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The Effect of Chronic Disease Self-Management Program on Health Status of Patients Undergoing Coronary Artery Bypass Graft Surgery

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Abstract

Background: The chronic disease self-management program is among the most important methods for promoting self-care.
Objectives: This study was done to evaluate the effects of this program on patients' health status after undergoing coronary artery bypass graft surgery.
Patients and Methods: This one-group pretest-posttest clinical trial was conducted in 2013 on 46 patients, who had recently undergone a coronary artery bypass graft surgery and had been referred to the cardiac rehabilitation center of Imam Ali (PBUH) Hospital, Kermanshah, Iran. The participants were recruited conveniently and were educated based on the chronic disease self-management program. The data were collected using a demographic questionnaire and the health status questionnaire and were analyzed through conducting the Chi-square test using the SPSS software (v.21.0).
Results: The chronic disease self-management program had significant effects on the participants' general health, daily activities and pain ($P < 0.001$) but did not significantly affect their overall health status, energy or fatigue, feeling of well-being and social functioning.
Conclusions: The chronic disease self-management program significantly affects various health-related parameters. It is an inexpensive non-invasive intervention, which complements conventional medical treatments and thus, can be used by rehabilitation centers.

Keywords: Self-Management, Self Efficacy, Health Status, Coronary Artery Bypass Graft Surgery

1. Background

Ischemic heart diseases, with increasing prevalence and mortality rates, have become a major health problem (1). According to the world health organization, 1.7 million deaths occur yearly due to coronary artery disease (CAD) and this rate has been estimated to reach 11.1 million by 2020 (2). The prevalence of CAD is also increasing in Iran. Coronary artery disease was the first leading cause of death in Iran in 2009 with a mortality rate of 25.6% (3). Furthermore, CAD-related mortality rate among adults, aged forty years or older, is fourteen per 1000 individuals and the number of required coronary care unit and post-cardiac surgery beds have been estimated to be respectively 14280 and 8240 (1). Annually, great sums of money are spent on the prevention and the treatment of CAD and the rehabilitation of patients affected by this disease (2).

A treatment option for CAD, which has decreased its mortality rate, is coronary artery bypass graft (CABG) surgery (4). The quality of life (QOL) of most patients who undergo CABG is dramatically decreased due to fragile recovery, anxiety, depression, and decreased self-confidence in doing activities of daily life (5). Currently, post-CABG hospital stay has been shortened and hence, patients usually achieve recovery at their homes without receiving continuous healthcare services. On the other hand, because of CABG-related stress, rehabilitation of patients who undergo the surgery is a matter of great importance (4).

Nursing knowledge in the area of cardiac diseases has significantly changed in the last decade and thus, current emphasis is mainly on self-care and rehabilitation as the main strategies for health promotion (6). The general aim of educational programs for cardiac patients is behavior changes achieving of which requires patients' confidence in their own capabilities for accepting and performing new responsibilities (7). Self-care is among the key strategies for decreasing healthcare costs, particularly the costs of managing chronic conditions. Health policy makers greatly emphasize on developing and broadening patients' self-care skills. Self care is among the most important types of primary care. About 65% - 85% of caring activities are performed by patients or their family members without receiving help from physicians (8-11).

One of the self-care programs is the chronic disease self-management program (CDSMP). This program was introduced by Stanford University in 1998 and was then implemented in many countries. As the most acceptable self-care program in the world, the CDSMP emphasizes on three

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skills of planning, solving disease-related problems, and decision making and has produced positive outcomes (10).

Furthermore, CDSMP-based patient education is based on Bandura's self-efficacy theory. Self-efficacy is defined as one's confidence for performing an action and it is considered as a key prerequisite for successful self-care and behavior modification (10). Self-efficacy means one's ability to produce an effect or a desirable outcome. It is defined as an individual's perception or judgment about his/her ability to do a certain action successfully through managing surrounding factors. Empowerment is a practical strategy for developing this ability in individuals (12). The Bandura's theory holds that self-efficacy consists of an individual's confidence about successfully performing self-care activities so much so that he/she achieves desirable outcomes (13). Individuals with higher self-efficacy perceive fewer barriers to their self care and therefore, engage in self-care activities more actively (14).

2. Objectives

Concerning the importance of self-care for patients, who suffer from chronic diseases and the necessity to empower cardiac patients to do self-care activities, this study was done to evaluate the effects of a CDSMP-based educational program on patients' post-CABG health status.

3. Patients and Methods

This one-group pretest-posttest clinical trial was conducted in 2013 at the cardiac rehabilitation center of Imam Ali (PBUH) hospital, Kermanshah, Iran. The study population comprised of all patients who had undergone CABG and had been referred to the center for receiving rehabilitation services. Patients were included if they had their physicians' permission to participate in the program, had undergone CABG at least two months before the study, did not participate in any other similar programs, had an age of less than 70 years, and were able to read and write Persian. The exclusion criteria were having two absences or more from the educational sessions, refraining from completing the study questionnaires, voluntarily withdrawal from the study, experiencing any significant deterioration in health status, and developing health problems, which made them unable to participate in the program.

With a confidence interval of 95%, a power of 80%, and a pretest and a posttest self-efficacy value of 65 ± 9.6 and 69.8 ± 5.7 (15), respectively, the results of the sample size calculation formula (Equation 1) revealed that at least 43 patients were required for the study. Considering a potential attrition of 20%, 52 patients were conveniently recruited in the study. In total, six patients withdrew from the study and therefore, the data retrieved from 46 patients were included in the final analysis.

(1) $$n = \frac{\left(z_{1-\frac{\alpha}{2}} + z_{1-\beta}\right)^2 \left(\sigma_1^2 + \sigma_2^2\right)}{\left(\mu_1 - \mu_2\right)^2} = \frac{(1.98+0.84)^2\left(9.6^2+5.7^2\right)}{(65-69.8)^2} = 43$$

The content and the method of the educational program were developed using the textbook 'Living a healthy life with chronic conditions' (16). The content was translated from English to Persian and then was assessed and approved by nursing faculty members and two translation experts. Sampling was performed from March to November 2013 during which, the structured CDSMP was implemented for the participants in six 2.5-hour sessions, during six consecutive weeks. In total, four educational courses were held for the participants, three courses for males and one course for female participants. The number of participants in each course was 10 - 15. The content of the program included relaxation, physical exercise, fatigue management, communication with healthcare professionals, proper medication use, emotion management, nutrition, problem solving, and decision-making. Educational sessions were provided by a healthcare professional (a nurse, a psychologist, or a nutritionist based on the contents of the sessions) and one of the participating patients, who had a history of successful self-management.

The study data were collected using a demographic characteristics form and the health status questionnaire (HSQ) at three time points including before, immediately after and three months after implementing the educational program. The demographic characteristics form was a researcher-made questionnaire whose face and content validity were assessed and confirmed by ten nursing faculty members. The HSQ was developed based on the SQ2/0 questionnaire (Kina, 1993) (17). This questionnaire consists of 37 items on health status, which fall into three domains of physical, psychological and social health. The sub-domains of the HSQ are general health (two items), daily activities (ten items), daily activities for physical problems (four items), daily activities for psychological problems (three items), pain (two items), energy or fatigue (four items), feeling of well-being (six items), social functioning (two items) and health perception (four items). The items are responded and scored either dichotomously or on a three- or five-point Likert scale. Higher sub-domain scores reflect better health status. The minimum and the maximum possible scores of the sub-domains are as follows: general health: 2 and 10; daily activities: 10 and 30; daily activities for physical problems: 4 and 8; daily activities for psychological problems: 3 and 6; pain: 2 and 10; energy or fatigue: 4 and 20; feeling of well-being: 6 and 30; social functioning: 2 and 10; and health perception: 4 and 20.

The validity and the reliability of the Persian HSQ were assessed by Kafami et al. (2012) (17). The pretest-posttest correlation coefficients for the aforementioned sub-domains of the HSQ have been reported to be 0.81, 0.79, 0.78, 0.86, 0.89, 0.94, 0.92 and 0.87, respectively (17). The study data were analyzed by the SPSS software (v. 21.0) through conducting the Chi-square test.

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4. Results

In this study, 46 patients were assessed. The mean of the participants' age was 58.91 ± 6.88 years. The youngest and the oldest participants were aged 45 and 70 years, respectively. Most of the participants were retired (54.3%), male (91.3%) and married (97.8%), had either primary or university education (28.3%), and lived in Kermanshah city, Iran (91.3%). Other study data are presented in the Tables 1 - 6.

Table 1. Comparing the Study Participants' General Health Across the Three Measurement Time Points[a,b]

General Health	Before the Intervention	Immediately After the Intervention	Three Months After the Intervention
Poor	2 (4.3)	2 (4.3)	0
Moderate	41 (89.1)	42 (91.3)	1 (2.2)
Good	3 (6.5)	2 (4.3)	45 (97.8)
Total	46 (100)	46 (100)	46 (100)

[a]Values are expressed as No. (%).
[b]P < 0.001.

Table 2. Comparing the Study Participants' Physical Activity Across the Three Measurement Time Points[a,b]

Daily Activities	Before the Intervention	Immediately After the Intervention	Three Months After the Intervention
Poor	0	2 (4.3)	0
Moderate	25 (54.3)	12 (26.1)	9 (19.6)
Good	21 (45.7)	32 (69.6)	37 (80.4)
Total	46 (100)	46 (100)	46 (100)

[a]Values are expressed as No. (%).
[b]P < 0.001.

Table 3. Comparing the Study Participants' Pain Across the Three Measurement Time Points[a,b]

Pain Intensity	Before the Intervention	Immediately After the Intervention	Three Months After the Intervention
Poor	16 (34.8)	33 (71.7)	39 (84.8)
Moderate	24 (52.2)	13 (28.3)	7 (15.2)
Good	6 (13)	0	0
Total	46 (100)	46 (100)	46 (100)

[a]Values are expressed as No. (%).
[b]P < 0.001.

Table 4. Comparing the Study Participants' Energy or Fatigue Across the Three Measurement Time Points[a,b]

Energy or Fatigue	Before the Intervention	Immediately After the Intervention	Three Months After the Intervention
Poor	1 (2.2)	1 (2.2)	1 (2.2)
Moderate	41 (89.1)	42 (91.3)	45 (97.8)
Good	4 (8.7)	3 (6.5)	0
Total	46 (100)	46 (100)	46 (100)

[a]Values are expressed as No. (%).
[b]P < 0.001.

Table 5. Comparing the Study Participants' Feeling of Well-Being Across the Three Measurement Time Points[a,b]

Feeling of Well-Being	Before the Intervention	Immediately After the Intervention	Three Months After the Intervention
Poor	3 (6.5)	0	1 (2.2)
Moderate	20 (43.5)	22 (47.8)	20 (43.5)
Good	23 (50)	24 (52.2)	25 (54.3)
Total	46 (100)	46 (100)	46 (100)

[a]Values are expressed as No. (%).
[b]P < 0.001.

Table 6. Comparing the Study Participants' Social Functioning Across the Three Measurement Time Points[a,b]

Social Functioning	Before the Intervention	Immediately After the Intervention	Three Months After the Intervention
Poor	7 (15.2)	4 (8.7)	1 (2.2)
Moderate	38 (82.6)	41 (89.1)	45 (97.8)
Good	1 (2.2)	1 (2.2)	0
Total	46 (100)	46 (100)	46 (100)

[a]Values are expressed as No. (%).
[b]P = 0.192.

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5. Discussion

The present study was done to evaluate the effects of the CDSMP on post-CABG health status of patients, who had referred to the cardiac rehabilitation center of Imam Ali (PBUH) hospital, Kermanshah, Iran, in 2013. Before the study, the health status of most study participants was at a moderate level while only a small percentage of the participants had poor health. This finding is probably due to the fact that compared with other people, patients participating in the rehabilitation program considered greater value for their health and could afford the costs of participating in the program. After the study, the general health status of most participants was better than before the study. Besides, three months after the study, the health status of most participants was great.

Before the study, most participants moderately performed daily physical activities. One reason behind this finding was that their cardiac problems had been diagnosed only during the year preceding the study and hence, their problems had not significantly affected their ability to do physical activity. Immediately after and three months after the study, the level of physical activity of most participants was high.

Most of the participants showed moderate levels of pain before the study. Given the short period between the time of patients' CABG and the time of the study, having moderate pain was a normal finding. Immediately after the study, the pain intensity of 71.7% of the participants was low and three months after, most participants had low-intensity pain. In other words, three months after the study, study participants' health status in the area of pain was good.

Before implementing the study intervention, the level of energy or fatigue of most participants was moderate while most of them considered their well-being at a high level. On the other hand, the social functioning of most of the participants was at a moderate level.

Immediately after the study, the energy or the fatigue of most participants was at a moderate level and they considered their well-being at a high level. Moreover, the social functioning of 89.1% of them was at a moderate level.

Three months after the study, the energy or fatigue level of most participants was moderate and their feeling of well-being was high. In addition, the social functioning of 97.8% of them was at a moderate level. Three months after the study, none of the participants had poor social functioning status.

The study findings showed that the posttest scores of general health, physical activity, and pain sub-domains were significantly different from the baseline readings while there was no significant difference between the pretest and the posttest readings of social functioning, feeling of well-being, and energy or fatigue sub-domains.

Haas et al. (2005) conducted a study to assess the effects of the CDSMP on elderly people's lower back pain and found no significant difference between pretest and posttest readings of patients' health status (18). Their findings are in line with the findings of the present study.

Kafami et al. (2002) also found that the implementation of the CDSMP significantly improved different aspects of health among patients with multiple sclerosis ($P < 0.05$) (17); however, our findings revealed that the CDSMP improved only some aspects of patients' health.

Ataee et al. (2013) found that self-care education for patients with permanent pacemaker was effective in improving all physical, psychological, and social aspects of quality of life (19). However, in the present study, only some aspects of patients' health changed significantly after the study. Griffiths et al. (2005) also found that although the CDSMP did not significantly affect their participants' health status, it had significant effects on self-care behaviors ($P = 0.047$). However, in our study, only some aspects of patients' health were improved following the study intervention. Like the present study, the length of the follow-up period in their study was four months (20).

Elzen et al. (2007) also found CDSMP ineffective in significantly improving health status and self-care ability. Their participants' health status and self-care ability did not change significantly immediately after their intervention ($P = 0.29$ and 0.06, respectively). Changes in health status and self-care ability after the sixth month of their intervention were also insignificant (21). Their findings are in line with our findings; however, the length of their follow-up was twice longer than our follow-up.

Lorig et al. (2003) also conducted a study with a four-month follow-up period and found that self-management education significantly improved patients' self-care ability ($P < 0.05$) and health status ($P < 0.05$) (22). Smeulders et al. (2010) also performed a randomized controlled trial to evaluate the effects of a nurse-led self-management group program for patients with congestive heart failure. Contrary to the findings of the present study, their findings revealed that their intervention significantly affected patients' ability to manage cognitive symptoms ($P < 0.001$), self-care behaviors ($P = 0.008$) and quality of life ($P = 0.005$) (23).

Differences in the designs and the measurement tools of the studies can result in different findings. Conflicts between our findings and the findings reported in previous studies may be due to the fact that we collected the study data using a self-report questionnaire. Collecting data using more objective measures and during longer periods of time may result in different findings.

One of the study limitations was the confounding effect of the information, which was provided to the participants by radio and television, newspapers and other sources. Moreover, differences in the participants' psychological characteristics, interpersonal relationships, motivations, and other factors such as the barriers and the facilitators to learning might have affected the study findings. The small number of female patients in the study setting was another limitation of the study. Conducting further studies is recommended to evaluate the effects of the CDSMP on patients' health status.

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5.1. Conclusions

In this study, the effects of the CDSMP on patients' post-CABG health status were evaluated during a five-month time period. The findings revealed that the CDSMP had no significant effects on the participants' overall health status while it was effective in improving their general health and daily activity and alleviating their pain. The CDSMP is an inexpensive non-invasive intervention, which complements conventional medical treatments and thus, can be used by rehabilitation centers. Patient education is among nurses' most important responsibilities and roles. Nurses are credible sources for providing self-care educations to patients. In order to promote patients' self-care behaviors, it is necessary to assess and determine their self-care needs and also to provide them with systematic educational programs.

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