

Inpatient cardiac rehabilitation program in the elderly patients: effect on psychological factors

Javad Teimouri ^{1*}, Zohreh Kalani ², Mahdieh Ghanbari ³, Elham Eghbali ⁴

¹ MSc in Geriatric Nursing, Shahid Sadoughi University of Medical Sciences, Yazd, Iran; ² MSc in Medical- Surgical Nursing Education, Research Center for Nursing and Midwifery Care, Nursing Department, Shahid Sadoughi University of Medical Sciences, Yazd, Iran; ³ MD, Cardiac Rehabilitation Center, Shahid Sadoughi University of Medical Sciences, Yazd, Iran. ⁴ BSc in Midwifery, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.

Abstract

Background/aim: Although the impact of rehabilitation programs on the psychological status of patients with coronary artery disease has been shown more or less in studies, the impact of these interventions in older patients has been less widely considered. This study was conducted to evaluate the effectiveness of inpatient cardiac rehabilitation on the depression, anxiety and stress of elderly patients with coronary artery disease. **Materials and methods:** the present study was a two group's quasi-experimental study. Seventy elderly were selected through convenient sampling and were divided into two groups. The intervention group received the inpatient cardiac rehabilitation program, daily, for 4 days. The short form of the Depression, Anxiety and Stress Questionnaire (DASS-21) was completed for patients in both groups. **Results:** There was a significant difference in the level of stress in the two groups ($P=0.000$), but the mean of depression and anxiety did not differ significantly between the two groups. **Conclusion:** The findings of this study showed that the inpatient cardiac rehabilitation program is effective in decreasing the stress level of elderly patients with coronary artery disease admitted in intensive care unit. This program failed to alter the level of depression and anxiety in these patients.

Keywords: Depression, anxiety, stress, phase I cardiac rehabilitation, elderly

INTRODUCTION

Cardiac rehabilitation is a team-based intervention that improves functional capacity, improves quality of life, improves and feels good, and reduces the risk of a recurrent heart attack or death by 25-30%^[1]. The WHO defines cardiac rehabilitation as a series of activities that have the desired effect on mental and social physical aspects of heart disease^[2], and especially for coronary patients^[3]. Among the measures that can reduce the risk of cardiovascular disease, cardiac rehabilitation was first proposed by the US Public Health Services as a comprehensive long-term program of medical evaluation, prescribing a sports program, modifying cardiac risk factors, training and advice is defined. These programs specifically designed to limit the physiological and psychological effects of heart disease, reduce the risk of sudden death or re-infarction, control heart symptoms, stabilize or reverse the atherosclerosis process, and strengthen the psychosocial and occupational status of some of the selected patients^[4]. 86% of the deaths and deaths due to cardiovascular events occur at age 65 and above^[5]. The number and proportion of the elderly are increasing in all countries, both advanced and developing. This growth is estimated to be 2.5% for a population over 60 years of age^[6]. So, it is clear that Cardiac rehabilitation has a considerable importance in this special group of patients^[7]. Cardiac rehabilitation has been shown to reduce mortality in the elderly by controlling risk factors and improving physical

performance and quality of life^[8, 9]. The results of a randomized clinical trial in the elderly show that cardiac rehab reduces elderly mortality by 26-13%^[10]. Due to the prevalence of cardiovascular disease, the complications of these diseases have also increased. Psychological complications such as stress, anxiety and depression, which can aggravate and prolong the disease, interfere with the treatment, and delay the recovery. Patients with coronary artery disease experience different levels of anxiety during admission. About 50% of patients with acute coronary syndrome have anxiety symptoms and 20-45% of them have depression^[11]. These complications often resolve without any diagnosis and can reduce the quality of life and increase the cost of treatment^[12]. Stress has a negative effect on the health

Address for correspondence: Javad Teimouri, Nursing & Midwifery School, Boo Ali Street, Safaeeyeh, Yazd, Iran.
Email: javadteimouri1369@yahoo.com

This is an open-access article distributed under the terms of the Creative Commons Attribution-Non Commercial-Share Alike 3.0 License, which allows others to remix, tweak, and build upon the work non commercially, as long as the author is credited and the new creations are licensed under the identical terms.

How to cite this article: Teimouri, J., Kalani, Z., Ghanbari, M., Eghbali, E. Inpatient cardiac rehabilitation program in the elderly patients: effect on psychological factors. Arch Pharma Pract 2020;11(S4):174-7.

of the heart, especially in cardiac patients, and can directly control heart disease by influencing diet, exercise and other self-management behaviors [13]. Anxiety is highly important as it may result in the increase of sympathetic activity, reduction of vagal tone, deterioration of ventricular arrhythmias and ultimately the increase of sudden death risk [14]. Psychological factors directly lead to myocardial ischemia, increased inflammatory responses and cortisol release, and indirectly affect the patient's recovery process by changing behavioral and lifestyle behaviors such as inactivity, inappropriate nutrition, and smoking [13, 15]. Cardiac rehab is performed in three phases, the inpatient of which is performed at the time of hospitalization. The second phase is two to four weeks after the discharge and the third phase is self-centered home care program [16]. Cardiac rehabilitation is recommended to be started just after the acute phase of the disease has resolved or the patient is dismissed from the intensive care unit [7]. The inpatient cardiac rehabilitation in view of the fact that patients are still not cleared and available, so the greatest contribution to rehabilitation can be expected, should be considered more. Momosaki meta-analysis study has shown that even the inpatient cardiac rehab is also associated with improving physical function and reducing the mortality of the elderly [10]. In patient cardiac rehabilitation in Afshar Hospital has begun since 2014. Due to the lack of study on the elderly in this center, this study was conducted. However, the impact of the in-patient rehab program on improving the psychological complications of coronary artery disease as a life-threatening illness, an important goal of cardiac rehab, is not clear in the elderly. The purpose of this study was to determine the effect of inpatient rehabilitation program on depression, anxiety and stress in elderly people.

MATERIALS AND METHODS

1. This study was a two-group non-randomized controlled trial that was registered on the Iranian clinical trials website (IRCT2016022726794N1).

Elderly patients with a diagnosis of coronary artery disease admitted to the Cardiac Care Units of Afshar Hospital in the city of Yazd, Iran have been included in this study. Patients were consecutively recruited for the study between May 2016 and September 2017. Sampling method was selected using available sampling method based on inclusive and exclusive criteria. Inclusive criteria were age over 60, ability to speak and understand Persian language. Exclusion criteria were cardiac rehabilitation contraindications such as post-myocardial infarction angina, resting systolic blood pressure > 180 mmHg; resting diastolic blood pressure > 110 mmHg, bundle branch or complete heart block, severe aortic stenosis, symptomatic orthostatic change in systolic blood pressure > 20 mmHg, uncontrolled tachycardia or bradycardia, decompensated heart failure, mental illness, motor problems such as orthopedic and rheumatologic diseases, acute systemic illness, a history of dementia and the use of drugs related to psychological disorders.

Of the four cardiac care units in the hospital, the patients of two units were considered as the intervention group and the patients of other 2 units were considered as control group. The patients were not randomly allocated due to moral considerations.

The data collection tools in this study were demographic information questionnaire (consisted of age, sex, marital status and education) and Depression, Anxiety and Stress Scale (DASS-21) [17]. Validation and reliability of this tool for the Iranian population was done by Hanifi et al [18]. The short version has 21 items and each depression, anxiety and stress construct is assessed by 7 items. Each item is scored with a 4-point Likert-style scoring (from 0 to 3 (severe)) based on the severity of the symptoms.

On the first day of admission and after stability of the patient's condition in the CCU, explained to patients regarding the goals and method of conducting the study. Patients were assured that they can be excluded if they do not wish to continue to work at any time. Then written informed consent was obtained. This study was approved by the University's Ethics Committee with the code IR.SSU.REC.1395.58.

From the second day of admission, patients in the intervention group, in addition to receiving routine care, participated in the daily cardiac rehabilitation program for 4 days, including 4 session face-to-face training and physical training with duration of 20 minutes of each (Table 1).

At the time of the implementation of the cardiac rehabilitation program, the control group received routine care and pharmaceutical treatments. At the end of the fifth day of the study, the DASS-21 questionnaire was completed in both control and intervention groups. The Statistical software SPSS version 22 was used for data analysis.

RESULTS

Data were analyzed using Kolmogorov-Smirnov test. Non-parametric test was used because of the non-normal distribution of data in relation to anxiety and stress variables. Of the 70 patients, 60% were male and 40% were female. The mean age of participants in the intervention group was 69.57 ± 5.32 and in the control group was 70.14 ± 5.40 . Based on the results of statistical tests, there was no significant difference between the two groups in terms of demographic variables and disease characteristics. In other words, the two groups were homogeneous (Table 2).

As shown in table 3, at the end of the 4-day inpatient cardiac rehabilitation, the mean depression score in the intervention group (8.11 ± 3.32) and the control group (7.65 ± 2.96) was not significantly different with independent t-test ($P=0.546$). The mean of anxiety score in the intervention group (8.34 ± 3.12) and in the control group (8.34 ± 3.34) was also approximately the same and did not show a significant difference with the Mann-Whitney test ($P=0.967$). The mean score of stress after intervention in the test group was $5.02 \pm$

2.88 and in the control group was 9.77 ± 2.94 , which was significantly different with the Mann-Whitney test ($P=0.000$).

DISCUSSION

The findings of this study showed that the inpatient cardiac rehabilitation program is effective in decreasing the stress level of elderly patients with coronary artery disease admitted in intensive care unit. This program failed to alter the level of depression and anxiety in these patients.

Despite the implementation of an inpatient heart rehab program for the intervention group, depression in the elderly was not statistically different between the two groups. This study also achieved a similar result in relation to the anxiety variable, so that the level of anxiety in the two groups was close to the end of the rehab sessions.

By review of the literature, not found any study on effect of the phase I cardiac rehab program on the psychological factors of the elderly with coronary artery disease. However, studies in coronary patients have achieved different results, regardless of age group. Similar to the findings of this study, in the study of Seki *et al.*, the elderly participated in the 3rd-phase cardiac rehabilitation program for 6 months, there were no significant changes in depression scores in both intervention and control groups [14].

On the other hand, Duarte Freitas *et al.*, have shown that the short-term cardiac rehabilitation program significantly reduces depression and anxiety in the intervention group [19]. Lavie and Milani, in their study on the benefits of cardiac rehabilitation in two age groups of the elderly and young, reported that cardiac rehabilitation was a significant reduction in anxiety in both the elderly and the youth [20]. In the study of Pourafkari *et al.*, after 8 weeks of cardiac rehabilitation programs in coronary patients, depression and anxiety were reduced in men and women [21]. Moosavi *et al.*, who for eight weeks treated patients with coronary artery disease in three groups of home rehabilitation, hospital rehabilitation, and without rehabilitation, have shown that depression and anxiety levels in the two rehabilitation groups are significantly reduced [22]. In a study by Shinal, cardiac rehabilitation can also reduce patient anxiety levels [23].

Based on the results of this study, the inpatient cardiac rehab program can reduce the stress level of elderly patients compared with the control group. By examining the major challenges in cardiac rehabilitation, Gelinier and Bonin argue that cardiac rehabilitation plays a complementary role in psychological treatments and helps to better respond to the disease and reduce symptoms of stress and anxiety in heart patients. They also argue that cardiac rehab would better manage stress at the right time and reduce the distressing effects of stress on the body and mind of the patient [24]. In a study on effects of stress on elderly people with heart disease, it has been argued that elderly people who follow stress

management and treatment regimens are more likely to adapt to their illness and have better outcomes than older people who have not experienced stress-management training [13]. It has also been shown that training provided to patients in the phase I cardiac rehabilitation program can raise their awareness of their illness until one year and enable the patient to manage cardiac stress more effectively.

Currently, short-term inpatient cardiac rehabilitation interventions as an effective and complementary method and as a non-drug treatment for elderly patients with coronary artery disease are emphasized and its implementation in medical centers is increasing. Therefore, according to the results of this study, it seems that its effects on the psychological factors of the elderly should be paid more attention.

These findings emphasize the importance of conducting research on the impact of the implementation of the second and third phases of cardiac rehabilitation in elderly patients. Due to the limitation of the study and that some result are not differ significant, further studies are needed.

Study Limitation

Although in this study due to ethical considerations, random allocation of patients to two groups of intervention and control was not possible and random allocation was done only in the CCUs, the elderly were homogeneous for demographic variables and did not have any significant difference.

Conflict of Interest:

None declared.

ACKNOWLEDGEMENT:

We give thanks of all participants in this study.

Table 1: The phase I cardiac rehabilitation program

Patients training	<p>1st session: brief familiarity with the heart anatomy, disease signs and symptoms, education and modification of risk factors.</p> <p>2nd session: The disease and treatment course, drug regimen, familiarity with the medications, their side effects and diet in the cardiac patients.</p> <p>3rd session: Education about anxiety control methods, prevention of depression, disease control and prevention methods, chest pain prevention and appropriate actions in the case of chest pain onset.</p> <p>4th session: Education on physical activity and preparation for returning to normal life, different permitted exercises for this group of patients, the useful exercise duration and frequency and the way of checking pulse during exercise.</p>
Bedside physical therapy	<p>Low-level exercises: included big-muscle-group range of motion exercises, raising shoulder, exercises for deep breathing, active ankle range of motion exercises and walking.</p>

Table 2: The patients' characteristics in the intervention and control groups

Variable		Control	Intervention	P value*
		N (%)	N (%)	
Sex	Female	18 (51.4)	17(48.57)	0.81
	male	17(48.57)	18(51.42)	
Age (Years)	60-70	22(62.8)	24(68.57)	0.83
	71-80	8(22.8)	6(17.14)	
	81-90	5(14.2)	5(14.28)	
Marital status	Married	12(34.28)	12(34.28)	0.59
	Single, divorced	23(65.70)	23(65.71)	
Education	Below diploma	35(100)	32(91.42)	0.20
	diploma	0	2(5.71)	
	Associate degree	0	1(2.85)	
Cause of hospitalization	UA ^a	10(28.75)	11(31.42)	0.54
	STEMI ^b	7(20.00)	8(22.85)	
	NSTEMI ^c	8(22.80)	7(20.00)	
	PCI ^d	10(28.75)	9(25.71)	

* Chi square test; ^aUnstable Angina; ^bST Elevation Myocardial Infarction; ^c Non ST Elevation Myocardial Infarction; ^d Percutaneous Coronary Intervention

Table 3: Comparison of depression, anxiety and stress mean in the two groups

		Mean	SD	P value
Depression	intervention	8.11	3.32	0.546*
	Control	7.65	2.96	
Anxiety	intervention	8.34	3.12	0.967**
	Control	8.34	3.34	
Stress	intervention	5.02	2.88	0.000**
	Control	9.77	2.94	

*Independent t test; **Mann-Whitney U test.

REFERENCES

- Jackson Ac, Le Grande Mr, Higgins Ro, Rogerson M, Murphy Bm. Psychosocial Screening And Assessment Practice Within Cardiac Rehabilitation: A Survey Of Cardiac Rehabilitation Coordinators In Australia. *Heart Lung Circ*. 2017;26(1):64-72.
- Babu A, Noone M, Haneef M, Naryanan S. Protocol-Guided Phase-1 Cardiac Rehabilitation In Patients With St-Elevation Myocardial Infarction In A Rural Hospital. *Heart Views*. 2010;11(2):52-6.
- Casey Ml. The Role Of Depression In Cardiac Rehabilitation Attendance [M.A.]. Ann Arbor: Northern Arizona University; 2011.
- Dehdari T Ha, Ramezankhani A, Sadeghian S, Ghofranipour F, Babaei Ruchi G, Etemadi S. Effects Of Phase Iii Cardiac Rehabilitation Programs On Anxiety And Quality Of Life In Anxious Patients After Coronary Artery Bypass Surgery. *The Journal Of Tehran University Heart Center*. 2007;2(4):207-12.
- Menezes Ar, Lavie Cj, Forman De, Arena R, Milani Rv, Franklin Ba. Cardiac Rehabilitation In The Elderly. *Progress In Cardiovascular Diseases*. 2014;57(2):152-9.
- Zarifnejad G, Saberi Noghabi E, Delshad Noghabi A, Koshyar H. The Relationship Between Social Support And Morale Of Elderly People In Mashhad In 2012. *Journal Of Rafsanjan University Of Medical Sciences*. 2014;13(1):3-12.
- Boydak B. [Cardiac Rehabilitation In The Elderly Patient]. *Turk Kardiyoloji Dernegi Arsivi : Turk Kardiyoloji Derneginin Yayin Organidir*. 2017;45(Suppl 5):117-9.
- Momosaki R, Yasunaga H, Matsui H, Horiguchi H, Fushimi K, Abo M. Effect Of Early Rehabilitation By Physical Therapists On In-Hospital Mortality After Aspiration Pneumonia In The Elderly. *Archives Of Physical Medicine And Rehabilitation*. 2015;96(2):205-9.
- Rodrigues P, Santos M, Sousa Mj, Brochado B, Anjo D, Barreira A, Et Al. Cardiac Rehabilitation After An Acute Coronary Syndrome: The Impact In Elderly Patients. *Cardiology*. 2015;131(3):177-85.
- Doll Ja, Hellkamp A, Thomas L, Ho Pm, Kontos Mc, Whooley Ma, Et Al. Effectiveness Of Cardiac Rehabilitation Among Older Patients After Acute Myocardial Infarction. *American Heart Journal*. 2015;170(5):855-64.
- Arefi S, Zakerimoghdam M, Ghiasvandian S, Haghani H. The Effect Of First Phase Cardiac Rehabilitation Programs On Anxiety And Depression In Acute Coronary Syndrome Patients. *Cardiovascular Nursing Journal*. 2012;1(3):32-8.
- Abberger B, Haschke A, Wirtz M, Kroehne U, Bengel J, Baumeister H. Development And Evaluation Of A Computer Adaptive Test To Assess Anxiety In Cardiovascular Rehabilitation Patients. *Arch Phys Med Rehabil*. 2013;94(12):2433-9.
- Bastani F, Pourmohammadi A, Haghani H. Relationship Between Perceived Stress With Spiritual Health Among Older Adults With Diabetes Registered To The Association Of Diabetes Prevention And Control In Babol, 2013. *Hayat*. 2014;20(3):6-6.
- Seki E, Watanabe Y, Shimada K, Sunayama S, Onishi T, Kawakami K, Et Al. Effects Of A Phase Iii Cardiac Rehabilitation Program On Physical Status And Lipid Profiles In Elderly Patients With Coronary Artery Disease: Juntendo Cardiac Rehabilitation Program (J-Carp). *Circ J*. 2008;72(8):1230-4.
- Kachur S, Menezes Ar, De Schutter A, Milani Rv, Lavie Cj. Significance Of Comorbid Psychological Stress And Depression On Outcomes After Cardiac Rehabilitation. *Am J Med*. 2016;129(12):1316-21.
- Sharif F, Shoul A, Janati M, Kojuri J, Zare N. The Effect Of Cardiac Rehabilitation On Anxiety And Depression In Patients Undergoing Cardiac Bypass Graft Surgery In Iran. *Bmc Cardiovascular Disorders*. 2012;12:40.
- Abdollahi Aa, Hosseini Sa, Salehi A, Vaghari G, Behnampour N. The Risk Factors Of Coronary Disorders In The Elderly. *Journal Of Research Development In Nursing & Midwifery*. 2013;10(2):18-25.
- Hanifi N, Bahraminezhad N, Mirzaee T, Ahmadi F, Khani M, Taran L. The Effect Of Orientation Program On Stress, Anxiety And Depression Of Patients Undergoing Coronary Angiography. *Iranian Journal Of Nursing Research*. 2012;7(25):1-8.
- Duarte Freitas P, Haida A, Bousquet M, Richard L, Mauriege P, Guiraud T. Short-Term Impact Of A 4-Week Intensive Cardiac Rehabilitation Program On Quality Of Life And Anxiety-Depression. *Ann Phys Rehabil Med*. 2011;54(3):132-43.
- Lavie Cj, Milani Rv. Adverse Psychological And Coronary Risk Profiles In Young Patients With Coronary Artery Disease And Benefits Of Formal Cardiac Rehabilitation. *Archives Of Internal Medicine*. 2006;166(17):1878-83.
- Pourafkari L, Ghaffari S, Shahamfar J, Tokhmechian L, Nader Nd. Koroner Revaskularizasyon Sonrasi Kardiyak Rehabilitasyonun Psikolojik Etkileri. *Turk Kardiyoloji Dernegi Arsivi : Turk Kardiyoloji Derneginin Yayin Organidir*. 2016;44(3):228-36.
- Moosavi Sohroforouzani A, Esfarjani F, Sadeghi M, Rohafza Hr. Assessing Psychological Factors After Home-Based Versus Centre-Based Cardiac Rehabilitation In Patients With Coronary Artery Disease. *Journal Of Nursing And Midwifery Urmia University Of Medical Sciences*. 2015;13(9):814-24.
- Shinal Rm. The Relationship Between Depression, Coping And Adherence To Phase Ii Cardiac Rehabilitation [Ph.D.]. Ann Arbor: Washington State University; 2005.
- Chauvet-Gelinier J-C, Bonin B. Stress, Anxiety And Depression In Heart Disease Patients: A Major Challenge For Cardiac Rehabilitation. *Annals Of Physical And Rehabilitation Medicine*. 2017;60(1):6-12.