

# The Effect of Family-Centered Empowerment Model on Treatment Plans Adherence of Patients Undergoing Coronary Artery Bypass Graft

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## Abstract

**Background:** Coronary artery diseases are among the most important causes of disability and coronary artery bypass graft (CABG) surgery is considered as one of the most important methods of treatment. The improvement of post-surgery adherence to treatment plan is one of the main healthcare objectives.

**Objectives:** The present study attempted to determine the effect of family-centered empowerment model on the adherence of patients undergoing CABG to the treatment plans.

**Methods:** This research was a clinical trial and a quasi-experimental study, including pre and post tests with a control group performed on 102 patients and active family members of the patients hospitalized at the intensive care unit (ICU) of Imam Khomeini hospital of Tehran, Iran in 2014. For the experimental group, the family-centered empowerment model was implemented with four steps. The control group received only common care. The rate of patients' adherence to the treatment plans was then investigated in three areas of diet, medication, and physical activities before and after the intervention, and the data were analyzed using PASW Statistics V18 software.

**Results:** The two groups were similar in terms of demographic variables. After the intervention, there was a significant difference based on the results of the independent T-test in terms of mean scores of adherence to the treatment plan in the three areas mentioned above ( $P = 0.000$ ). Also, before and after the intervention, a significant difference was observed in the experimental group in terms of the above mean scores ( $P = 0.000$ ).

**Conclusions:** Based on the research findings, the family-centered empowerment model seems to be practical and feasible for the patients under CABG, which can bring improvement or correction of adherence to the treatment plan.

**Keywords:** Family-Centered Empowerment Model, Coronary Artery Bypass Graft, Adherence to the Treatment Plan

## 1. Background

Coronary atherosclerosis is one of the most prevalent cardiovascular chronic diseases (CAD), which can be identified by decreased diameter of coronary arteries and limitation in the periodic increase of myocardial perfusion when the increased blood flow is necessary, especially during activity and excitement (1). They were recognized as the main reason of death worldwide until 2020. Cardiovascular disease is responsible for 39.3% of deaths in Iran. Approximately 378 deaths occur daily due to heart diseases in Iran. In Iran, as many other countries, the disease is considered as the main cause of death (2). Coronary artery bypass surgery is the only preferred treatment for many patients with coronary heart disease. Its main purpose is to improve and relieve angina, and judge the improvement

of left ventricular function in maintaining coronary perfusion (1). Mental and physical examination of the patient before surgery, the patient understanding of the surgical process and adherence to the treatment plan are considered as three main elements for the treatment team (3, 4).

Following heart surgery, the patients require careful monitoring at the ICU and nurses are responsible for controlling the critical condition of the patients and their families. Therefore, training of the patient and his/her family is one of the most important nursing roles. In the recent decade, nursing knowledge regarding chronic diseases has emphasized on self-care and patient empowerment as the main goals of nursing measures (5). A significant and effective part of training programs for patients under coronary artery bypass surgery is devoted to training dietary and medication regimen and activities, which

have practical effect on the patient recovery process. A considerable part of hospitalization and discharge care is focused on these factors, and surgical success largely depends on the said factors in the long term (6). In his study, Funnell used the group discussion method and training based on empowerment and self-efficiency to improve adherence to the treatment plan (7). The results of a comparative study on adherence to treatment plan performed by Turppin in the United States indicated that receiving no training is effective in reducing the rate of adherence to the treatment plan (6). Aggrawall also used the active participation of families as a suitable social base to improve adherence to a treatment plan. Family-centered care is considered as one of the main concepts of nursing, which aims at maintaining the integrity of the patient's family and providing unique care for each patient (8).

Stromberg believed that family-centered care would increase the knowledge, decrease solitude and isolation and provide the necessary ground for mental, physical and social support (9). In the family-centered training model, the family actively participates in investigating and recognizing the needs and obtains the required training; the occurrence of disease in an individual will pass to all family members, one by one, in the disease cycle (10). Coronary bypass surgery involves not only the patient but also his family members, thus, their participation in controlling the disease is very important. Therefore, this research was performed to assess the effect of family-centered empowerment model with four steps (knowledge improvement, self-efficiency, self-esteem and evaluation) on adherence of the patients under coronary artery bypass to the treatment plan. The patients and their family members participated in providing care. The families controlled their patients' conditions and efficiently met their health requirements with self-esteem and sense of responsibility. Therefore, this study was performed to investigate the effect of family-centered empowerment model, considering the hypothesis that "family-centered empowerment model is effective in adherence of patients under coronary bypass surgery to treatment plans. In regards to education and the role of nurses as the patient's primary education source in clinical settings much emphasis is Apart from the care and education of patient's functional and technical aspects of care such as clinical nurse's duties.

Despite the involvement and participation of family members in the management and support of patients and their impact on individual and community-based training programs to improve adherence to therapy in chronic patients, yet only a few studies have been done in this regard.

## 2. Objectives

This study aimed to assess the effect of family-centered empowerment model with four steps (knowledge, self-efficacy, self-esteem and evaluation) on adherence to therapy.

## 3. Methods

This study was a clinical trial with a control group, which consisted of non-emergency patients under coronary bypass surgery, hospitalized at Imam Khomeini hospital Tehran, Iran in 2014 and their active family members. The sample size was determined based on mean difference and variance in a similar study on the same subject. In each group, 51 samples and in total 102 samples were selected. In this research, sampling was continuous and samples were selected through convenience sampling and randomly divided into two groups, experimental and control groups, using a random number table.

The inclusion criteria in the study were being a patient or family member (daughter, wife, husband or one of his collateral or first-degree relatives) participating in the treatment process, and having literacy (able to read and write) in order to improve the health level and obtain recovery. The family member had to be more capable than other members in terms of companionship, power of decision making, caring and identification of the patient conditions; the patient was not to undergo emergency cardiac surgery; they should not have any record of hospitalization for coronary bypass surgery; having no mental disease; and it should have been possible to have phone calls with the patient after being discharged from the hospital. Possible criteria for being excluded from the study were failure of adhere to the anticipated treatment plan due to the need for re-hospitalization or emergency intervention, disease progression during the study and patient death, severe motor limitation during the study and being unable to perform physical activity, and using other training classes for cardiac rehabilitation during the study.

Tools Used in This Study:

### 3.1. Patient Demographic Information Questionnaire

Patient demographic information questionnaire includes questions about age, gender, marital status, education level, history of chronic diseases, smoking, clinical symptoms during hospitalization and etc., which were completed by the researcher.

### 3.2. Questionnaire for Evaluating Adherence of the Patients Under CABG Surgery to Treatment Plans

a) Diet questionnaire: In this questionnaire, patients were asked questions about their food basket, consumption of fat and salt, frequency of consumption and how to consume 30 major food ingredients in terms of the amount of consumption. For scoring, this table assigned a score from 0 to 100 to each of the choices based on food type.

b) Medication regimen questionnaire: In this questionnaire, patients were asked questions about observation of medication regimen. Ten components of the questionnaire were graded based on a six-point Likert scale (never = 0, very high = 100). The higher grades indicated better adherence. The contents of the questions included drug name, drug effects, quantity and time of consumption, outcomes of drug consumption, taking necessary measures to prevent side effects, drug discontinuation if there was recovery, increasing or decreasing the dosage, adding other pharmaceutical components without physician's prescription.

c) Physical activity questionnaire: In this questionnaire, the patient was asked questions about adherence to the motor program. Fourteen components of the questionnaire were graded based on a five-point Likert scale (never = 0, always = 100). The contents of questions included the amount of warming up before exercise, controlling heart rate before and during the exercise, doing light exercises at the end of physical activity, stopping exercise if there are side effects, having heart drugs during the exercise, observing appropriate time interval between eating and starting the motor program, using appropriate clothing during exercise, doing stretching exercises and controlling the position of legs after the exercise, the rate of refrain from doing heavy physical activities, considering weather conditions for doing the motor program outdoors, and the rate of activity in cold and warm weather.

Overall, the rate of adherence to the treatment plan (in all three areas of diet and medication regimen and physical activity) was considered in three classes as follows:

Unfavorable adherence: total score < 50%, relatively favorable adherence: 50% - 75% of the total score, and favorable adherence: total score > 75%

To determine the reliability of the questionnaires, 30 participating patients completed the questionnaires and Cronbach's Alpha was computed respectively:  $\alpha > 0.81$ ,  $\alpha > 0.78$  and  $\alpha > 0.76$  for diet, medication regimen and physical activity questionnaires. Intra-class correlation coefficient (ICC) was respectively 0.77, 0.82 and 0.75 for these three areas. To determine the scientific validity of the tools, face and content validity was used. To do so, tools suitable for data collection were prepared after studying sources

and books related to the research subject, and then, required corrections were made using scientific opinions of ten faculty members of Tehran University of Medical Science and Tarbiat Modarres university.

In this study, after obtaining permission from the authorities of Imam Khomeini hospital, a description of the intervention and the teaching and research goals was provided for the patients and their family members and a consent was then obtained from eligible candidates.

The samples were then randomly divided to two experimental and control groups. After sample selection, a questionnaire for evaluating adherence to the treatment plan (before intervention) was completed and after analyzing the data, the content of the designed empowerment program was reviewed in terms of content and volume. The experimental group then received the main intervention (implementing the model) and the control group received only routine care of the ward. The main intervention in this study included using family-centered empowerment model to achieve the objectives of the study. It included the following four dimensions that were conducted in four training sessions (a 30-minute session before surgery, three training and group discussion sessions [including groups of 4 to 6 patients for 30 to 40 minutes after surgery] and four training sessions for 30 - 40 minutes for the active family member through the patient training participation, and eight weeks after the termination of the intervention, the questionnaire was completed for a second time, after the intervention):

The first step (increasing the perceived threat): during this step, an individual training session and a group discussion session was used with an instructional booklet and cards to improve the level of perceived threat. Thus, the first training session was held 24 hours before the surgical operation and the second session was held 48 hours after surgery for 30 - 35 minutes for the patients. During these sessions, subjects were taught based on patients' needs and goals of the model in the following five sections including; 1- Physiology, symptoms, complications and prognosis, 2- Treatment measures before surgery, 3- Diet during hospitalization in three sections titled motor activity, nutrition and medical treatment, 4- Treatment program and mental condition after being discharged and physical changes after surgery, and 5- planning for the future. At the end of the session, conclusions were given and the patient's questions were answered.

The second step (improving the sense of self-efficiency): Two 30-minute training sessions were held through practical method of presentation. Therefore, at first, necessary descriptions were given about the practical skills required for the patients and then, that skill was displayed to the patients, including 1- Information about the

practical skills (physical activities) after surgery and their importance, problems resulting from failure to perform such activities and teaching of these skills was done for the patients 2- The process of performing the practical programs (such as stretching exercises, diaphragmatic breathing, etc.) was done once in front of the patient 3- The task or skill was divided to smaller parts and performed step by step 4- The patient was asked to perform that part of the task 5- The patient was given the opportunity to become proficient in that part (behavior) by practicing and repeating the behavior 6- Then, the patient was asked to practice and repeat the behavior to reach a level of proficiency to be able to do it alone 7- Finally, the patient became self-efficient in performing a skill completely.

The third step (increasing self-esteem through educational participation): During this step, the patient was asked to instruct his active family members to make them familiar with issues related to coronary bypass surgery (in three 20 to 25-minute sessions after each group discussion session) and encourage them to help him/her. Then, he was asked to transfer what was discussed in each group discussion session and what he had learned through observation in the self-efficiency sessions to his family members and to explain completely what he had been taught in each session to his active family members. Then, he was asked to write down what he had learned and any question he may have faced on a paper in order to ask at the next session. According to these reports and direct encounter of family members, the success rate of the patients in transferring the contents became clear and those issues that had not been transferred to the family members were discussed. At this step, the family was considered as a necessary source of support in the process of learning the interventions for improvement of empowerment through raising self-efficiency and self-esteem. After the intervention and discharge, a telephone follow-up was performed to monitor the mental and physical state of patients; in a way that the researcher called the patient every two weeks and by answering the patients' questions, the process of changes was evaluated.

The fourth step (final evaluation): During this step, which happened eight weeks after the last empowerment session and patient discharge, the second questionnaire (after intervention) was completed by the patients and the results gathered from the data of this step were analyzed. The PASW statistics software and SPSS version 18 were employed for the data analysis using the independent T test, paired T test and Chi-square test.

#### 4. Results

Mean and standard deviation (SD) of the age of patients in the experimental and control groups were respectively 60.55 (7.3) and 57.9 (6.64). Both groups had no significant difference in terms of gender, occupation, marital status and education level and were similar ( $P > 0.05$ ) (Table 1).

The results of the independent t-test indicated adherence of the patient to the treatment plan, which included three dimensions of diet, medication regimen and physical activities. There was no significant difference between the experimental and control groups in all these three dimensions before the intervention while a significant difference was seen in all three dimensions after the intervention (Table 2).

Mean and standard deviation of the above scores after intervention and those of paired t-test indicated a significant difference in the rate of adherence of the patients to the treatment plan in the experimental group compared with that before the intervention (Table 3).

#### 5. Discussion

The results of the present study indicated that using family-centered empowerment model has created significant changes to improve the patient's adherence to the treatment plan. Therefore, using the above model as an empowerment-based model, which emphasizes the active participation of the family in providing care, would create suitable conditions for active presence of the patients and their families in the process of treatment-care. Relatively similar studies have been conducted in Iran in the field of using family-centered empowerment models.

In the present study, a significant difference was observed between the mean scores of the patients' adherence to treatment plans in the dimension of diet before and after the intervention in the experimental group. Regarding the results of the study conducted by Aggarwal et al. in 2010, titled "Low Social Support" and its connection with non-adherence to diet during a year, the interventions of family-centered trial for heart health revealed that providing good social support for the patient is considered as one of the most important factors for adherence to the treatment plan after being discharged from the hospital and for those patients who didn't receive suitable support from their families, the rate of adherence to the diet significantly decreased after being discharged (8). The results of the research conducted by Chien et al. in 2006, revealed that "those patients who received training along with their families regarding their needs after being discharged from the intensive care unit (ICU), had a significant difference

**Table 1.** Demographic Characteristics of Patients Undergoing Coronary Artery Bypass Graft (CABG) in the Two Groups<sup>a</sup>

Group Characteristics	Experiment	Control	P Value	Statistical Test
<b>Gender</b>			P = 0.672	Fisher exact
Male	36 (70.6)	33 (64.8)		
Female	15 (29.4)	18 (35.2)		
<b>Occupation</b>			P = 0.128	Chi-Square
Employee	5 (9.8)	5 (9.8)		
Self-employed	13 (25.6)	6 (11.8)		
Retired	8 (15.6)	14 (27.4)		
Worker	7 (13.8)	12 (23.6)		
Housekeeper	15 (29.4)	14 (27.4)		
Disabled	3 (5.8)	0 (0)		
<b>Marital status</b>			P = 0.362	Chi-Square
Married	47 (92.2)	50 (98)		
Widowed	4 (7.8)	1 (2)		
<b>Educational level</b>			P = 0.586	Chi-Square
Illiterate	17 (33.4)	20 (39.2)		
Below high school diploma	19 (37.2)	18 (35.2)		
High school diploma	14 (27.4)	10 (19.6)		
University degree	1 (2)	3 (5.8)		

<sup>a</sup>Values are presented as No. (%).

**Table 2.** Comparison of Mean  $\pm$  Standard Deviation Related to the Dimensions of the Patients' Treatment Plan Before and After the Intervention in the two Groups

Groups Dimensions of adherence to the treatment plan	Before (Mean $\pm$ SD)		T-test	After (Mean $\pm$ SD)		T-test
	Control	Experimental		Control	Experimental	
<b>Diet</b>	63.4 $\pm$ 6.05	61.2 $\pm$ 7.34	P = 0.95	63 $\pm$ 5.6	86 $\pm$ 4.5	P = 0.000
<b>Medication regimen</b>	50.70 $\pm$ 9.15	49.96 $\pm$ 9.4	P = 0.686	52 $\pm$ 1.28	83.66 $\pm$ 5.32	P = 0.000
<b>Physical activity</b>	27.8 $\pm$ 16.46	23.4 $\pm$ 14.13	P = 0.147	26.1 $\pm$ 16.65	84.73 $\pm$ 8.4	P = 0.000
<b>Total adherence</b>	52.4 $\pm$ 6.6	49.3 $\pm$ 5.7	P = 0.14	52 $\pm$ 6.6	88.9 $\pm$ 3	P = 0.000

Abbreviation: SD, Standard deviation.

in their level of knowledge and awareness about diet compared with the control group" (11).

In the present study, a significant difference was observed between the mean scores of the patients' adherence to medication regimen before and after intervention in the experimental group. The results of the study conducted by Taddeo et al. in 2008, indicated that simple instructional sheets (training simplification) contained important pharmaceutical points for the patients and their families in short-term training sessions and the active participation of the families in the patients' treatment process would be effective in improving adherence to treat-

ment. (12). In the study conducted by Getachew et al. (2014), it was concluded that the rate of the patients' adherence to medication regimen is low. The most important reason for non-adherence to medication program were forgetfulness, lack of information regarding the importance of the amount and frequency of medication use, and the decision to stop taking medication (13). Considering the reasons for non-adherence, there is a need to increase the patient's knowledge on the importance of medication use and family training in order to accompany the patient (14).

In the present study, there was a significant difference between the mean scores of the patients' adherence to

**Table 3.** Mean and Standard Deviation of the Scores Related to the Dimensions of Patients' Treatment Plan Before and After the Intervention in the Experimental and Control Groups

Groups Dimensions of Adherence to Treatment Plan	Experiment (Mean ± SD)		Paired t-Test	Control (Mean ± SD)		Paired t-Test
	Before	After		Before	After	
Diet	61.2 ± 7.34	86 ± 4.5	P = 0.000	63.4 ± 6.05	63 ± 5.6	P = 0.252
Medication regimen	49.96 ± 9.4	83.66 ± 5.32	P = 0.000	50.70 ± 9.15	52 ± 1.28	P = 0.298
Physical activity	23.4 ± 14.13	84.73 ± 8.4	P = 0.000	27.8 ± 16.46	26.1 ± 16.65	P = 0.349
Total adherence	49.3 ± 5.7	88.9 ± 3	P = 0.000	52.4 ± 6.6	52 ± 6.6	P = 0.195

Abbreviation: SD, Standard deviation.

the motor program in the area of adherence to diet in the experimental group before and after the intervention. Chan et al. conducted a study in 2009, titled "Patients' Motivation and Adherence to Physical Recommendations", in a post-surgery rehabilitation program, and concluded that to create suitable conditions for adherence to a treatment plan, especially post-surgery motor program, good conditions should be provided for active participation of the patients and their families in the treatment process (15). These researchers used a method called "supportive independent behaviors" to achieve optimal adherence in the area of motor activity after surgery; so by presenting simple and understandable training to the patients and their families, the rate of adherence to the treatment program increased significantly in the group that had used this method (16).

Based on the results of studies in this area, it seems necessary to provide education with a focus on active involvement of the patient and their family and training them according to specific educational programs and multi-dimensional presentation on education and care needs of patients and their families after discharge from the hospital for improving adherence to diet and medication.

The results of the study conducted by Stafford et al. indicated that one of the most important and effective ways to increase adherence to treatment plans in chronic diseases, especially heart diseases, is to use training models and methods, which can primarily raise the patient's belief in the disease, treatments and the importance of adherence to the treatment plan (17). The results of the study conducted by Church et al. indicated that one of the most important factors affecting adherence to the treatment plan is to train the patients in relation to their conditions (18). In the present study, there was a significant difference between the mean scores of the patients' adherence to the entire treatment plan in the experimental group before and after intervention in a way that the patients' adherence to the entire treatment plan increased. The results of the study conducted by Auley et al. indicated that using

training methods associated with increased patients' self-efficiency can lead to increased rate of patients' adherence to the treatment plan (19). The results of the study conducted by Grady et al. (2013) indicated that patient self-care significantly improved the quality of life in patients with heart failure and the ability of patients in disease management, medical treatment and physical activity also increased significantly (20). According to the summary of results of providing education to patients and families seem Seems to offer educational programs, simple and active participation in the treatment and care of patients and families in the treatment and care by taking maximum care needs are a significant influence on the formation and stability of behavior will be correct The model used in consideration of the above factors can be helpful.

The following are all actions that can be used for improving adherence to treatment after surgery: general measures of family-centered care and education of the patient undergoing surgery, providing explanations about the disease and surgical procedures, answering their questions simply and involving patients in their own health care decisions, providing emotional support for patients and their families, and educational participation of families.

The study limitations were as follows: different characteristics, mental and spiritual, individual differences in the interactions between patients, differences in motivation and personal differences between subject's characteristics, which could influence learning, sense of self-efficacy, self-esteem and self-empowerment and thus affect the rate of adherence to the treatment. According to the study, it is suggested that in this study, patient and family satisfaction rate of improvement was assessed independently, other researches suggest that the impact of family-centered empowerment model on patient satisfaction and an active member of the family to the course of improvements review and also stress patients were examined directly It is suggested that future studies in this field stress levels are measured before and after the intervention.

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## Footnotes

**Authors' Contribution:** Neda Sanaie, drafting of the manuscript and the first author; Fatemeh Bahramnezhad, collecting the data, drafting the manuscript, analysis and interpretation of data and the corresponding author; Mitra Zolfaghari, supervision, drafting of the manuscript and critical revision of the manuscript; Fatemeh Alhani, conception design, drafting of the manuscript and critical revision of the manuscript.

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