

Effectiveness of psychological training, treatment, exercise and nutritional programs in self-efficacy, maintaining duties and control of symptoms in patients with bypass surgery

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Abstract

The research purpose was to assess the effectiveness psychological training, treatment, exercise and nutritional programs in self-efficacy, maintaining duties and control of symptoms. The study is a quasi-experimental intervention with single group pre-post. The sample consisted of 120 subjects (38 females and 82 males). The sampling method was random with sequential assignment. The subjects were selected from among all the patients referring to rehabilitation clinic in Tehran Heart Center during the study period and one month after coronary artery bypass graft surgery. Firstly, the researcher administered the study questionnaires on the patients explaining the intervention and treatment process and obtaining their consent before the intervention. Secondly, pre-test was performed and the data gathering tools included collecting demographic information and self-efficacy questionnaire for heart patients. After filling out the questionnaire, all the subject participated in the rehabilitation program based on the psychological interventions and exercise activities. The results showed that implementing rehabilitation programs based on psychological interventions and basic activity increases self-efficacy, improves maintaining duties, and enhances control of symptoms of the disease. As paired t-test results indicate, it can be said with 99% confidence that the difference between pre-test and post-test mean scores is significant. The results showed that implementing rehabilitation programs based on psychological interventions and basic activity increases self-efficacy, improves maintaining duties, and enhances control of symptoms. In interventions related to patients with chronic diseases, increasing self-efficacy should be a priority and training programs should consider increasing the four components of self-efficacy (dominating performance or action plan, modeling, interpretation of symptoms, social support and encouragement).

Keywords: implementing rehabilitation programs, self-efficacy, patients with bypass

It has been reported patients who have belief can do something for their physical condition, are less depressed, and less stressed. Secondly, beliefs in self-efficacy affect choosing and performing healthy behaviors and therefore influence health status and functioning. It is assumed that in chronic diseases, their efficacy to deal with the illness and its consequences may decline because of variable and unpredictable course of the disease. This leads to depression and anxiety, which in turn, increases the perception of pain and illness perception and reduces efforts to deal with complications or to do daily activities. As a result, their health status becomes worse than before. So to deal with the challenges of chronic disease, not only special skills and knowledge are required but also belief in the ability of using these skills realistically and believing that using these skills will lead to desired results are also required. Therefore, if self-efficacy increases in patients with chronic disease, risk of vicious cycle caused by chronic disease can be reversed, i. E. Sense of control will be increased and anxiety, depression and pain will be reduced. Therefore, in interventions related to patients with chronic disease, increasing self-efficacy should be a priority and training programs should be created considering four components of self-efficacy (dominating performance or action plan, modeling, interpretation of symptoms, social support and encouragement) (Halo Wei, 2002). Dominating performance is based on personal

Self-efficacy is defined as a person's trust to perform behavior, which is essential to achieve the desired goals. Self-efficacy is also an important prerequisite for successful self-management and behavior change. According to Bandura's social cognitive theory, self-efficacy is a direct predictor of behavior and is made up of four elements: person's belief in ability to perform; others' belief in ability to perform successfully; others' influence and social support; and sense of physical well-being caused by performing task. Self-efficacy influences on health in two ways. Firstly, biological systems are influenced by beliefs related to the ability to cope with stressors (Sol et al, 2006).

The cardiovascular patient education program emphasis is on changing the behavior. The patients are asked to follow drug therapy and other medical orders. They participate in the treatment. However, less attention is paid that the participation requires that the patient to be sure that they can follow the lifestyle changes and lifelong medication. If the patients do not believe in their ability to improve their health through behavior change or taking lifelong medication, it would not be feasible to restore health (Lorig, 2006).

One of the causes of the decline in mortality from coronary artery diseases is using the techniques of open heart surgery (bypass surgery). Bypass is a surgery by which a detour is constructed in arterial route at the site of narrowed and blocked coronary arteries with venous patch grafts usually taken from other parts of the body in order to eliminate blocked flow path (Dunkley, 2008). However techniques and advances in medical sciences have reduced mortality of heart patients, due to lack of a good recovery, many heart patients who are operated would face psychological consequences such as lack of self-reliance, diminished self-esteem in order to maintain tasks, lack of healthy behaviors, anxiety, and depression. On the other hand, untreated psychological consequences in these patients not only impose a great cost on governments and people of a society but also cause further heart problems such as repeated heart attacks and premature death (Petr, 2000).

This disease is one of the major causes of mortality in Iran, and every day a large number of people are killed or become disabled due to this disease. As in 2001, 26 percent of mortalities in Iran were due to cardiovascular diseases. Coronary artery bypass patients (CABG) are those with multiple atherosclerosis in their all three coronary arteries and are usually referred for bypass surgery (Dunkley, 2008).

Introduction

Although a wide range of scientific evidence shows the benefits and effects of rehabilitation program in order to improve patients' ability to perform duties and their physical ability, because this program and especially psychological interventions with rehabilitation in Iran are new there is not enough information about benefits of a comprehensive rehabilitation program based on psychological interventions and basic training exercises on self-efficacy and improved health behaviors in people. Thus, the present study has investigated the effect of comprehensive rehabilitation program based on psychological interventions and basic training exercises in self-efficacy, maintaining duties and control of symptoms in bypass patients of rehabilitation department of Tehran Heart Hospital. Moreover, the answer to this question has been given that what impacts psychological

Studies show that coronary artery disease is considered as a chronic and progressive lesion. Several complications of this lesion depend on how to apply care treatment patterns from the patient and his/her family. So that the strict enforcement of pharmaceutical, food, and activity regimes in patients with chronic coronary heart disease have significantly important roles in enhancing quality of life and reducing incidence of risk factors. Despite rehabilitation services as part of secondary prevention of chronic diseases have been launched since 2000, its use is not very common. A large group of patients for whom participating in rehabilitations is essential are not able to participate in these courses. Also, out of the few groups that start these courses a lot of them would give up ongoing presence and completing it in mid-course. The most formal cardiac rehabilitation programs have several essential components. They aim at improving exercise performance of patient, encouraging him/her to change lifestyle and improving his/her social psychological health (Walsh, 2005).

Rehabilitation of the chronic diseases is defined as rehabilitation of a coordinated series of interventions needed to provide the best physical, psychological and social condition. Based on these interventions, patient with chronic disease or after an acute disease such as heart disease can resume his/her optimal performance in society by personal effort and can prevent disease progression by healthy behaviors.

experience. If a person is successful in performing a particular behavior, self-efficacy increases and the behavior is done more frequently. This is the most important information source of self-efficacy because gives direct information on the ability to perform successfully. Similarly, repeated failures also reduce confidence. Modeling refers to the fact that when a person watches people with similar situation as theirs and manages it well, they will be more motivated, try more and learn more. Encouragement means being noted by others that one can successfully perform a specific behavior. When people face a problem, if they are encouraged verbally that they are capable of dominating the specific activity or behavior, they are more likely to concentrate and keep their efforts to perform that specific activity or behavior rather than those who are skeptical about themselves or focus more on their own flaws, shortcomings and inefficiencies. Reinforcement of physiological symptoms is based on the assumption that people's judgment about their own ability to do a specific behavior is based on their beliefs and information about physiological symptoms and signs. These people attribute physiological symptoms to a cause. The symptoms are sometimes misinterpreted (Halo Wei, 2002). Inaccurate and incorrect beliefs about a cause as well as inaccurate health beliefs about an illness may lead to inappropriate thoughts about ability, which may in turn lead to inappropriate behavior. Nonetheless, positive mood while doing a particular behavior increases self-efficacy. Thus, reinterpretation of physiological symptoms is driven in order to reduce stress reactions, negative emotions and correct misinterpretations and misbeliefs. Also, self-efficacy enhancement leads to improvement of beliefs, attitudes, motivation, thought patterns and emotional well-being (Wilson, 2008).

training and treatment and exercise and nutritional programs have on self-efficacy, maintaining duties and control of symptoms.

Method and Materials

The sample consisted of 120 subjects (38 females and 82 males). The study is a quasi-experimental (single group pre-post). The sampling method was random (sequential assigned). The subjects were selected among all the patients referring to rehabilitation clinic in Tehran Heart Center during the study period one month after coronary artery bypass graft surgery.

Those who had inclusion criteria and were consent to participate in the study were selected. Patient's inclusion and exclusion criteria were: location: residence in Tehran, level of education: at least graduated primary school, history of disease: having a history of heart disease and bypass surgery for the first time, medical conditions: chronic disease other than heart disease, psychiatric disorders: the absence of major psychiatric disorders, physical disability: not a serious physical disability, and signing a consent form for participation in the study. Accordingly, sample size was included considering the possible loss of 140 subjects and sampling continued until the desired volume was obtained. The present study was conducted on a sample of 140 subjects (males and females) and due to various reasons such as lack of cooperation, medical problems and not answering all questions, the final volume was reduced to 120. 120 left subjects (male and female) gave post-test.

After selecting the patients, the researcher gave the study questionnaires to patients explaining intervention and treatment and obtaining their consent before the intervention, and pre-test was performed.

Data were collected by two-part instruments. One part was collecting demographic information: 1. Full name, 2. Gender (female / male), 3. Age, 4. Marital status in four levels (married / single / widowed / divorced), 5. Education in four levels (elementary / junior high school-diploma / associated degree-BA/ higher), and 6. Smoking in three levels (yes/ no/ quit). The second part was self-efficacy questionnaire for heart patients.

This questionnaire was designed by Sullivan et al (1998) in order to study self-efficacy, its relation with behaviors associated with prevention, cardiovascular rehabilitation, and assessing specific target behavior change in patients with cardiovascular disease to clarify the role of self-efficacy in the interpretation of disease into symptoms, signs, and disabilities in cardiovascular disease in this way. A self-efficacy scale of a self-report questionnaire has 16 questions. Questions are answered on a five-point Likert scale. Self-efficacy scale of cardiac patients has two subscales. The scale of symptom control included 8 items and maintaining duties subscale included 8 items.

Score points for each of the two subscales is equivalent to average of question scores. In multiple regression model, self-efficacy scale notably predicts physical performance, physical functioning, social functioning and family functioning after controlling for the baseline functioning, baseline anxiety, and other important correlations.

The results of reliability in the original study for self-efficacy of symptom control indicated 0.90 and maintaining duties and functions show 0.87. Correlations between subscales were obtained ($r=0.38$). The results suggested that predictive validity of this scale for physical functioning, family and social functioning of cardiac patients had a satisfactory level. To determine the reliability, the questionnaire was conducted on 30 patients. The validity of subscales was obtained by alpha method (0.92 and 0.88, respectively).

After filling out the questionnaire, all subject participated in the rehabilitation program based on psychological interventions and base exercise activities, and intervention took place. Intervention program was as follows: Rehabilitation program consisted of 24 sessions (eight weeks) of exercise program for 60 to 90 minutes (3 times a week) and 8 sessions of weekly psychological training.

First session: According to a summary of patient's files, doctor visits, changing medications, determining the level of activity using exercise testing, and psychological testing.

Second session: According to the test results and medical records of each patient, nutrition plan, exercise activity and individual and group psychology sessions.

Exercise program: 24 sessions, three days a week and each session consisted of 5 minutes of light exercises to warm up the body, walking on the treadmill (15-20 minutes), cycling on a stationary bike (10-12 min), using an arm ergometer (8-10 min), hand dumbbells (10-15 min), foot dumbbells (10-15 min) and a 20-minute relaxation program. The patients performed all above exercised in each treatment session. The exercises began with moderate intensity. Therefore, in addition to fatigue and heart symptoms, 60% of maximum heart rate during the exercise test was considered as target heart rate of patients. Accordingly, duration and intensity of exercises were adjusted based on each patient's situation.

Weekly schedule of psychological-training intervention as one of the main components of rehabilitation therapy based on psychological interventions was as follows:

First week: Introducing people in group, expressing group norms, program objectives, and an overview of underlying psychological factors.

Second week: relaxation training, understanding and managing common symptoms and stress, using the mind to manage symptoms, changing beliefs and attitudes and individual sessions.

Third week: train how to change attitudes, exercise for fun and fitness, proper exercise training to maintain and enhance the robustness, flexibility and tolerance, and exercise tips for chronic diseases.

Fourth week: Teaching nutritional and behavioral factors, weight management, physical activity, blood glucose and lipid management, smoking cessation and relapse prevention, pharmaceutical decisions and drug consumption management, and individual sessions.

Fifth week: Problem solving skills training, training personality types and how they impact on arterial stenosis, training interpersonal skills, and marital relationships.

Sixth week: Lively and fun programs and relaxation to promote mental health, patient's family attending the family group sessions with the patient, and individual sessions.

Seventh week: Evaluation of nutritional status, physical activity, heart disease and hypertension management, relaxation exercises, planning for the future, fear and reality, and providing beneficial tips.

Eighth week: Health tour (taking patient to park for biking and relaxation), planning and encouraging patients to continue health behaviors and following treatment in the future.

Age	Statistical Index	Frequency	Percent
35-40		4	3.3
41-45		4	3.3
46-50		21	17.5
51-55		37	30.8
56-60		39	32.5
More than 60		15	12.5
Total		120	100

Table 2- Frequency and distribution percent of the sample according to age

Table 1 shows of the 120 subjects, 68, 3% were male and 31, 7% were female.

Gender	Statistical Index	Frequency	Percent
Male		82	68.3
Female		38	31.7
Total		120	100

Table 1- Frequency and distribution percent of the sample according to gender

Results and Findings

Out of 120 participants, 68, 3% were men. The mean age of the patients was 55±10. 5 and 51 to 60 year old patients were 63, 3%. 74, 2% were married and 48, 3% had an under diploma degree.

Demographic characteristics

Demographic characteristics are discussed in this section using frequency and percentage indicators.

Patient's reassessment and implementation post-test was done two months after pre-test (after an 8-session psycho-educational intervention).

As table 4 shows of the 120 subjects, 48.3% had primary or junior high school education, 32.5% had associate degree or BA degree, and 3.3% had higher than BA. Comprehensive rehabilitation program based on psychological interventions and base exercise activities influence self-efficacy, control symptoms and maintain duties in CABG patients.

Statistical index	Frequency	Percent
Education		
Primary/ junior high school	58	48.3
Diploma	39	32.5
Associate degree / Bachelor	19	15.8
Higher than BA	4	3.3
Total	120	100

Table 4- Frequency and distribution percent of the sample according to level of education

Table 3 shows that of the 120 subjects, 74.2% were married, 6.7% were single, 15% were widowed, and 4.2% were divorced.

Statistical index	Frequency	Percent
Marital status		
Married	89	74.2
Single	8	6.7
Widowed	18	15
Divorced	5	4.2
Total	120	100

Table 3- Frequency and distribution percent of the sample according to marital status

As the results in Table 2 show, of the 120 subjects 3.3% were 35 to 40 years and 41 to 45 years, 17.5% were in the age group 46 to 50 years, 30.8% in the age group 51 to 55 years, 32.5% in 56 to 60 years, and 12.5% were more than 60 years old.

Table 5- Descriptive statistics related to self-efficacy scores

Statistical Index	Number	Mean	Standard deviation	Standard error of the mean
Control of symptoms and signs of disease	120	18.83	4.82	0.44
Maintaining duties	120	16.16	4.46	0.41
Self-efficacy	120	34.99	7.95	0.73
(Total score)	120	41.86	7.56	0.69

As it can be inferred from table 5, mean scores of post-test in components such as control of symptoms and signs of disease and maintaining duties (total score) are more than their pretest mean scores. We continue to investigate the significance of these differences.

Table 6- The results of paired t-test mean scores of self-efficacy

Variable	Mean difference	Standard deviation	Paired-t	Degrees of freedom	Significance level
Control of symptoms and signs of disease	-4.22	2.44	-18.96	119	0.0001
Maintaining duties	-2.64	3.57	-8.09	119	0.0001
Self-efficacy (Total score)	-6.86	4.95	-15.17	119	0.0001

As paired t-test results indicate, because the absolute values of t obtained in symptoms and signs control, maintaining duties, and self-efficacy (total score) with 119 degrees of freedom are greater than the critical t values, and since their significance level obtained is less than significance criterion (0.01), then it can be said with 99% confidence that the difference between pre-test and post-test mean scores is significant. Therefore, the hypothesis concerning the effect of cardiac rehabilitation program on self-efficacy and its components in CABG patients is confirmed and null hypothesis is rejected.

Discussion

The experiences, which one can gain during rehabilitation therapy based on psychological interventions and basic exercises, include all four components, and also reorganize perception and thoughts on disease by educating and informing the correct issues related to the disease. Hence, patients can cope with debilitating and negative emotions. Therefore, providing a context to change thoughts and replace them with efficient thoughts associated with amplifier emotions and behaviors can help patients to accept their inappropriate behaviors and emotions with symptoms and take responsibility to create and sustain healthy behaviors.

Dominating performance is based on personal experience. If a person is successful in performing a particular behavior, self-efficacy increases and the behavior is done more frequently. This is the most important information source of self-efficacy because direct information on the ability to perform successfully. Similarly, repeated failures also reduce confidence. Modeling refers to the fact that when a person watches people with similar situation as theirs and manage it well, they will be more motivated, try more and learn more. Encouragement means being noted by others that one can successfully perform a specific behavior. When people face a problem, if they are encouraged verbally that they are capable of dominating the specific activity or behavior, they are more likely to concentrate and keep their efforts to perform that specific activity or behavior rather than those who are skeptical about themselves or focus more on their own flaws, shortcomings and inefficiencies. Reinterpretation of physiological symptoms is based on the assumption that people's judgment about their own ability to do a specific behavior is based on their beliefs and information about physiological symptoms and signs. These people attribute physiological symptoms to a cause. The symptoms are sometime misinterpreted. Inaccurate and incorrect beliefs about a cause as well as inaccurate health beliefs about an illness may lead to inappropriate thoughts about ability, which may in turn lead to inappropriate behavior. Thus, reinterpretation of physiological symptoms is driven in order to reduce stress reactions, negative emotions and correct misinterpretations and misbeliefs. Also, self-efficacy enhancement leads to improvement of beliefs, attitudes, motivation, thought patterns and emotional well-being.

Strong belief in the seriousness of the disease and the strong belief that lifestyle is the cause of disease would increase sense of control and healthy behaviors. In secondary prevention, the difficulty in changing behavior and lifestyle of patients is due to failure to change their personal beliefs or models related to their disease. Belief in access to data support predicts decreased psychological distress and self-confidence in patients (Heljenson, 1993). In interventions related to patients with chronic diseases, increasing self-efficacy should be a priority and training programs should consider increasing the four components of self-efficacy (dominating performance or action plan, modeling, interpretation of symptoms, social support and encouragement).

The results showed that implementing rehabilitation programs based on psychological interventions and basic activity increases self-efficacy, improves maintaining duties, and enhances control of symptoms and signs of disease. These results are consistent with the results of the study by Hossainzadeh Bazargan (2010), which has studied effects of psychological and exercise training in multi-dimensional rehabilitation program on increasing the level of self-efficacy and adherence to bypass treatment and reported a significant relationship. Also, it is consistent with the results of Lorig and Lorraine (2006) and Wilson (2006), who had assessed the effects of rehabilitation program on increasing self-efficacy in patients with bypass.

- Accordingly, they can improve these consequences by health-related behaviors, which are directly related to health outcomes, and predict further health behaviors. This process increase their confidence and self-efficacy. With such positive feedback, negative thoughts and emotions will be reduced and in turn improve the psychological status of patients.
- Since the study was conducted by one single group with pre-and post-test and had no control group, the ability to generalize the results was affected. The incidence of heart disease in men is far more than women. So the number of women was much less in the sample. Thus, the interpretation of results related to gender is limited and makes any comparison impossible. Also, educational pamphlets were used in teaching strategies to improve the self-efficacy, which resulted in the selection of patients with early literacy. Consequently, the results could not be generalized.
- Recommendations**
- Components of rehabilitation based on psychological training in other cardiovascular hospitals and comparing the results are recommended. Following treatment regimen by patients requires change in their lifestyle, which should be persistent due to the chronic nature of coronary artery disease. So, booster sessions seem necessary in order to keep the changes and improvements.
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