2015-2016, 2360 patients suffering from depression 3 years after depression [6]. Moreover, results obtained from studies conducted by Geovena and colleagues (2017) on patients with chronic renal disease indicated that 36.7% of studied samples had mood disorders; of them, 9.6% had fundamental depression and 27.1% had mild depression disorder [7]. Moreover, there was a significant dependence on the quality of life scopes and mental health among these patients and so, the reduction in the mental health of renal patients had an effect on their quality of life leading to dysfunction among them [8]. Various non-pharmacological methods have been used as complementary treatments to reduce anxiety and depression in diseases under different circumstances; some of the mentioned methods include exercise, massage therapy, acupuncture, music therapy, pray therapy, exercise, had considerable effects. There are numerous shreds of evidence showing that physical activity has beneficial effects on the health of renal patients so that it can improve the sense of wellbeing and mood recovery reducing anxiety and depression symptoms [9]. Elavsky and colleagues indicated that physical activity and exercise prevent some mental disorders such as depression and anxiety in older adults [10]. Also, regular exercises have a positive effect on the depression level of 2-14 years old children under hemodialysis

treatment [11]. Salesi and colleagues showed lower stress, anxiety, and depression among kidney transplant patients in the exercise group who did the designed exercise program for 10 weeks compared to control group patients who followed no exercise program [1]. Therefore, one of the substantial objectives in kidney transplant patients is their physical and mental health promotion. Considering the high prevalence of kidney transplantation and the need to support these patients reducing mental and physical problems such as depression and anxiety and reducing complications, it seems that the application of available physical activities can be effective in promoting the health of patients. Hence, this study was conducted to examine the effect of exercise on anxiety and depression in kidney transplantation patients with new membership in Specific Patients and Transplant Sports Federation of Khuzestan.

MATERIALS AND METHODS

This was an interventional (quasi-experiment) study conducted to determine effect of exercise on anxiety and depression among kidney transplantation patients after obtaining ethics code and introduction letter from research deputy of university referring to the research environments and explaining research objectives based on the collaboration of officials; then researcher gave some explanations about study necessity and objective, confidential information to participants presenting introduction letter then obtained consent satisfaction letter of participants persuading them to fill questionnaire out and participate in physical activities. This research was conducted in 2019. Considering the sample size formula of this study, 74 kidney transplantation patients with current membership in Specific Patients and Transplant Sports Federation of Khuzestan were entered into the study; the sampling method was random so that participants were randomly assigned to two tests (n=37) and control (n=37) groups. Metrics for participation in the study included 4-5 years after kidney transplant surgery, no alcohol and caffeine consumption, and lack of regular involvement in physical activities. After selection, respondents became familiar with cycling on ergometer

bicycle (Nautilus Incorporation of US), working with treadmill (Nautilus Incorporation of US) and other exercises used in this research; then the DASS21 questionnaire was filled out with both groups; this is a self-assessment depression, anxiety and stress scale including 21 items and 3 subscales (7 items) about each of studied indices. The validity and reliability of this questionnaire were confirmed by Aghebati, Moradipanah, and colleagues. Respondents of the test group participated in a sports program for 10 weeks including 3 60-90 minute sessions per week. The Sports program was designed for the physical conditions of patients in terms of type, intensity, frequency, and repetition of sports movements under the supervision of a researcher, sports physiology expert and specialized practitioner after two steps of preliminary study and safety confirmation, efficiency and ease of doing. Each exercise session consisted of three steps of warm-up, the main step and cooling down. Warm-up consisted of 15 minutes stretching of various parts of body, the main step consisted of 35-65 minutes circular exercises within 9-17 stations combined with aerobic exercises (on a fix bike or treadmill with 30-40 percent of heart rate) and resistance training (45-65% of maximum repetition) and cooling down step consisted of 10 minutes calm slow running, stretching, and light movements. Respondents participated in 9-17 stations, 3-6 circles per session including 1-2 min rest

between stations and 3-5 min rest between circles. Control group members had no regular exercise activity during the study. Participants were tested after the end of 10 sports sessions filling out questionnaires then the obtained results were studied and compared with each other. The data analysis was done using SPSS Software.

FINDINGS

In terms of age, majority of research participants in test group (48.7%) and control group (46%) were 45-48 years old, majority of participants in test group (64.8%) and control group (54.0%) were women; in terms of education, findings indicated that majority of participants in test group (37.9%) and control and control group (46.0%) had secondary degree. Moreover, the majority of participants in the test group (51.3%) and control group (46.0%) were workers. 48.7% of participants in the test group had had kidney transplantation 1-2 years ago and 0.46% of participants in the control group had had this surgery 1-2 and 2-3 years ago. 0.54% of test group members and 64.8% in the control group had a family background of chronic renal failure. Statistical tests of chi-square did not show any significant difference ($P>0.05$) between groups in relationship with demographic information (table 1).

Table 1. Frequency distribution and percent of studied samples based on demographic information

Demographic specifications		Group name				P-value
		Intervention		Control		
		Number	Percent	Number	Percent	
Age	41-44	10	0.27	10	0.27	0.96
	45-48	18	48.7	17	0.46	
	49-53	9	24.3	10	0.27	
Sex	Male	13	35.2	17	0.46	0.34
	Female	24	64.8	20	0.54	
Education	Elementary	3	8.1	4	10.8	0.77
	Secondary	14	37.9	17	0.46	
	High school	11	29.7	9	24.3	
	Diploma	6	16.2	3	8.1	
	Academic	3	8.1	4	10.8	
Job	Employee	5	13.5	8	21.6	0.65
	Worker	19	51.3	17	46.0	
	Housewife	13	35.2	12	32.4	
Transplantation duration	1-2	18	48.7	17	0.46	0.96
	2-3	10	35.2	17	0.46	
	3-4	9	24.3	10	0.27	
family background of chronic renal failure	Yes	20	.54	24	64.8	0.89
	No	17	0.46	13	35.2	

According to table 2, the mean score of depression among patients in two groups before exercise was not significantly different using independent t-test while there was a significant difference in depression means scores of intervention group after exercise ($P < 0.002$). It means that depression score was reduced in the intervention group; while the depression score not only did not reduce in the control group but also was increased. According to table 3, the

mean score of anxiety in patients of two groups indicated no statistically significant difference before the intervention using an independent t-test while there was a significant difference ($P = 0.001$) in anxiety mean score of patients after exercise. It means that the anxiety score of the test group was reduced while the anxiety score of the control group was increased (table 2 & 3).

Table 2. Comparing depression mean of renal transplantation patients after 10 weeks of exercise in two test and control groups

Group		Number	Mean	SD	df	T	P
Intervention (test)	Pretest	37	23.74	9.08	34	7.55	0.002
	Posttest		18.97	5.55			
Control	Pretest	37	20.55	6.01	37	1.999	0.36
	Posttest		21.13	6.33			

Table 3. Comparing anxiety mean of renal transplantation patients after 10 weeks of exercise in two test and control groups

Group		Number	Mean	SD	df	t	P
Intervention (test)	Pretest	37	20.94	8.51	34	4.389	0.001
	Posttest		18.22	5.29			
Control	Pretest	37	20.13	4.34	37	1.932	0.061
	Posttest		21.86	4.08			

DISCUSSION

The results of this study showed that physical activity could reduce anxiety and depression among kidney transplantation patients in the test group compared to control group patients. It was revealed that exercises could reduce nervous pressures and depression in a work environment; it can be explained that increased serotonin levels and norepinephrine during physical activities can reduce depression. In other words, physical activities affect the mind and soul of a human being in two ways: releasing endorphin and reducing hormonal cortisol levels that release into the blood with neurological pressure [11-14]. According to the opinion of physiologists, endorphins are natural medicines for pain reduction and producing pleasure and are increasingly released after doing physical activities. Some researchers believe that physical activities have considerable effects on increasing serotonin releases affecting mood correction [15]. Therefore, exercise does not only increase endorphin and serotonin

hormones in the body but it also keeps them longer during activities [16]. In this regard, Saxena and colleagues reported lower stress, anxiety, and depression in kidney transplant patients in the test groups who did a 10-week planned exercise program compared to control group patients [17]; this finding was in line with studies conducted by Palleschi [18] and Calfas [19]. Mcauley indicated in his study that although exercise plays a positive role in mental health, it does not affect anxiety, stress, and depression [20]. Also, Hale has expressed that physical activity is not accepted by clinical psychologists and psychiatrists as an efficient interventional strategy [21]. Seemingly, the current differences between results of the present paper and other studies are related to some factors such as using different protocols with different variables and exercises, different physical and training conditions of individuals, nutrition situation, and mental status of respondents, gender and age of patients. On the other hand, Salesi and colleagues expressed that a selected exercise with low intensity can be

effective in treating stress, anxiety and controlling blood pressure of kidney transplantation patients [1]; this result is matched with findings of the present study.

CONCLUSION

Considering the results of this study and other researches, regular physical activities besides diet and medicines are a substantial factor affecting the recovery process of stress, anxiety, and depression in kidney transplantation patients. Therefore, exercise can be used as a solution to prevent diseases and reduce healthcare costs. However, lack of physical activity besides exercises session and lack of measurement of created anxiety during the study were some of the research limits; hence, it is recommended to consider them in further studies.

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