Original Article

The Effects of a Multimedia Education on Self-Efficacy and Self-Esteem among Patients with Acute Coronary Syndrome: A Clinical Randomized Trial

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Abstract

Background: Acute Coronary Syndrome (ACS) is the first leading cause of death in the industrial world. It is associated with low self-esteem and self-efficacy. Given that patient education is a key role of nurses, this study sought to evaluate the effects of multimedia education on self-efficacy and self-esteem among patients with ACS. **Materials and Methods:** This randomized clinical trial was conducted in 2017 on 60 patients recruited from the two coronary care units of Hajar and Kashani hospitals, Shahrekord, Iran. Participants were randomly allocated to an intervention and a control group. The study intervention was a multimedia educational program. Data were collected before and 1 and 2 months after the intervention onset using a demographic questionnaire, the Cardiac Self-Efficacy Scale, and Coopersmith Self-Esteem Inventory. Data analyses were performed using repeated measures analysis of variance, *t*-test, Chi-square test, and Fisher's exact test. **Results:** The mean score of self-efficacy in the intervention group (F_2 = 119.26, p < 0.001) and in the control group (F_2 = 74.21, p < 0.001) significantly increased across the three measurement time points. The mean score of self-esteem in the intervention group significantly increased across the three measurement time points (F_2 = 101.19, p < 0.001), while it remained significantly unchanged in the control group (F_2 = 2.56, p = 0.086). **Conclusions:** Multimedia education is effective in significantly improving self-efficacy and self-esteem among patients with ACS. Therefore, nurses can use this strategy to improve these patients' self-efficacy and self-esteem.

Keywords: *Acute coronary syndrome, education, multimedia, nursing, self concept, self efficacy*

Introduction

Cardiovascular Disease (CVD) is one of the leading causes of death worldwide[1] and the first leading cause of death due to noncommunicable diseases. Estimates show that the number of deaths caused by CVD will increase from 17 million in 2008 to 20 million in 2030, and Coronary Artery Disease (CAD) will be the first leading cause of death in the world by 2020.[2] The prevalence of CVD has also increased in Iran.[3] The World Health Organization reported that 43% of all deaths in Iran in 2016 were due to CVD.[4] Acute Coronary Syndrome (ACS) refers to a wide spectrum of cardiovascular symptoms, namely, unstable angina, Myocardial Infarction (MI) with ST-segment elevation, and MI without ST-segment elevation.[5] Rapid and abrupt progression of this syndrome is an intense and horrible psychological experience.[6] ACS causes high levels of physical, sexual, occupational, and social stress and disability and considerably increases mortality rate.[7] These stressors reduce self-esteem, cause fear and disappointment,[4] and undermine mental health, thereby negatively affect self-efficacy.[8] Self-esteem refers to the subjective self-evaluation of self-worth.[9] Patients with CAD suffer from low self-esteem.[10-12] Self-esteem affects the social relationships,[13] thinking, feelings, and functioning of patients.[14] Self-efficacy is the ability to exert a desirable effect and is defined as an individual's perception of the ability to successfully perform a given action.[10] Individuals with low self-efficacy avoid any behavior or action that they feel is beyond their abilities. On the contrary, high levels of self-efficacy help change a threatening situation into a situation of confidence,[15,16] result in better self-management outcomes, and improve life expectancy.[17] High self-efficacy improvement is also effective in modifying

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health-related behaviors among cardiac patients.[18] However, patients with chronic conditions usually feel low levels of self-efficacy.[19]

Education is a potentially effective strategy for empowering patients and promoting their self-esteem and self-efficacy.[20] Patient education is a key component of nursing care and is considered as one of the professional standards in nursing practice.[21,22] In Iran, obstacles such as nursing shortage and lack of sufficient time prevent nurses from educating patients.[21] There are several methods to educate a patient. Choosing the right method for educating the patient is important.[23] Electronic education is among the modern approaches to education. It integrates different equipment and technologies to deliver educational material. These equipment and technologies include, but are not limited to, electronic media, elaborate networks such as internet and extranet, compact discs, multimedia software, and computer simulation modeling.[24] Multimedia education is an extension of electronic education, through which several media are combined in order to facilitate the interaction of learners and software, thereby encourage creativity and increase the effectiveness of education.[25] The main goal of multimedia education is to help learners achieve higher levels of knowledge and skills.[26] One of the advantages of multimedia education is its easy applicability for people with low literacy skills.[27] In studies on the use of multimedia for patients with chronic diseases such as diabetes mellitus,[28] patients undergoing heart surgery,[29] heart failure,[30] and hemodialysis,[31] on preparing patients with prostate cancer for radiotherapy,[32] lumbar disc surgery,[33] and patients with rheumatoid arthritis,[34] different results have been observed in terms of the effects of multimedia use. In addition, in these studies, multimedia has been used for patients with chronic disorders and has not been utilized in patients with acute conditions. Given that ACS is one of the most life-threatening acute disorders and there is a need for self-care in a patient who has suddenly been diagnosed with the disorder to prevent complications, to evaluate the effects of multimedia education on self-efficacy and self-esteem among patients with ACS.

Materials and Methods

This two-group, single-blind, randomized, controlled clinical trial (IRCT2017041632764N30) was conducted in the two coronary care units of Hajar and Kashani hospitals, Shahrekord, Iran, from April to September 2017. This study adheres to CONSORT guidelines. The study population comprised all patients with ACS who referred for the first time to the study setting. Sample size was calculated with a mean self-esteem score of 100 ± 7,[35] an effect size of 6, a confidence interval of 95%, and a power of 90%. The sample size calculation equation revealed that 30 patients were needed in each study group. Sample size was also calculated based on the mean score of self-efficacy.[36] However, the calculated sample size was less than 30 individuals, and hence, the sample size calculated based on the mean score of self-esteem was used in this study. The sample size was calculated taking into account a 10% sample loss.

Participants were purposefully recruited to the study at their hospital discharge based on the inclusion criteria and were randomly allocated to an intervention and a control group. For randomization, 30 cards labeled 1 and 30 cards labeled 2 were placed in a box and a nurse in the study setting was asked to randomly draw a card from the box for each patient who was recruited to the study. Accordingly, the intended patient was allocated to the intervention group if the card was labeled 1 or to the control group if the card was labeled 2. The drawn cards were not placed in the box again. The study inclusion criteria were definitive diagnosis of ACS by a cardiologist, basic literacy skills, age of less than 75 years, access to a video CD player and the ability to use the player, no cognitive disorders, accessibility via phone call, willingness to participate in the study, hospitalization for ACS for the first time, and orientation to time, place, and person. The exclusion criteria included voluntary withdrawal from the study, acquiring information about ACS from other sources (determined by asking the research units), and significant progression of the disease.

The study data were collected using a demographic questionnaire, the Cardiac Self-Efficacy Scale (CSES), and Coopersmith Self-Esteem Inventory (CSEI). The items of the demographic questionnaire were related to age, gender, and history of cardiovascular risk factors, educational level, length of stay, marital status, and employment status. Self-efficacy was assessed using the CSES developed by Sullivan *et al*. in 1998. This scale contains 16 items on self-efficacy and confidence in symptom control, medication adherence, and adherence to general care-related activities. The items of the CSES are scored on a five-point scale ranging from 0 (“not at all confident”) to 4 (“completely confident”). The total score of the scale can range from 0 to 64, with higher scores showing higher self-efficacy.[37] In the study by Vareai, the Content Validity Index (CVI) of the CSES was examined in terms of relevance, clarity, simplicity, and fluency of its sentences. Each section’s content, clarity, and simplicity were 93.40, 89.80, and 90.80%, respectively. In total, the CVI of the questionnaire was 91.33%. Moreover, the reliability of the questionnaire was determined using the internal consistency method. The Cronbach’s alpha coefficient was 0.977.[38] The other data collection instrument used was the CSEI. This inventory is used to measure adults’ self-esteem. It consists of 35 items that are scored on a four-point scale ranging from 1 (“Completely disagree”) to 4 (“Completely agree”). Therefore, its total score ranges from 35 to 140, with higher scores illustrating higher self-esteem. In the study by Madani *et al*.,[39] the reliability of the CSEI was confirmed using the correlation

coefficient (r = 93%). The Cronbach's alpha coefficient obtained by the researcher was 0.97.

The study intervention was a multimedia educational program developed based on the existing literature[40-42] and approved by five cardiologists in the study setting. The content of the program included ACS, its etiology, and cardiac dietary regimen, appropriate use of cardiac medications, stress management strategies, and physical activity. Education was provided using a video CD containing pictures and sound clips. At the time of their hospital discharge, eligible participants were recruited to the study, allocated to the study groups, and asked to respond to the data collection instruments. Then, each participant in the intervention group or one of his/her family members was provided with a copy of the video CD and was taught using a laptop how to use the multimedia educational program. All participants in this group and their family members were required not to give the video CD or the educational materials to other patients. They were provided with a reminder checklist, which included items on adherence to dietary regimen, physical activity, cardiac medications, smoking cessation, and stress management, and were asked to assess their adherence through marking the items of the checklist on a weekly basis for eight successive weeks. In addition, we made weekly telephone contacts with them in order to remind them to use the educational program. Participants in the control group exclusively received routine care services by receiving an educational pamphlet at the time of discharge from the hospital. All participants filled out the study instruments before and 1 and 2 months after the onset of the study intervention. After the second posttest, the multimedia educational program was also provided to participants in the control group. The CONSORT flow diagram of this study can be seen in Figure 1. Data analysis was performed using repeated measures analysis of variance (ANOVA), Chi-square test, and Fisher's exact test in SPSS software (version 21.0; IBM Corp., Armonk, NY, USA).

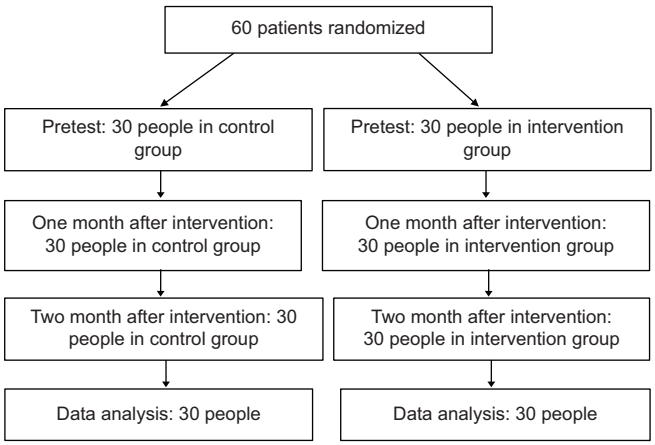

Figure 1: CONSORT flow diagram

Ethical considerations

The ethics committee of Shahrekord University of Medical Sciences, Iran, approved this study (ethics code: (IR.SKUMS.1395.125)). All of the participants filled out written informed consent forms.

Results

The study participants included 60 patients with ACS (30 individuals in each group). All of them remained in the study until the end. The majority of the participants were men (58.33%). Groups did not significantly differ from each other in terms of participants' history of cardiovascular risk factors and demographic characteristics ($p > 0.05$), except educational level ($p < 0.05$). However, the significant difference between the groups in terms of participants' educational level did not significantly affect the results of repeated measure ANOVA [Table 1].

Repeated measure ANOVA showed the significant effects of group and time on self-efficacy. The mean score of self-efficacy in the intervention group (F_2 = 119.26, $p < 0.001$) and control group (F_2 = 74.213, $p < 0.001$) significantly increased across the three measurement time points. The mean score of self-esteem in the intervention group was significantly higher than the control group 1 month (t_{58} = 11.35, $p < 0.001$) and 2 months after the intervention (t_{58} = 11.13, $p < 0.001$) [Table 2 and Figure 2].

The results of repeated measures ANOVA also illustrated the significant effects of group and time on self-esteem. The mean score of self-esteem in the intervention group significantly increased across the three measurement time points (F_2 = 101.19, $p < 0.001$), while it remained significantly unchanged in the control group (F_2 = 2.56, p = 0.086). The mean score of self-esteem in the intervention group was significantly higher than the control group 1 month (t_{58} = 4.94, $p < 0.001$) and 2 months after the intervention (t_{58} = 7.79, $p < 0.001$) [Table 2 and Figure 3].

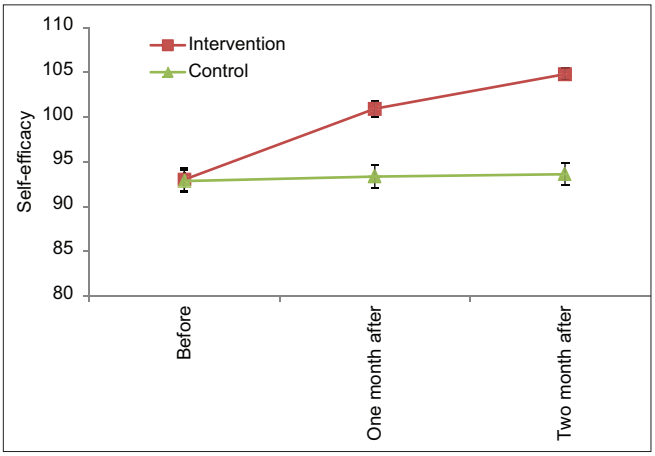

Figure 2: The mean scores of self-efficacy in both groups at the three measurement time points

Table 1: Between-group comparisons regarding participants' characteristics

Group Characteristics	Intervention *n* (%)	Control *n* (%)	Test results	df	*p*
Gender					
Male	19 (63.30)	16 (53.30)	0.62	1	0.432*
Female	11 (36.70)	14 (46.70)			
Employment status					
Employee	1 (3.33)	1 (3.33)	2.29	4	0.758**
Retired	4 (13.33)	1 (3.33)			
Laborer	5 (16.66)	4 (13.33)			
Self-employed	8 (26.68)	10 (33.33)			
Housewife	12 (40)	14 (46.68)			
History of cardiovascular risk factors					
Yes	16 (53.30)	22 (73.30)	2.58	1	0.108*
No	14 (46.70)	8 (26.70)			
Marital status					
Married	28 (93.30)	30 (100)	2.07	1	0.492*
Single	0 (0)	0 (0)			
Divorced	2 (6.70)	0 (0)			
Place of residence					
Urban areas	25 (83.30)	19 (63.30)	3.07	1	0.08*
Rural areas	5 (16.70)	11 (36.70)			
Educational level					
Primary	27 (90)	18 (60)	7.66	3	0.039**
Guidance school	2 (6.70)	5 (16.70)			
High school	1 (3.30)	6 (20)			
University	0 (0)	1 (3.30)			

*The results of Chi-square test. **The results of Fisher's exact test

Table 2: Within-group and between-group comparisons regarding the participants' mean scores of self-efficacy and self-esteem

Time group	Before mean (SD)	One month after mean (SD)	Two month after mean (SD)	Repeated measures ANOVA		*p***
				F	df	
Self-efficacy						
Intervention	20.80 (8.60)	35.90 (4.20)	37.20 (4.30)	119.26	2	< 0.001**
Control	18 (7)	19.60 (6.60)	20.80 (6.80)	74.21	2	< 0.001**
t-test						
t	1.35	11.35	11.13	——	——	——
df	58	58	58	——	——	——
*p**	0.181*	< 0.001*	< 0.001*	——	——	——
Self-esteem						
Intervention	93.03 (7.12)	100.9 (4.82)	104.80 (3.70)	101.19	2	< 0.001**
Control	92.8 (6.90)	93.33 (6.85)	93.30 (6.88)	2.56	2	0.086**
t-test						
t	0.09	4.94	7.79	——	——	——
df	58	58	58	——	——	——
*p**	0.927	< 0.001	< 0.001	——	——	——

*The results of *t*-test. **The results of repeated measures analysis of variance

Discussion

This randomized, controlled clinical trial was conducted with the aim to evaluate the effects of multimedia education on self-efficacy and self-esteem among patients with ACS. The mean score of self-efficacy significantly increased in both groups, though the increase in the intervention group was greater than the control group. Accordingly, the mean score of self-efficacy in the intervention group was significantly greater than the control group in both posttest measurements. The significant increase in the mean score of self-efficacy among participants in the control group

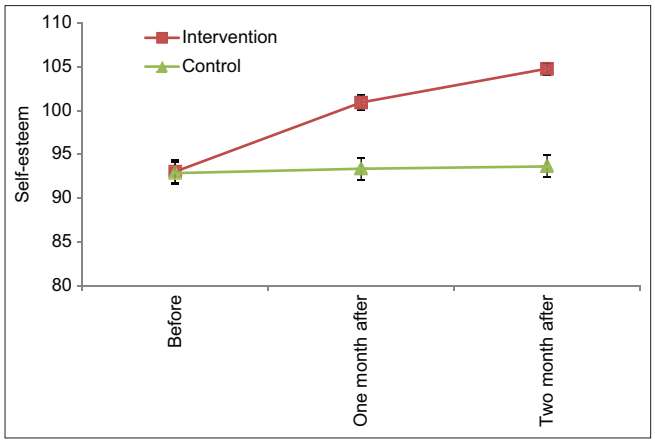

Figure 3: The mean scores of self-esteem in both groups at the three measurement time points

may be due to the growing acceptance of the disease and coping with it over time. In line with our findings, a former study reported that multimedia education during cardiac rehabilitation significantly improved cardiac patients' knowledge and self-efficacy.[43] Another study also reported the effectiveness of education in significantly improving self-efficacy for medication adherence, physical exercise, weight loss, smoking cessation, and healthy eating.[18] Knowledge and awareness are key factors in self-efficacy; therefore, educational interventions can be used to promote patients' self-efficacy in self-care and improve health-related outcomes.

Study findings also indicated a significant increase in the mean score of self-esteem in the intervention group and no significant change in this mean score in the control group. Moreover, the mean score of self-esteem in the intervention group was significantly greater than the control group in both posttests. Similarly, an earlier study reported that multimedia education for family empowerment significantly improved knowledge, self-esteem, self-efficacy, and quality of life (QOL) among the parents of children with asthma.[44] Mayer, a famous multimedia education theorist, noted that the philosophy of developing multimedia education is to use the whole cognitive capacity of learners for data processing.[45] This fact may be the justification for the significant between-group difference in the present study even 2 months after the intervention. The other justification is the fact that we provided participants in the intervention group with a reminder checklist to personally assess their cardiac self-care activities and cardiac health-promoting behaviors and also made regular telephone calls to remind them to watch the video CD and assess their behaviors using the checklist.

The significant effects of our multimedia education program on self-efficacy and self-esteem can denote its effectiveness in promoting behavior modification and improving patient outcomes. Several earlier studies have reported the positive effects of multimedia education on walking indices, heart rate, self-efficacy,[46] satisfaction, anxiety,[47] treatment adherence, and behavior modification[48] among cardiac patients and also preoperative anxiety among the candidates for coronary artery bypass graft surgery.[49] However, a study reported that multimedia education had no superiority over traditional methods (i.e., pamphlet and face-to-face lecture) in modifying patients' behaviors.[50]

The most important study limitation was the lack of a group to compare the effects of multimedia education with traditional educational methods. Another limitation of study was the duration of patient follow-up. Thus, future studies are recommended to compare the effects of traditional educational methods and electronic educational methods on self-esteem and self-efficacy using a longer follow-up period.

Conclusion

This study revealed the effectiveness of multimedia education in significantly improving self-esteem and self-efficacy among patients with ACS. Multimedia education is a simple and inexpensive method of patient education that requires little amount of time and energy. Therefore, it can be used to empower patients for behavior modification and improve their illness-related and health-related knowledge, self-esteem, self-efficacy for self-care and behavior modification, and QOL. Moreover, the simplicity and easy applicability of multimedia education may help reduce nurses' workload through helping them provide patient education in a shorter period of time.

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Conflicts of interest

Nothing to declare.

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