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## Comparison of the Effects of Media-based and Face-to-face Cardiac Rehabilitation Training Programs on Self-efficacy in Patients Undergoing Coronary Artery Bypass Grafting

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### Abstract

**Background:** Several complications may occur in patients after coronary artery bypass grafting (CABG) leading to decreased self-efficacy. Rehabilitation training is the best method for reducing the complications and increasing self-efficacy. Various educational techniques lead to different rehabilitation results and levels of self-efficacy. Improving these measures requires the selection of the most appropriate educational technique.

**Aim:** This study aimed to compare the effect of two media-based and face-to-face cardiac rehabilitation training methods on self-efficacy in patients undergoing CABG.

**Method:** This clinical trial was conducted among 60 patients, who were randomly assigned into two groups, in Imam Reza Hospital, Mashhad, Iran, 2017. Cardiac rehabilitation training program was implemented face-to-face or using a researcher-made multimedia upon admission, discharge, at the start of cardiac rehabilitation, and at the end of the 10<sup>th</sup> session for half-hour. A researcher-constructed questionnaire on self-efficacy was completed by the participants in the mentioned stages. Data analysis was performed in SPSS software, version 16.

**Results:** The mean ages of the participants in the face-to-face and multimedia groups were 56.0±8.1 and 57.5±7.3 years old, respectively. No significant difference was observed in the self-efficacy scores of the patients upon admission (P=0.36). However, there was a significant difference between the groups at the post-intervention stage (P<0.001).

**Implications for Practice:** Despite the lack of presence of an active teacher, media-based cardiac rehabilitation training improved the self-efficacy of patients undergoing CABG more than face-to-face method.

**Keywords:** Cardiac rehabilitation, Coronary artery bypass grafting, Education, Self-efficacy

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## Introduction

Globally, cardiovascular disease is the leading cause of death, accounting for 50% of all deaths in developed countries. In Iran, this disease is the first cause of mortality in all ages and both genders (1). One of the common therapies for these patients is coronary artery bypass grafting (CABG), which is used in 60% of cases in Iran (2). Cardiac surgery may lead to multiple life-threatening complications, such as angina and occlusion of vein grafts.

By three years following surgery, one fourth of patients experience angina again. In addition, vein graft occlusion was observed in 10-20% of patients during the first year and in 40% of them five to seven years postoperative (3). These statistics indicate the continuity of postoperative complications, which occur in 7,000,000 patients per year causing one million deaths (4). After cardiac surgeries, most patients have a false perception about their condition and think that they will remain ill their whole life; and they are afraid of performing daily activities (5).

The lack of patient awareness about postoperative conditions, self-care, and requirements at the time of discharge are important issues that must be recognized by nurses. In fact, cardiac rehabilitation and patient education are among the major nursing care plans after CABG (6). In this regard, one of the most effective ways is the participation of patients undergoing CABG in cardiac rehabilitation programs (5).

Cardiac rehabilitation is known as a secondary prevention method, acting as a treatment or intervention to accelerate the recovery from disease and its complications to reach maximum level of performance, independence, and quality of life (2, 7). There are various protocols involved in cardiac rehabilitation provided by different countries. In Iran, a protocol was developed in the framework of the Standard Cardiac Rehabilitation Program in 2014 in three phases.

The first phase starts upon admission, whereas the second phase is initiated after discharge. Moreover, the third phase, which is the maintenance phase, begins after 36 sessions of cardiac rehabilitation training (8). Regarding the evidence, cardiac rehabilitation programs decreased cardiovascular mortality rate by 25% over three years. Moreover, survival rate has increased up to three years and there were reduced numbers of recurrent cardiac events, lower levels of postoperative complications, and improved self-efficacy in patients (9).

The main objective of cardiac rehabilitation is to prevent recurrent cardiovascular events by encouraging patients to maintain lifestyle changes, improving their quality of life by the diagnosis and treatment of mental stress, returning to active life, and empowering patients (8). An important part of the correct implementation of cardiac rehabilitation program is influenced by various training methods and how the responsibility of patient to implement the program.

There are two types of risk factors, namely, controllable and uncontrollable factors. The uncontrollable ones include gender, age, and genetics, while specific cognitive-behavioral factors such as self-efficacy can promote healthy behaviors (10). Self-efficacy is defined as an individual perception, belief, ability, and self-confidence to carry out certain activities and tasks, which emerged as an important predictor of the intention of individuals in performing healthy behaviors (11).

Bandura's theory of self-efficacy is considered as an appropriate model for cardiac rehabilitation due to the provision of a systematic direction, which allows one to interpret, modify, and predict the patients' behaviors (12). Baljani et al. indicated the positive impacts of education on self-efficacy improvement in cardiovascular patients in 2009, Urmia, Iran (13). Furthermore, the results obtained by Borzoo et al. in 2017 demonstrated that cardiac rehabilitation increased patients' self-efficacy after cardiac surgery (14).

Nowadays, various training methods are used to improve self-efficacy. However, the available information on the most effective techniques is inadequate (15). As the key member of healthcare teams, nurses play a crucial role in purposive education of patients owing to their complete understanding of patient needs for self-efficacy improvement (16). In addition, nurses can select the most efficient education methods for each patient according to their needs (15).

Among the various training methods, the face-to-face approach is the gold standard for patient education (17). This technique is recognized as the most powerful and effective one in comprehensive learning. In schools, active learning opportunity in real conditions is provided while appropriate models based on the individual characteristics of students are presented. One of the most important features of this method is observing comprehensive behavior in a way that teachers and learners cannot hide from each other.

This method of training is a useful technique due to mutual interaction, provision of feedback, and attention to comprehensive requirements (18). Among the limitations of this method are spending more time and greater need for recruitment of skilled, forbearing, and experienced staff. Additionally, it is not possible to implement this method in crowded centers (19, 20). On the other hand, media-based training affects human life due to increasing the spread of communication and information technology that turns it into an effective and efficient communication tool in the area of health and medicine (21).

Today, the use of available technologies for training patients is a national priority. Moreover, multimedia is suitable for even less literate patients because of presenting a combination of videos, graphic designs, and sounds (15). Given that traditional teaching methods cannot fully respond to the rapid changes and growth of information and educational needs of patients, multimedia features are used to overcome traditional training constraints and provide more detailed information, compared to other educational methods (15, 21).

Furthermore, several advantages of media-based training are the ability to create information storage continuity, easy application, and cost-effectiveness (22). Despite the numerous benefits of this technique, some learners prefer personal contact and instant feedback (22). The clinical experiences of the researcher revealed the lack of awareness of patients toward the implementation of National Standard Cardiac Rehabilitation Program developed by the Ministry of Health. Moreover, there is a controversy regarding the effectiveness of various methods on self-efficacy of patients undergoing CABG. Therefore, the present study aimed to compare the effect of two training methods of media-based and face-to-face on self-efficacy of these patients.

## Methods

This clinical trial was conducted among 60 CABG candidates hospitalized in the Department of Open Heart Surgery, Imam Reza Hospital affiliated to Mashhad University of Medical Sciences, Mashhad, Iran, 2017. The subjects were selected based on the inclusion criteria and were randomly divided into two groups of face-to-face and multimedia using random number table (9×9) and lottery method of sampling.

In order to prevent the distribution of information between the groups at the time of admission, the patients were privately trained in their own room. At the Cardiac Rehabilitation Center, the patients trained by media-based method in the previous stages received cardiac rehabilitation on odd days, whereas the others were treated on even days. Sample size was estimated to be 29 individuals per group based on a pilot study conducted among 20 patients (10 subjects per group), 95% confidence interval, 80% test power, and the formula for comparing the means of the two communities.

For more certainty, the sample size for each group increased to 40 patients, 10 of whom were excluded from the research due to mortality, arrhythmias, pleural effusion, prohibition of rehabilitation based on physician's order, and unwillingness to attend the rehabilitation sessions. Ultimately, a total of 60 patients (30 subjects per group) were enrolled in the study (Figure 1).

The inclusion criteria entailed the age range of 18 to 64 years old, elective CABG, no history of heart surgery, no auditory or visual problems affecting learning, full consciousness and awareness of time and place, no previous participation in rehabilitation programs, familiarity with Persian language, having the possibility of using compact disks (CDs) at home, and being literate. However, the exclusion criteria included skipping more than two consecutive sessions in the second phase of rehabilitation, impaired consciousness until one day postoperative, extubation failure after one day postoperative, postoperative hemodynamic disorders, prohibition of rehabilitation by the physician's order, and dangerous arrhythmias, which required invasive treatment.

Data were collected using a research unit selection form, demographic characteristics form, and a researcher-constructed questionnaire on self-efficacy in cardiovascular management. The self-efficacy survey was developed by Steca et al. in 2015, Italy, to evaluate the self-efficacy beliefs of cardiac patients receiving cardiac rehabilitation and assess the management of cardiovascular risk factors, adherence to treatment, and recognition of disease symptoms.

This questionnaire has nine items scored based on a five-point Likert scale within the range of completely agree to completely disagree. The lowest trust level received score 1 (completely disagree), while the full trust was indicated by score 5 (completely agree). The scores ranged from 9 to 45; higher scores were indicative of more efficient self-efficacy in cardiovascular management.

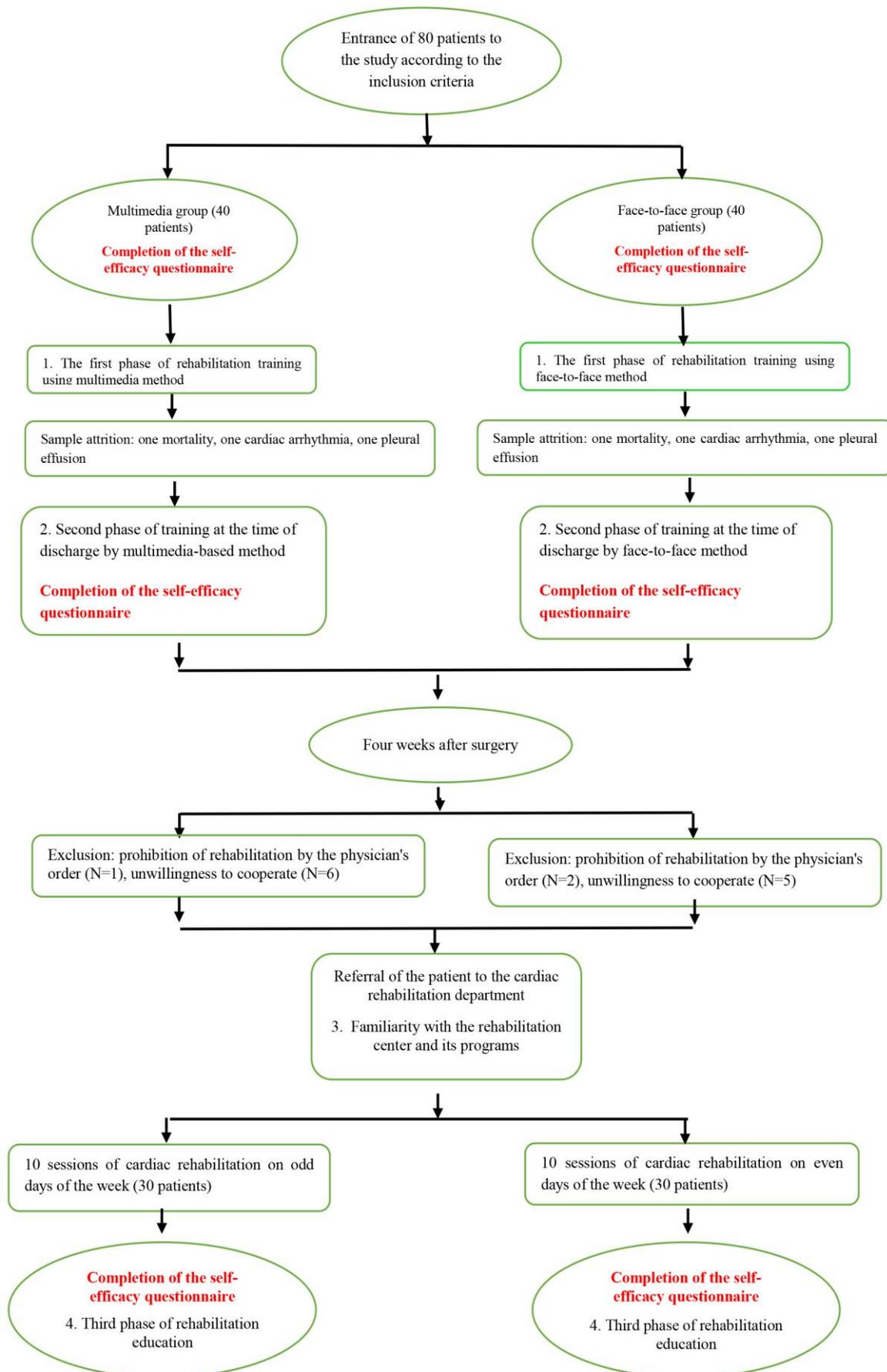


Figure 1. Study steps

Moreover, the first four items of the scale showed the level of self-efficacy in the management of cardiovascular risk factors (anxiety, physical activity, diet, and smoking cessation). On the other hand, the fifth and sixth items demonstrated the level of self-efficacy in adherence to treatment. The seventh and ninth items indicated the level of self-efficacy in recognition of disease symptoms.

The questionnaire applied in the present study was inferred from a psychometric study by Steca in 2015 under the title of cardiovascular management self-efficacy, which was used in Iran for the first time. In order to confirm the validity of the questionnaire, its English text was translated into Persian by a translator and was reversely translated into English by another translator. Afterwards, both translations along with the article were provided to 10 experts, opinions of whom were applied to confirm the validity of the questionnaire.

The reliability of the survey was confirmed by a re-test on 10 individuals with the interval of three days and a correlation coefficient of  $r=0.986$ . In fact, the reliability was estimated at the Cronbach's alpha of 0.874. Data collection was initiated after receiving the approval of the Ethics Committee of Mashhad University of Medical Sciences, Mashhad, Iran. In this study, the Standard Rehabilitation Program of the Ministry of Health was implemented in three phases of from the time of admission to discharge, from discharge to the end of the rehabilitation sessions in the cardiac rehabilitation center of the hospital, and maintenance phase until the end of life.

Educational contents were trained to the patients in both groups during four stages of admission, discharge, admission to the cardiac rehabilitation center, and the end of the 10<sup>th</sup> session of cardiac rehabilitation for a maximum of 30 min.

Upon admission, the self-efficacy questionnaire was completed by the patients and contents of the first phase of cardiac rehabilitation were individually and orally trained to the subjects in the face-to-face group in the patients' room. On the other hand, the contents were provided to the participants in the multimedia group using a researcher-made multimedia with a personal computer in the patients' room.

Hearing devices were applied to prevent the dissemination of information and to respect the other patients' rights. The educational contents of this stage included a brief explanation of the surgical procedure and the patient's condition after surgery, patient connections, diaphragmatic breathing, effective coughing techniques, use of incentive spirometers, relaxation technique, postoperative motor activities, and diet until the time of discharge.

On the day of discharge, all the subjects received the contents of the second phase of rehabilitation, which included proper home-based rehabilitation, exercise, dietary recommendations, medication management therapy, wound care, recognition and management of risk factors, driving, performing rituals, and emphasis on referral to cardiac rehabilitation center four weeks postoperative.

Thereafter, the self-efficacy questionnaire was completed for the second time. In addition, the CDs containing cardiac rehabilitation trainings were provided to the subjects in the multimedia group and the method of using it was taught to the patients and one of their family members. During three weeks of home-based cardiac rehabilitation, the patients received no education from the researcher, and only the application of multimedia and adherence to the trained contents were emphasized via phone calls with the subjects in the multimedia and face-to-face groups, respectively.

After the referral of the patients to be admitted to the rehabilitation ward, 10 sessions of rehabilitation were scheduled to be held on odd and even days for the participants in the multimedia and face-to-face groups, respectively. The next phase of rehabilitation training included making the subjects familiar with the rehabilitation center and its programs upon admission to the rehabilitation ward for 30 min.

However, the patients only received the routine cares of the ward (in-person and pamphlets) until the end of the 10<sup>th</sup> session. The self-efficacy questionnaire was completed for the third time at the end of the 10<sup>th</sup> session after the provision of contents of the maintenance phase to the patients in both groups, containing taking care of the heart during the rest of life.

In the present study, self-efficacy was not evaluated in the third phase of rehabilitation training due to the lack of time. It is notable that the research objectives and safety of research stages were explained to the participants, and a written informed consent was obtained prior to the study. Moreover, subjects were ensured of the confidentiality terms regarding their personal information, and they were allowed

to withdraw from the research at any time.

Data analysis was performed in SPSS version 16 using descriptive statistics to separately compare and summarize the information of the subjects in each group, Kolmogorov-Smirnov, and Shapiro-Wilk tests to determine the normal distribution of the quantitative variables. Furthermore, the two groups were assessed in terms of age and other variables including smoking and the history of underlying diseases applying Mann-Whitney U test and Chi-squared, respectively.

Moreover, the homogeneity of the groups regarding the educational and occupational status, type of underlying diseases, and other variables including self-efficacy and its dimensions (i.e., cardiac management, cardiovascular risk factors, adherence to treatment, and recognition of disease symptoms) were evaluated using Fisher's exact test and independent samples t-test, respectively.

It is worth mentioning that independent samples t-test and one-way analysis of variance (ANOVA) were used to achieve research goals. The two-way ANOVA was applied to assess the relationship between intermediating and underlying variables and self-efficacy in cardiac management. In all the measurements, P-value less than 0.05 was considered statistically significant.

## Results

This study was conducted on 60 CABG candidates, 14 of whom (23.3%) were female. According to the results of Kolmogorov-Smirnov and Shapiro-Wilk tests, the population was assumed to be normally distributed considering the age. Nevertheless, other variables had skewed distribution. In addition, the mean ages of the patients in the face-to-face and multimedia groups were  $56.0 \pm 1.8$  and  $57.5 \pm 3.7$  years old, respectively.

According to the results of Mann-Whitney U test, both groups were homogenous and no significant difference was observed between them ( $P=0.44$ ). Regarding the results of Chi-squared test, the study groups were homogenous regarding the variables of gender, educational and occupational status, and the type of underlying disease ( $P=1.00$ ,  $P=0.36$ ,  $P=0.20$ , and  $P=0.46$ , respectively). The underlying diseases included respiratory disorders, diabetes, renal disease, musculoskeletal disorders, and hypertension.

Moreover, the patients were homogeneous regarding smoking status and the diagnosis of underlying diseases ( $P=0.60$  and  $P=0.15$ , respectively; Table 1). The results obtained by applying

**Table 1. Comparison of demographic characteristics of patients in research groups**

Variables		Face-to-face	Multimedia	Test result
Age (year)		$8.1 \pm 0.56$	$7.3 \pm 5.57$	*** $P=0.44$
Mean $\pm$ standard deviation				
		Frequency (%)	Frequency (%)	
Gender	Male	23 (76.7)	23 (76.7)	** $P=1.00$
	Female	7 (23.3)	7 (23.3)	
Occupational status	Employed	19 (63.3)	14 (46.7)	*** $P=0.49$
	Retired	3 (10.0)	7 (23.3)	
	Housewife	6 (20.0)	6 (20.0)	
	Dependent	2 (6.7)	3 (10.0)	
Smoking status	Yes	14 (46.7)	12 (40.0)	** $P=0.60$
	No	16 (53.3)	18 (60.0)	
Educational status	Primary education	19 (63.0)	12 (40.0)	*** $P=0.20$
	Junior high school degree	4 (13.3)	11 (36.6)	
	Diploma	5 (16.7)	5 (16.7)	
	Higher education	2 (6.7)	2 (6.7)	
Underlying diseases	Yes	24 (80.0)	19 (63.3)	** $P=0.15$
	No	6 (20.0)	11 (36.7)	
Type of underlying diseases	Respiratory disorder	3 (12.5)	0 (0.0)	*** $P=0.36$
	Diabetes	6 (25.0)	8 (42.1)	
	Renal disorder	1 (4.2)	2 (10.5)	
	Musculoskeletal disease	0 (0.0)	1 (3.5)	
	Hypertension	3 (12.5)	2 (10.5)	
	Diabetes and hypertension	11 (45.8)	6 (31.6)	

\*Independent t-test; \*\*Chi-squared; \*\*\*Fisher's exact test; \*\*\*\*Mann-Whitney U

Kolmogorov-Smirnov and Shapiro-Wilk tests indicated the normal distribution of self-efficacy in cardiac management of both groups upon admission (pre-intervention). The independent samples t-test results demonstrated no significant difference between the multimedia and face-to-face groups in terms of the mean score of self-efficacy in cardiac management of patients upon admission ( $P=0.36$ ).

Nonetheless, the mean score of self-efficacy in the multimedia group was significantly higher than that of face-to-face group ( $42.1\pm 7.7$  and  $37.2\pm 6.8$ , respectively;  $P=0.0007$ ; Table 2).

Moreover, repeated measures ANOVA was used for intragroup comparison. The sphericity of self-efficacy scores upon admission, at discharge, and at the end of the rehabilitation program was significant using the Mauchly's test ( $P=0.04$ ). Therefore, the sphericity hypothesis was rejected and the estimation of freedom degrees by Greenhouse-Geisser procedure was reported. According to the results, a significant difference was observed between the groups considering the mean scores of self-efficacy in different stages ( $P<0.001$ ).

Meanwhile, different stages and the method of training had significant impact on the mean score of self-efficacy ( $P<0.001$ ; Table 2). In this study, the mean of changes in the self-efficacy of the subjects was evaluated at the end of the rehabilitation program and compared to the time of admission based on the demographic characteristics. Given the results of two-way ANOVA, the variables of age, gender, and occupational, smoking, and educational status, as well as the presence of underlying diseases caused no significant change in the self-efficacy score at the post-intervention phase compared to pre-intervention ( $P=0.80$ ,  $P=0.08$ ,  $P=0.65$ ,  $P=0.21$ ,  $P=0.08$ , and  $P=0.50$ , respectively).

Furthermore, the results of the independent t-test were indicative of a significantly higher score of dimensions of self-efficacy in cardiac management (management of cardiovascular risk factors, adherence to treatment, and recognition of disease symptoms) in the multimedia group at the end of the rehabilitation program compared to the face-to-face group ( $P<0.001$ ; Table 3).

**Table 2. Mean and standard deviation of self-efficacy score in cardiac management of coronary artery bypass grafting candidates in pre- and post-intervention stages**

Stages	Face-to-face Mean±standard deviation	Multimedia mean±standard deviation	Test result
Time of admission	23.6±4.8	24.7±4.3	* $P=0.36$
Time of discharge	31.9±3.7	36.4±3.9	* $P<0.001$
End of rehabilitation	37.6±2.8	42.7±1.7	* $P=0.007$
	General effect	** $P<0.001$	
	Group effect	** $P<0.001$	
	Time effect	** $P<0.001$	
	Reaction	** $P<0.001$	

\*Independent t-test; \*\*Repeated measures analysis of variance

**Table 3. Mean and standard deviation of mean score of dimensions of self-efficacy in cardiac management of patients undergoing coronary artery bypass grafting in pre- and post-intervention stages**

Dimensions of self-efficacy	Time stages	Face-to-face	Multimedia	Independent t-test results
		Mean±standard deviation	Mean±standard deviation	
Cardiovascular risk factors	Time of admission	11.1±2.3	12.3±2.7	$P=0.06$
	Time of discharge	14.0±2.0	16.0±2.0	$P<0.001$
	End of the 10 <sup>th</sup> rehabilitation session	15.8±1.4	18.5±1.1	$P<0.001$
Adherence to treatment	Time of admission	5.0±1.7	4.9±1.9	$P=0.83$
	Time of discharge	7.0±1.5	8.2±1.8	$P=0.007$
	End of the 10 <sup>th</sup> rehabilitation session	8.6±1.1	9.7±0.6	$P<0.001$
Recognition of symptoms	Time of admission	7.5±2.2	7.4±1.9	$P=0.85$
	Time of discharge	10.9±1.9	12.2±1.5	$P=0.006$
	End of the 10 <sup>th</sup> session	13.2±1.3	14.4±0.8	$P<0.001$

## Discussion

The present study was conducted to compare the effect of cardiac rehabilitation training by two methods of multimedia-based and face-to-face on self-efficacy of CABG candidates. The results indicated an increase in the mean score of self-efficacy in cardiac management of all the patients at the time of discharge and end of the rehabilitation program compared to before the surgery.

However, this increase was more in the multimedia group in comparison to the face-to-face group. According to the literature, various educational methods and tools have been used to evaluate their impacts on self-efficacy. In a study conducted by Wong li in 2016, multimedia-based training increased the score of self-efficacy in patients undergoing cardiac surgeries.

In the mentioned study, the Self-efficacy for Walking Scale designed by the rehabilitation team was applied (23). It is notable that the results of the Wong li's study were in line with the results of the present study in terms of the application of multimedia in education and its impact on self-efficacy. In another study carried out by Varej in 2014, peer education increased the level of self-efficacy in CABG candidates.

In the mentioned study, self-efficacy was assessed using the Cardiac Self-Efficacy Scale developed by Salivan in 1998 (24). This study and the current study were similar in terms of study population. In addition, our findings were in line with their research regarding the impact of education on improved self-efficacy of CABG candidates. It is obvious that the implementation of any type of educational program was effective in a way.

However, the content, comprehensiveness, situation, being executable, and having a simple application are effective characteristics of training methods that can lead to different results. Baljani in 2011 revealed that face-to-face education using slides, images, and handouts in 90-minute sessions in the presence of patients' family affected their level of self-efficacy for up to one month.

In the mentioned study, Diabetes Self-Efficacy Scale was utilized, and the results demonstrated the effectiveness of education on change in the self-efficacy and its maintenance for up to one month (13). The results of the mentioned study were in congruence with ours. Nevertheless, the use of specialized questionnaires for these patients can show a more accurate level of self-efficacy.

Therefore, the cardiac management self-efficacy questionnaire was applied in the present study. In a study performed by Kaveh in 2012, training method using a workshop with a scenario design along with a booklet and weekly phone calls for 8 weeks was the main cause of increased self-efficacy in patients with hypertension. In the mentioned study, the questionnaire of self-efficacy in cardiac patients was applied, and the results were consistent with our findings (25).

However, repeating educations by phone calls for 8 weeks affected the results of self-efficacy after education through workshops. The results obtained by Borzou indicated the effectiveness of the first phase of rehabilitation education through explaining the theories and performing exercises and reviewing booklets in the improvement of self-efficacy in patients undergoing cardiac surgery (20).

Self-efficacy of the participants in the mentioned study was assessed in three stages of pre-intervention, at the time of discharge, and one month after the discharge based on the myocardial infarction self-efficacy questionnaire (14). While their results are in line with our findings, our results were more reliable due to using the cardiac rehabilitation questionnaire. Moreover, one of the strengths of the present study was the second phase rehabilitation training based on the assessment of self-efficacy one month after discharge.

On the other hand, Naderipour et al. in 2015 reported no significant difference between the scores of self-efficacy of CABG candidates in pre- and post-intervention stages and three months after the intervention. This educational program was held in the form of one two-and-a-half-hour session per week for 6 weeks. It is worth mentioning that the patients were trained by two individuals, namely, an expert (nurse, psychologist, or nutritionist) and one patient with a history of proper management.

In addition, self-efficacy of the participants was evaluated by Sherer's General Self-efficacy Scale (26). In this regard, our findings were inconsistent with the results of the mentioned study. Given the fact that the results were indicative of medium or good self-efficacy in all patients, the results of the present study might be due to lower level of self-efficacy in the participants and different educational methods (26).

At the post-intervention phase, the mean score of self-efficacy was significantly higher in the multimedia group compared to the face-to-face group in all dimensions. Self-efficacy in the management of cardiovascular risk factors encompasses four areas of anxiety, smoking cessation,

diet, and physical activity management. Consistent with the results of current study, the studies conducted by Rabiei in 2017 and Jalala in 2010 are among the studies carried out into anxiety management, in which the application of multimedia-based training in patients before cesarean section and patients undergoing other surgeries led to a significant reduction in anxiety (27, 28).

On the other hand, inconsistent with our findings, Saki et al. in 2014 marked no significant impact of the two face-to-face and electronic education methods on reduction of anxiety in patients with heart attacks (29). This inconsistency might be due to the better effect of multimedia before performing invasive operations. In a study conducted by Hasanzadeh in 2011 on the effectiveness of self-efficacy of patients undergoing hemodialysis in the management of cardiovascular risk factors, specifically the dietary regimen, education by multimedia and self-to-face methods increased the attitude related to the dietary adherence and consistent drinking in both groups. However, this difference was not significant (22). In other words, a multimedia-based training program designed based on the requirements and problems of patients can be as effective as the face-to-face technique despite the lack of presence of an active instructor.

Brandrine in 2008 reported that considering the effect of self-efficacy on the management of cardiovascular risk factors, especially smoking cessation, the participants in the multimedia group, who received educational pamphlets had clinically and statistically higher levels of smoking cessations compared to the control group (30). The effect of self-efficacy on adherence to treatment is another area of cardiac management self-efficacy, which expresses the trust of patients in adhering to the pharmaceutical regimen and proper medication dose and requires the retention of information. In a study conducted by Cornio in 2011, the level of information retention in patients undergoing arthroscopic surgery was significantly higher in the multimedia group compared to the group trained using pamphlets (31). This result showed the effect of multimedia on retention of information. This educational method can be repeatedly applied and has positive impacts on information retention.

Another area of self-efficacy in cardiac management is self-efficacy in recognition of disease symptoms, which can be improved by level of knowledge and learning ability. In a study performed by Temdrup et al. in 2013, the actions required when having a chest pain were taught to old patients using multimedia, which increased the level of knowledge in all the participants (32). Their results were in congruence with our findings in terms of the effectiveness of multimedia.

Compared to other methods, the higher efficiency of the multimedia method might be related to the use of visual and auditory functions and repetitiveness of this type of education, which had positive impacts even on the elderly, who were experiencing learning deterioration. Regarding the mental and physical condition of patients undergoing CABG and the possibility of the loss of information over time, the use of multimedia is appropriate due to availability, the possibility of education continuity, and a free choice in training time of the patients.

Problems such as the lack of sufficient time of nurses for face-to-face training and the possibility of incomplete training and discontinuation of education due to specific situations of the patients and nurses, the gender difference between the patients and the nurses and its effect on the exchange of information can largely be solved with the use of multimedia.

In addition, several benefits of multimedia include the use of visual and auditory functions, possibility of rewinding to repeat the trainings, adjusting the volume of sound for individuals with impaired hearing, possibility of being used in crowded environments and inside the public ward by using special devices, and application of relaxation programs after education.

Some of the major drawbacks of the research included performing the study in one hospital, holding only 10 sessions of cardiac rehabilitation due to limited time and location, and receiving information from sources and media within the community.

### **Implications for Practice**

Regarding the level of change in the self-efficacy score of participants in the multimedia group compared to the face-to-face group, while both groups had improved self-efficacy, this improvement was more meaningful in the multimedia group. Therefore, it seems that in case of having the proper equipment, using multimedia in cardiac rehabilitation education can improve self-efficacy in cardiac management of patients undergoing CABG.

Considering the fact that improving the quality of healthcare and health status of patients is one of the objectives of the evidence-based nursing care programs, the results of present study can be provided

for education managers in the healthcare centers to apply the education processes for patients and improve the quality of clinical nursing care. Further studies are recommended to evaluate the impact of multimedia education on self-efficacy in cardiac patients at a broader range by holding 36 sessions of cardiac rehabilitation.

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### Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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