Interdisciplinary Journal of Acute Care
Volume 1, July/December 2020, Issue 2, pp. 66-73
Journal homepage: www.ijac.lums.ac.ir

Effectiveness of Rehabilitation by Telephone Follow-up on the Self-Efficacy of Patients Undergoing Coronary Artery Bypass Graft Surgery

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ABSTRACT

Empowering patients after coronary artery bypass graft surgery plays a major role in promoting their health behaviors, and improving self-efficacy is one way to increase this skill. This study aimed to compare the effectiveness of center-based rehabilitation and telephone follow-up on the self-efficacy of patients undergoing CABG. In this randomized controlled trial, 77 patients undergoing CABG referred to the Shahid Madani Medical Educational Center of Khorramabad were selected by convenience sampling. They were then randomly divided into two groups: telephone follow-up (N=38) and control (N=39). The intervention group received cardiac rehabilitation for four weeks, while the control group did not receive any intervention. Trail questionnaires were completed by patients before (at discharge) and after the study. The mean pre-study score was not significantly different between the two groups (P = 0.960). However, the findings after the study showed that self-efficacy was significantly different in the clinical practice of patients in the follow-up group compared with the control group (P = 0.001). Based on the findings of the effectiveness of telephone follow-up in increasing the self-efficacy of patients undergoing CABG, it is recommended to use this method as a low-cost but effective method.

Keywords: Rehabilitation, self-efficacy, CABG, telephone follow-up

Introduction

Important complications after coronary artery bypass grafting include pulmonary disorders, brain stroke, deep vein thrombosis, reoperation, bleeding and embolism, issues related to wound, nutritional problems, and sleep disorders [1,2]. In a study by Chug et.al (2016), chronic obstructive pulmonary disease has been reported as the leading cause of death in patients over 75 years of age after coronary artery bypass graft surgery [3]. In addition , sudden pain, leg swelling, fatigue, shortness of breath, chest pain, depression, anxiety, fear and lack of information and lack of awareness are also other problems [4]. Also, the recovery period of this group of patients is often

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DOI: 10.22087/ijac.2020.127194

stressful and especially the first weeks after returning home are accompanied with many physical and psychological challenges, and postoperative complications may delay patients' recovery. Therefore, hospital staff, especially nurses, should answer patients' questions about lifestyle and provide education, counseling and follow-up after discharge in the form of rehabilitation programs [3].

Rehabilitation is a coordinated set of measures needed to provide the best physical and social conditions, including comprehensive medical evaluation, exercise, adjustment of risk factors, psychosocial counseling, stress management, promotion of health behaviors, reduction of disability and lifestyle modification [5-8]. Based on the available evidence, among the benefits of cardiac rehabilitation can be reduced anxiety and depression, increased quality of life [9, 10] and reduced mortality in heart patients, so that in a study, reduced mortality of patients were reported by 27-31% [9]. In the study of Pourafkari et.al (2016), the reduction of readmission in the hospital was confirmed following rehabilitation [10].

Providing special education to patients and increasing their awareness about risk factors [11-13], treatment and control of the disease lead to improved health, adherence to prescription treatments, facilitation of healthy habits and behaviors and modulation of mental status and as a result, increase self-efficacy 14]. Thus, cardiac rehabilitation programs for these patients after discharge are important and one of the goals of rehabilitation in these patients is to increase their self-efficacy training [9]. Self-efficacy is one of the important factors in managing complications and risk factors in preventing primary and secondary cardiovascular diseases. Practically, people with higher self-efficacy are more likely to cooperate in reducing high-risk behaviors [11]. However, the results of studies indicate that the self-efficacy of heart patients is moderate and sometimes poor. For example, in the Alisha study, the self-efficacy of heart patients was reported to be poor. Therefore, cardiac rehabilitation and providing nursing interventions are recommended to improve patients' self-efficacy [15, 16]. Also, with regard to the importance of improving the self-efficacy of heart patients and complications of coronary artery bypass graft surgery, especially in the elderly, rehabilitation program has great importance and is an effective strategy to reduce these complications [17]. Postoperative self-care behaviors have positive effects on increasing adaptation and reducing the disability of heart surgery patients. Developing and implementing an educational program can lead to increase self-care behaviors and reduce readmissions in patients after heart surgery [18].Knowing the self-efficacy rate of postoperative patients, which is an unforgettable experience for patients undergoing coronary artery bypass graft surgery, can increase the quality of care provided and the effectiveness of post-discharge education [19].

Most rehabilitation programs for patients undergoing coronary artery bypass graft surgery focus on the hospital, which has problems such as increased treatment costs, distance, lack of full insurance coverage [20], low patient participation, low referral to centers due to their geographical location especially after living in remote villages, having burden of living responsibilities as well as traffic problems [21, 22]. In addition, due to being elderly patients and intolerance of activity by them and their ineligibility to participate in hospital rehabilitation programs and the lack of hospital beds, home-based rehabilitation is a way to overcome such problems [23].

Home-based rehabilitation programs include a combination of a home visit, support and follow-up over the phone or by email, letter, remote self-care training or treatment by phone. Despite the effectiveness of following up treatment cares of home visit, the mentioned method requires a lot of human resources, time and cost. Therefore, to solve these problems, the use of telecommunications has been suggested as another component of home-based rehabilitation to follow up on patient care at home, which has a growing trend [24, 25].This method with the aim of

controlling and supporting patients with chronic diseases, especially heart patients, has optimal results and causes to reduce the rate of readmission [26, 27] and increase their quality of life [28, 29].

In Shahid Madani teaching-medical Hospital of Khorramabad, which is considered as the main heart center of Lorestan province, after the discharge of patients, there is no special follow-up system and cardiac rehabilitation center, and patients have many problems to perform this cares. Therefore, the present study was conducted to evaluate the effectiveness of rehabilitation by telephone follow-up on the self-efficacy of patients undergoing CABG surgery.

Materials and Methods

In this two-group randomized controlled trial before and after, 77 patients undergoing coronary artery bypass graft surgery referred to the heart center of Shahid Madani in Khorramabad were selected by available method. Eligible patients were allocated to two groups of telephone follow-up (n=38) and control (n=39) based on randomized blocking. Entry of individuals into each group was done in the order of the number of selected blocks and using the arrangement inside the block. Inclination criteria to the study included willingness to participate in the study, history of coronary artery bypass graft surgery (under cardiopulmonary pump), age 30 to 70 years, number of grafts (three, four, five), no previous history of participation in cardiac rehabilitation programs, lack of any known psychiatric or motor disorders, lack of any kinds of hearing disorder, vision disorder, speech disorder, no chronic debilitating illness, and access to telephone or mobile. Exclusion criteria from the study included unwillingness to continue participating in the study, readmission or death during the study, lack of access if the contact number or address is changed without informing the researcher, the incidence of systemic disease that disrupts the patient's cardiac rehabilitation and incidence of hemodynamic disorders during study. The sample size was determined for each group of 40 people using similar studies [28], which, considering three cases of loss, the sample size was considered 77 people.

The questionnaire of Jokar et.al (1395) was used to assess patients' self-efficacy in the field of cardiac rehabilitation. The first part of the questionnaire included demographic and clinical information of the patient such as age, gender, marital status, level of education, place of residence, occupation, economic status, reason for referral, number of participants in cardiac rehabilitation sessions, medications, address and telephone number. The second part consists of 55 questions with a 5-point Likert scale from I am sure completely = 4 scores to I'm not sure at all = 0 scores. The range of scores varies from zero to 220. Zero indicates the minimum and 220 indicates the maximum degree of cardiac rehabilitation self-efficacy. Scores of zero to 55, 56 to 110, 111 to 165, and 166 to 220 indicate low, medium, good and very good rehabilitation self-efficacy, respectively. The mentioned instrument is native and prepared based on the correct principles of design and psychometrics, and its validity and reliability have been confirmed. The reliability of the instrument was confirmed by internal consistency method with Cronbach's alpha coefficient of 0.92 and the validity of the structure was investigated using confirmatory and exploratory factor analysis

At first, after determining the eligible patients, the researcher provided the necessary explanations to the patient during discharge and the educational booklet prepared by the researcher, which the rehabilitation was performed in its framework, was delivered to the intervention group. In the control group, according to the routine of the medical center, during the patient's discharge, the desired trainings were provided by presenting an educational package prepared by the hospital. On the first day after discharge with the help of the desired tools, a pre-test was performed on the patient, the patient and his companion were explained how to complete the research and after completion via mobile and one of the social communication software (Telegram), it was sent to the researcher. In the intervention

group, the rehabilitation program was performed in the form of training and telephone counseling twice a week for an average of 30 minutes each time for 4 weeks.

Cardiac rehabilitation included evaluating and providing education and counseling to the patient and family about lifestyle modification (including risk factors management, assessment of sleep status, nutrition, appetite and excretion, use of drugs and side effects, mood and mental status of the patient, stop of use smoking, surgical wound care, subsequent visits to the doctor, observing personal hygiene, bathing, sexual activity, travel, driving, praying, climbing stairs, controlling blood pressure and blood sugar). The content of the rehabilitation program was prepared under the supervision of a cardiovascular surgeon, clinical nurse, nutritionist and psychologist, and its validity was evaluated and approved by a qualitative method with the opinion of 5 faculty members of the Department of Internal Surgery Nursing. Finally, the rehabilitation program was performed in two groups: completing the research tool and delivering the training booklet to the control group on the last day of the 4th week with returning the researcher to home. Data analysis was performed with descriptive and analytical statistics. The scores of the groups were compared using independent samples t-test. Significance level was considered less than 0.05. This study was approved by the code of LUMS.REC.1397.027 of the University Research Ethics Committee and the code IRCT20100609004129N2 on the IRCT site.

Results

In this study, patients underwent coronary artery bypass grafting in two groups of telephone follow-up (n = 38) and control (n = 39). According to Tables 1 and 2, there was no statistically significant difference between the two groups in terms of demographic and clinical variables (P> 0.05).

According to Table 3 of the results of independent samples t-test, there was no significant difference between the two groups of telephone follow-up and control before the study in terms of mean self-efficacy score (p = 0.82). But the findings related to the mean self-efficacy score after the study showed that there was a statistically significant difference between the two groups (p = 0.001), so that the mean self-efficacy score in the telephone follow-up group was higher than the control. In Table 2 the pain severity score means for the music and control groups are indicated based on the measurement times for the pain related to the CTR. There was no significant difference between the two groups in both stages of intervention (Table 2).

Discussion

The findings of this clinical trial show that cardiac rehabilitation by telephone follow-up method was effective on increasing the self-efficacy of patients undergoing coronary artery bypass graft surgery. The effect of self-efficacy on accepting and maintaining healthy behaviors and quality of life of heart patients has been confirmed [30] and in confirmation of the present study, the results of many studies indicate the improvement of patients' self-efficacy through various methods of rehabilitation. In a similar study, Akbari et.al (2018) examined the effect of education during discharge and postoperative counseling on quality of life after CABG.

The results of this study showed the effectiveness of education and telephone counseling during and after discharge in improving the quality of life and reducing postoperative problems [24].

Table 1: Demographic characteristics of patients undergoing CABG in two groups of study

Characteristics	Intervention	Control	*p value*	Characteristics	Intervention	Control	*p value*
Number of grafts			P=0.49*	**Neuromuscular disease**			P=0.60*
3	7(17.9%)	9(23.7%)		Yes	1(2.6%)	38(97.4%)	
4-5	32(82.1%)	29(76.3%)		No	0(0.0%)	38(100%)	
Ejec/fraction			P=0.57 *	**Smoking**			P=0.94 *
Normal	21(53.8%)	21(55.3%)		Yes	22(56.4%)	22(57.9%)	
Abnormal	18(46.2%)	17(44.7%)		No	17(43.6%)	16(42.1%)	
Gastrointestinal disorders			P=0.74 *	**Thyroid disorder**			P=0.94 *
Yes	4(10.3%)	5(13.2%)		Yes	1(2.6%)	2 (5.3%)	
No	35(89.7%)	33(86.8%)		No	38(97.4%)	36(94.7%)	
Hypertension			P=0.19 *	**Diabetes**			P=0.50*
Yes	34(87.2%)	37(97.4%)		Yes	14(35.9%)	13(34.2%)	
No	5(12.8%)	1(2.6%)		No	25(64.1%)	25(67.8%)	
Dyslipidemia			P=0.37*	**Sleep disorder**			P=0.74*
Yes	10(25.6%)	8(21.1%)		Yes	7(17.9%)	10(26.3%)	
No	29(74.4%)	30(78.9%)		No	32(82.1%)	28(73.7%)	
COPD			P=0.56*	**MI**			P=0.74*
Yes	29(74.4%)	32(84.2%)		Yes	34(87.2%)	35(92.1%)	
No	10(25.6%)	6(15.8%)		No	5(12.8%)	3(7.3%)	

(*Chi Square*** ,**T Test)*

Table 2: Risk factors and clinical characteristics of patients undergoing CABG in two groups before the study

Characteristics	Intervention	Control	*p value*	Characteristics	Intervention	Control	*p value*
Age, (year)	59.94±7.25	60.97±9.25	P=0.84*	**BMI**	25.84(3.47)	26.53(3.64)	
Marital Status			P=0.41 **	**Employment status**			P=0.45 **
Single	4(10.3%)	3(7.9%)		Unemployed	3(7.7%)	1(2.6%)	
Married	35(89.7%)	35(92.1%)		Self-employment	16(41.0%)	17(44.7%)	
Education			P=0.27 **	Housewife	10(25.6%)	15(38.5%)	
Illiterate	16(41.0%)	25(68.8%)		office worker	0(0.0%)	2 (5.3%)	
Under Diploma	14(35.9%)	7(18.5%)		Retired	10(25.6%)	15(39.5%)	
Diploma	6(15.4%)	4(10.5%)		**Number of children**			P=0.97**
University	3(7.7%)	2(5.3%)		0-3	13(33.3%)	10(26.3%)	
Location			P=0.32 **	4-6	14(35.9%)	13(34.2%)	
Urban	28(71.8%)	30(78.9%)		>6	12(30.8)	15(39.5%)	
Rural	11(28.2%)	8(21.1%)		**Financial situation Satisfaction**			P=0.74**
Gender			P=0.37**	Low	18(46.2%)	26(68.4%)	
Female	10(25.6%)	15(39.5%)		Moderate	19(48.7%)	10(26.3%)	
Male	29(74.4%)	23(60.5%)		High	2(5.1%)	2(5.3%)	

(*Chi Square*** ,**T Test)*

Table 3: Self-efficacy mean score of of patients undergoing CABG in two groups before and after the study

Characteristics		Mean (SD)	F	df	p value
Before	Intervention	132.94(31.03)	0.22	75	0.82
	Control	131.43(26.56)			
After	Intervention	179.79(30.61)	21.63	1	0.001
	Control	147.37(31.44)			

In addition, the results of the clinical trial of Boroumand et.al (2017), which was somewhat similar to the present study in terms of methodology, indicated that the intervention group's self-efficacy was improved.

During 3 months, the education was done by sending an educational message and a phone call, the mean score of self-efficacy in the intervention group was reported higher than the control group 3 and 4 months later [11]. The results of another study ,which was carried out with the purpose of evaluating the possible positive effects of continuing home-based cardiac rehabilitation programs on self-efficacy , showed the positive effects of home-based rehabilitation on patients' self-efficacy[12].

In another study, Portaji et.al (2013) evaluated the self-efficacy of 80 patients with cardiac complications in order to evaluate the possible positive effects of continuing home-based cardiac rehabilitation programs. A total of 12 rehabilitation sessions were performed and the general self-efficacy scale was used. Based on the results of home-based rehabilitation, it had positive effects on patients' self-efficacy [31].

In a study by Karen et.al (2016) conducted on 172 patients with myocardial infarction as a remote care, the results of the study showed that treatment costs were reduced. Also, the effectiveness of remote interventions on quality of life and self-efficacy and depression and anxiety of patients was shown to be positive [26]. In the present study, due to the fact that the self-efficacy of the telephone follow-up group increased compared to the control group. The intervention group had a reduction in frequent visits and also the researcher was helpful in providing the care they needed to learn, and this matter could help reduce costs.

In the confirmation of the present study, in the study of Bikmoradi et.al (2015), 71 patients underwent coronary artery bypass graft surgery were followed up by video communication for 4 weeks after discharge. The results showed that the patients of remote nursing group performed better than the control group in following the treatment plan and introduced this method as suitable for cost-effective education to patients undergoing CABG surgery [27]. In a study by Andort et.al (2008), they performed center-based rehabilitation interventions on 78 patients with heart failure and coronary artery disease for 16 months. The standard 6-week cardiac rehabilitation program was designed in accordance with national guidelines and telephone follow-ups were performed 3, 6, and 12 months later. Comprehensive cardiac rehabilitation dramatically reduced the length of hospital stay and improved cardiac risk factors [28].

In addition to the effectiveness of the method used, the results of other studies have shown a positive attitude of patients towards this method and similar methods. For example, in the study of Jan et.al (2018), the attitudes of 197 patients undergoing CABG surgery were assessed using information exchange through technology. The results of this study showed that digital communication can be useful in postoperative recovery of CABG [32].

In another study, cardiac rehabilitation through telephone was performed with the aim of increasing the participation of patients with cardiovascular diseases. During discharge, a 3-month daily rehabilitation program of controlling blood pressure, pulse and weight

was developed for each patient. The results showed that this intervention was not cost-effective and the reason for the increase of the costs was the use of digital devices to control blood pressure, pulse, and weight remotely and the transmission of information through a fixed line (telephone) [29]. In the present study, patients received medical services without going to medical centers and without spending money and their self-efficacy was increased.

Posht-Chaman et.al (2019) in a clinical trial examined the effect of two methods of care and SMS follow-up on adherence to treatment of patients after coronary artery bypass graft surgery. In addition, the results showed that both methods are equally effective in adhering to the treatment of patients after coronary artery bypass graft surgery [33]. In the study of Foroozeh et.al (2017), which aimed to investigate the effect of post-discharge telephone follow-up on readmission caused by complications after coronary artery bypass graft surgery, post-discharge telephone follow-up was effective on the number of referrals caused by postoperative complications coronary artery bypass grafting [34].

Considering the above-mentioned texts and the present study on the effectiveness of rehabilitation intervention through telephone follow-up and cost-effectiveness and no time and space limitations and additional costs, the use of this method is recommended especially in the clinical context of Iran. Because answering to patients' questions about lifestyle and other issues around the patient's rehabilitation matter through tele-nursing as a system to provide health services to patients after surgery and discharge to increase adherence to the treatment plan and improve quality of life is fruitful

Conclusion

Based on the results of this study, it is suggested that the patients' rehabilitation program by telephone follow-up method is considered as a low-cost but optimal method to increase patients' self-efficacy after coronary artery bypass graft surgery in order to prevent outpatient referrals with regard to the problems of this group of patients and the lack of government rehabilitation centers.

Conflict of interests

The authors have no financial interest related to this article

Acknowledgment

All the patients who participated in this research project, as well as the Vice Chancellor for Research and Technology of Lorestan University of Medical Sciences are thanked and appreciated for their financial support.

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