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Effect of Exercise Program on Health Status of Heart Failure Patients: A Quasi-Experimental Study

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Abstract

Background: Heart failure is a serious medical condition, where the heart is unable to push an adequate amount of blood compared to the amount needed by the body.

Methods: A quasi-experimental design was carried out throughout the present study with application of pre-post-tests approach for the study and control groups. A non-probability, purposive sample was selected which consisted of (400) samples, they were divided into two groups, first group of (200) heart failure patients were exposed to the exercise educational program considered as a study group, and second group of (200) patients were not exposed to the exercise educational program and considered as control group. The extent of samples knowledge about the disease was tested at both the pre and post education stages. A structured teaching program for imparting knowledge regarding the benefit of exercise for the health status of heart failure patients was developed by the authors. The results of the study were elicited based on two statistical approaches, first, descriptive statistics and the second is an inferential statistical analysis.

Results: A total of 400 heart failure patients completed a pre and post-test. Respect to subjects of studied socio-demographical characteristics of the samples, it shows that (32%) of the study group were (75-79) years old while (32%) of the control group were at age (70-74) years old, (52.5) of the study group were male while (50%) of the control group were male. The results show that study group main domains along (Pre-Post) periods were highly significant at $p<0.05$. An improvement in patients' knowledge has been shown immediately after program implementation. Moreover, the results show an improvement in patients' exercises status immediately after the implementation of the educational program.

Conclusion: The implementing an education program about the exercise practice in Erbil city had increased heart failure patients knowledge, in addition, the program improved their exercise status.

Keywords: Heart failure; Exercise; Education program; Quality of life; Cardio-vascular disease

Introduction

Cardiovascular Disease (CVD) is known as the main factors of threatening humans' health, and it is recognized as the most important cause of death. As a type of cardiovascular disease, Heart Failure (HF) is a major problem of the health care system and it is considered as a chronic, progressive illness [1]. Heart failure is a set of clinical symptoms that result from the inability of the ventricles to pump adequate blood to meet the body's metabolic needs [2]. Studies suggest that approximately about 5% of all hospital inpatients are accounted for by HF, and this result is due to both population ageing and advance therapy that gives to patients [3]. Although advance therapy in the management of HF, the one-year mortality rate still access 40% [4]. The high mortality and morbidity that associated with HF are not surprising that patient's typically record disturbance in quality of life (QoL) [5]. Despite a variety of pharmacological and advanced instruments used during HF management, prognosis and QoL remain poor, in addition, exercise instruction is an important non-pharmacological method for managing patients with HF, and it is revealed a positive outcome on improving quality of life [6]. Exercise training is described as "actions carried out frequently to enhance the performance scope of the cardiovascular system which is achieved by doing aerobic exercise [7]. The advantage of aerobic exercise in HF patients has been well recorded. Evidence from meta-analyses shown that aerobic exercise as well as safe it is also related to decreasing the risk of hospital readmission and decrease in mortality rate [8]. Comorbid coronary disease is present in more than 60% of sufferers with HF and careful evaluation is fundamental in managing this potentially reversible purpose of exercise difficulty [9]. Exercise problems are the hallmark of heart failure, and a growing degree of intolerance is associated with low prognosis, objective evaluation is essential for adequate guesses in patients suffering heart failure and for achieving a proper exercise training program [10]. A progressive exercise program has been shown to be useful and has grown to be an important factor of comprehensive cardiac rehabilitation in HF patients [11]. Moreover, an appropriate exercise program which is tailored to the patient's desire, capabilities, and physiologic potential has the greatest opportunities to be successful [12]. Despite to be safe, efficient, and guideline-recommended therapy to enhance the quality of life, exercise program training remains in a serious manner

underutilized [13]. Exercise intolerance is familiar among HF patients and this due o is the multifactorial cause. Exercise management considered as one of the best treatments for exercise intolerance in those. Understanding the barriers to exercise training program performing is essential to support this prevalent quality gap in the treatment of HF patients [14]. Having knowledge and information is the necessary element in developing healthy behaviour, as education considered as a cornerstone in the management of patients with heart failure [15]. Heart failure patients need to increase their knowledge in order to understand their disease and achieve self-care. The education process usually begins during the hospital admission, but must extend to the outside of the hospital [16]. The responsibility for HF self-care is started by patients in a community setting, and the bases for successful self-care are adequate HF knowledge [17].

Materials and Methods

A quasi-experimental design was carried out throughout the present study with application of pre-post tests approach for the study and control groups at Hawler teaching hospital, Rojhelat emergency hospital, and Rizgary teaching hospital in Erbil City. A non-probability, purposive sample was selected which consisted of (400) samples, they were divided into two groups, first group of (200) heart failure patients were exposed to the exercise educational program considered as a study group, and second group of (200) patients were not exposed to the exercise educational program and considered as control group. A structured teaching program for imparting knowledge regarding the benefit of exercise for the health status of heart failure patients was developed by the authors. The content of the educational program was designed based on an extensive review of the literature and expert opinion. The program composed of two modules related to exercise adherence. Modules content was created and edited by the researchers; the first module included general information about HF, some definitions, risk factors, the aetiology of the HF. While the second module explains the benefit of exercise for these patients, in addition, the types of exercise which can be assumed by those patients. Before the exercise program is finalized, it has been presented to a group of experts. Those experts were asked to review the education program as well as the instrument for their content, clarity, and adequacy. After the review, some items were excluded and some others are added after face to face discussion with experts and the instrument considered valid after taking all the comments and recommendations in considerations. Ethical consideration regarding data collection is done by the researcher. Informal consent was obtained from participants in the study. The patients were given the pre-test questionnaire before the administration of the educational program. In order to follow up with the patients in the second test, each patient was given a serial number. After administration of the pre-test questionnaire, the patients were imparted with an exercise education program by face-to-face interview with the primary author. The face-to-face interview lasted '30-35 minute-sessions' by using booklets and short videotapes. As a reminder, each participant heart failure patient was provided with a copy of the education program booklet prepared and designed by the primary author and reviewed by other authors. The content of the booklet was similar to that of the educational program and it summarized the most important points in the program. For preventing bias recall, one month later, patients were asked by telephone to complete the same questionnaire a second time (post-test). The data were analysed by applying SPSS, version 22, two statistical approaches were used in analysing the results, first; descriptive statistical approach which includes (Frequencies, percentage, mean, and mean of score), in order to compare pre-post test scores for patients knowledge as well as exercise status, a paired t-test was used. P-value>0.05 was considered as statistically not significant, p-value ≤ 0.05 was statistically significant and p-value ≤ 0.01 was statistically highly significant.

Results

A total of 400 heart failure patients completed a pre and post-test. Respect to sample socio-demographical characteristics, the results shows that studied groups had recorded in tAno significant differences at p>0.05, except in age groups, and levels of education, which represented significant different in at least at p<0.05, rather than most of studied group's individuals distribution concerning age, and levels of education are very similar (Tables 1 and 2).

Socio-Demographical Characteristics	Classes	Study		Control		C.S.
		No.	%	No.	%	p-value
Age	<65	8	4	0	0	C.C.=0.195; p=0.015 (S)
	65-69	23	11.5	32	16	
	70-74	45	22.5	64	32	
	75-79	64	32	58	29.9	
	80-84	38	19	33	16.5	
	85-89	14	7	9	4.5	
	90>	8	4	4	2	
	Mean ± SD	76.68 ± 6.67	75.44 ± 6.32			
Gender	Male	105	52.5	104	52	C.C.=0.005; p=0.920 (NS)
	Female	95	47.5	96	48	

Levels of Education	Illiterate	101	50.5	139	69.5	C.C.=0.227; p=0.001 (HS)
	Read and write	31	15.5	15	7.5	
	Primary	16	8	14	7	
	Intermediate	13	6.5	11	5.5	
	Preparatory	11	5.5	12	6	
	Institute graduate	11	5.5	4	2	
	College graduate	17	8.5	5	2.5	
HS: Highly Significant at p<0.01; NS: Non Significant at p>0.05; S: Significant at 0.05-0.01; C.C: Contingency Coefficient; C.S: Contingency Significance value (Testing based on a contingency coefficient (C.C.) test)						

Table 1: Socio-Demographical characteristics of heart failure patients.

Period	No.	GMS	SD	SE	MP t-test	p-value
Pre	200	0.516	0.121	0.009	20.33	0
Post	200	0.399	0.117	0.008		
GMS: Grand Mean of Scores; SD: Standard Deviation; SE: Standard Error; MP t-test: Matched Paired t-test; p-value: Probability value						

Table 2: Study samples exercise status at the pre-post-test.

Table 3 shows descriptive statistics of control group in light of pre-post periods, such that, grand mean of score, standard deviation, standard error, as well as comparisons significant of testing matched paired. Results showed that along pre-post periods in the light of case group main domains highly significant differences at p<0.01 are accounted.

Period	No.	GMS	SD	SE	MP t-test	p-value
Pre	200	0.524	0.117	0.008	5.48	0
Post	200	0.504	0.12	0.008		
GMS: Grand Mean of Scores; SD: Standard Deviation; SE: Standard Error; MP t-test: Matched Paired t-test, p-value: Probability value						

Table 3: Control samples exercise status at pre-post-test.

Table 3 indicates that control groups exercise status along pre-post periods were highly significant differences at p<0.01.

Discussion

Among the many risk factors that lead to CVD progress, a sedentary lifestyle, identified by persistently reduce of physical activity, is now identified as a leading cause to decrease cardiovascular health. Inversely, performing regular exercise and physical activity are related to notable health benefits and low CVD danger [18]. So, this study was conducted with the aim of evaluation of patients exercise status after giving a health education program.

Scientific variables consisting of age, gender, patients' physical activity and musculoskeletal ability require to be considered while putting an appropriate exercise plan. Many factors such as patient's condition, type of therapy are to exercise therapy, therefore, the health care person must carefully deal with any barriers to compliance, empower the patient with knowledge regarding the adequacy and assurance of exercise therapy [19]. Previous studies conclude that HF patients who are illiterate have less information regarding their disease and low level of education result in obstacle with self-care, moreover, patients chance to worsening the HF symptoms increase poorer quality of life as well as increased the risk of hospitalization and death when the patient has a low level of education [20].

Results showed that along pre-post periods in the light of case and control group concerning exercise status related to heart failure patients, highly significant differences at p<0.01 are accounted, but depending on the value of test statistics, the changes in the case group were significantly extremely more higher than that of the control group.

After the implementation of an exercise health education program, the patients' knowledge has significantly increased and this confirms the success of the health education program in improving patients' knowledge about HF.

It is generally confirmed that typical physical activity is useful for heart and blood vessels healthy. Constant exercise is associated with reducing cardiovascular fatality, in addition, the possibility of growing cardiovascular problems [21]. Lower blood pressure found in those individuals who is more active physically. A desired effect on the heart also been found in those individuals performing regular exercise, Moreover, regular exercise increases cardiac output and decrease blood pressure [22,23].

The results from our study stated that the use of an exercise education program based on the individual patient's pre-test scores and used telephone follow up leads to an improvement in patients' awareness about the exercise practice requirement for HF patients. Furthermore, the result indicates the success of the current program and this can be attributed to the content of the education program that was based on the extensive literature review and the design used in the presentation of the program.

Conclusion

In conclusion, the current study data showed that implementing an education program about the exercise practice in Erbil city had increased heart failure patients knowledge; in addition, the program improved their exercise status.

Ethical Consideration

The research project has been approved by ethical committee of research in College of Nursing/Hawler Medical University.

Conflict of Interest

The authors declare that there is no conflict of interest.

References

1. Kuck KH, Bordachar P, Borggrefe M, Boriani G, Burri H, et al. (2014) New devices in heart failure: A European heart rhythm association report: developed by the European Heart Rhythm Association; endorsed by the Heart Failure Association. Europace 16: 109-128.
2. Yancy CW, Jessup M, Bozkurt B, Butler J, Casey DE, et al. (2013) ACCF/AHA guideline for the management of heart failure: A report of the American College of CardiologyFoundation/American Heart Association task force on practice guidelines. Circulation 128: e240-327.
3. Lindenfeld J, Miller G, Shakar S, Zolty R, Lowes B, et al. (2004) Drug therapy in the heart transplant recipient: part I: Cardiac rejection and immunosuppressive drugs. Circulation 110: 3734-3740.
4. Pitt B, Remme W, Zannad F, Neaton J, Martinez F, et al. (2003) Eplerenone, a selective aldosterone blocker, in patients with left ventricular dysfunction after myocardial infarction. N Engl J Med 348: 1309-1321.
5. Florido R, Kwak L, Lazo M, Nambi V, Ahmed HM, et al. (2018) Six-year changes in physical activity and the risk of incident heart failure: ARIC study. Circulation 137: 2142-2151.
6. Vella C, Allison M, Cushman M, Jenny N, Miles M, et al. (2017) Physical activity and adiposity-related inflammation: The MESA. Med Sci Sports Exerc 49: 915-921.
7. Moholdt T, Lavie CJ, Nauman J (2018) Sustained physical activity, not weight loss, associated with improved survival in coronary heart disease. J Am Coll Cardiol 71: 1094-1101.
8. Schwartz G, Olsson A, Abt M, Ballantyne C, Barter P, et al. (2012) Effects of dalcetrapib in patients with a recent acute coronary syndrome. N Engl J Med 367: 2089-2099.
9. Sarzynski M, Ruiz-Ramie J, Barber J, Slentz C, Apolzan J, et al. (2018) Effects of increasing exercise intensity and dose on multiple measures of HDL (High-Density Lipoprotein) function. Arterioscler Thromb Vasc Biol 38: 943-952.
10. Laufs U, Wassmann S, Czech T, Munzel T, Eisenhauer M, et al. (2005) Physical inactivity increases oxidative stress, endothelial dysfunction, and atherosclerosis. Arterioscler Thromb Vasc Biol 25: 809-814.
11. Matsumoto Y, Adams V, Jacob S, Mangner N, Schuler G, et al. (2010) Regular exercise training prevents aortic valve disease in low-density lipoprotein receptor-deficient mice. Circulation 121: 759-767.
12. Potenza M, Marasciulo F, Chieppa D, Brigiani G, Formoso G, et al. (2005) Insulin resistance in spontaneously hypertensive rats is associated with endothelial dysfunction characterized by an imbalance between NO and ET-1 production. Am J Physiol Heart Circ Physiol 289: H813-H822.
13. Olver T, McDonald M, Klakotskaia D, Richardson R, Jasperse J, et al. (2017) A chronic physical activity treatment in obese rats normalizes the contributions of ET-1 and NO to insulin-mediated posterior cerebral artery vasodilation. J Appl Physiol 122: 1040-1050.
14. Hardy S, Loehr L, Butler K, Chakladar S, Chang P, et al. (2015) Reducing the blood pressure-related burden of cardiovascular disease: impact of achievable improvements in blood pressure prevention and control. J Am Heart Assoc 4: e002276.
15. Bacon S, Sherwood A, Hinderliter A, Blumenthal J (2004) Effects of exercise, diet and weight loss on high blood pressure. Sports Med 34: 307-316.
16. Fagard RH (2006) Exercise is good for your blood pressure: Effects of endurance training and resistance training. Clin Exp Pharmacol Physiol 33: 853-856.
17. Zago A, Park J, Fenty-Stewart N, Kokubun E, Brown M (2010) Effects of aerobic exercise on the blood pressure, oxidative stress and eNOS gene polymorphism in pre-hypertensive older people. Eur J Appl Physiol 110: 825-832.
18. Kuru O, Senturk UK, Kocer G, Ozdem S, Baskurt OK, et al. (2009) Effect of exercise training on resistance arteries in rats with chronic NOS inhibition. J Appl Physiol 107: 896-902.
19. Wilund KR (2007) Is the anti-inflammatory effect of regular exercise responsible for reduced cardiovascular disease. Clin Sci 112: 543-555.
20. Fleenor B, Marshall K, Durrant J, Lesniewski L (2010) Arterial stiffening with ageing is associated with transforming growth factor-beta1-related changes in adventitial collagen: reversal by aerobic exercise. J Physiol 588: 3971-3982.
21. Borlaug B, Lam C, Roger V, Rodeheffer R, Redfield M (2009) Contractility and ventricular systolic stiffening in hypertensive heart disease insights into the pathogenesis of heart failure with preserved ejection fraction. J Am Coll Cardiol 54: 410-418.
22. Burelle Y, Wambolt RB, Grist M, Parsons HL, Chow JC, et al. (2004) Regular exercise is associated with a protective metabolic phenotype in the rat heart. Am J Physiol Heart Circ Physiol 287: H1055- H1063.
23. Gibb A, Epstein P, Uchida S, Zheng Y, McNally L, et al. (2017) Exercise-induced changes in glucose metabolism promote physiological cardiac growth. Circulation 136: 2144-2157.