Original Article

Reduction of the rate of hospitalization in patients with acute coronary syndrome: An action research

Abstract

Background: Readmission of patients with Acute Coronary Syndrome (ACS) causes many problems for them and their family. This study aimed to improve the quality of care provided to patients with ACS and discover solutions to reduce the rate of readmission among them. **Materials and Method:** This participatory action research study was done based on Streubert and Carpenter approach. This study included 45 participants (31 patients and 14 stakeholders) and carried out in a hospital affiliated to Isfahan University of Medical Sciences, Iran, from 2013 to 2014. Solutions with high and moderate feasibility, flexibility, and suitability were implemented in each cycle until reaching <15% readmission rate. Data were analyzed using SPSS (V.16) and running descriptive and inferential statistics. **Results:** In this study, several actions were performed in each cycle such as assigning a free and 24-h telephone line was patients to contact nurses and face-to-face patient's education. Second cycle actions included active participation of all nurses in the education of patients and involvement of families in patient care. By carrying out the first action cycle, the readmission rate reached 35%, which was not favorable. By completing the second action cycle, the readmission rate reached 12%, which was desirable and significantly lower than the first cycle. **Conclusion:** Discovering possible solutions with the participation of stakeholders in therapeutic settings that have feasibility, flexibility, and suitability can lead to improved care quality and reduced readmission rate in patients with ACS, especially if the families of the patients also participate in action cycles.

Keywords: *Acute coronary syndrome, health services research, Iran, patient readmission*

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Introduction

Despite the progress made in the prevention, treatment, and rehabilitation of patients with coronary artery disease, it accounts for a high percentage of deaths worldwide.[1,2] The mortality rate due to coronary artery disease has been reported as 46% over a period of 4 years in Iran compared with other diseases,[3] presenting the main cause of mortality in Iran.[4] Nowadays, in Isfahan, as one of the most populous provinces in Iran, we witness an increase in the mortality rate, a decrease in the age of the onset of cardiovascular diseases, and an increase in people's unhealthy lifestyles. The cost of inpatient and outpatient treatment of cardiovascular diseases in Shahid Rajaee Heart Hospital in Tehran is about $5 billion a month.[5] In such a situation, it is important to take measures to reduce the financial burden of coronary artery disease and its incidence.

One of the most dangerous cardiovascular diseases is Acute Coronary Syndrome (ACS). In addition to threatening the patient's health, ACS can be associated with recurrence. Most ACS patients are scared to experience the recurrence of symptoms,[6] which can reduce their quality of life, lead to leaving their occupation, and impose economic costs on them and society. Therefore, consideration of appropriate and cost-effective solutions is important to return these individuals to their active and constructive life.[7] On average, readmission rates due to the heart attacks account for 17.1% of the total number of admissions. The cost of readmission varies from $7600 to $23400 depending on its cause. This represents 64% of the cost of initial hospitalization due to the heart attacks with an average of $20,800.[8] Cowper mentions that the rate of rehospitalization for ACS is 48% (half within 2 months and 57% with a cardiovascular diagnosis) with

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an average hospital cost of $18,931.[9] Therefore, the cost of readmission of patients with ACS is high and imposes financial burden on the health-care system, patients, and families. After being discharged from the hospital, patients with ACS are at a high risk of mortality and other adverse effects, such as heart failure, myocardial infarction, stroke, and bleeding.[10] Therefore, designing appropriate interventions to reduce treatment costs and the mortality of sufferers is very important.

Lenjan's hospital, affiliated to Isfahan University of Medical Sciences, is located in ZarrinShahr city, which is 35 km away from Isfahan. As a result of industrialization, air pollution, and the presence of industrial poles in this province, the rate of rehospitalization of patients with ACS was 32.2% based on the statistics of the first 6 months of 2014. On the contrary, this hospital faces with shortage of cardiac rehabilitation department and rehabilitation facilities. Therefore, patients do not have enough access to health-care services because of long distance from the capital of the province. The researcher's experiences show that patients and their families do not have sufficient information and knowledge about their illnesses and what they should perform after discharge. In addition, due to their misconception of cardiac problems, they are unable to return to normal work and life. Considering the researcher's experience with working in the cardiac care unit and existing deficiencies, lack of patients' knowledge, and the readmission rate of 32.2%, this action research study was conducted with the participation of stakeholders to reduce the readmission rate of patients with ACS. According to Baky *et al*.'s and Vaswani *et al*., studies, the rate of readmissions among ACS patients was 7.5%[11] and 6.6%,[10] respectively, revealing a high rate of hospitalization in this population.[11] A few studies have been conducted in Iran to minimize the rate of readmission, and none of them have focused on patients with ACS. Thus, this study aimed to improve the care of patients with ACS using an action research approach.

Materials and Methods

This qualitative study was performed from August 2013 to March 2014 utilizing the participatory action research approach. The initial idea of this research was formed from the direct encounter of one of the authors with the anxiety and confusion of patients who experienced readmission. Several formal and informal meetings were held with the attendance of nurses and head nurses of the Cardiac Care Unit (CCU) and all of them wanted to improve this problem, and they expressed their readiness for cooperation in this study. This study was based on the approach suggested by Streubert and Carpenter and contained five steps, namely, defining the problem, planning, data treatment and analysis, action, and evaluation.[12] We chose this approach because Streubert and Carpenter explain the steps in a clear, simple, and understandable way for readers.[13] In addition, this approach was recognized as an appropriate and understandable approach for stakeholders of this study.

In the first step, the problem was defined as the high rate of readmission of patients in the CCU. Among 602 patients diagnosed with ACS for the first time in the first 6 months of 2014, 194 patients (32.20%) experienced readmission, which indicated a high rate of readmission compared to other countries reporting a figure of less than 10%.[10,11] In the present study, the research team aimed to reduce the rate of readmission of patients with ACS to less than 15% and decided to continue the cycle of action until the readmission rate reached to this percentage. In the second step, planning was developed to solve the problem. At this step, all possible solutions were devised and completed through performing semistructured interviews with nurses, two cardiologists in the hospital, and one cardiology instructor of the Faculty of Nursing and Midwifery. During the interviews, two open-ended questions of "What can be done to reduce hospitalization?" and "How can we implement these interventions?" were asked. In order to extract solutions, a brainstorming meeting was conducted with six cardiac nurses and seven patients and their families. At this step, library resources and scientific texts were also used. After finding the solutions, the duplicates were eliminated, and finally 58 solutions were finalized. In the third step, 58 solutions were analyzed and ranked according to three criteria of suitability, feasibility, and flexibility (SFF). Scoring was conducted with the participation of the head nurse and CCU nurses. Each SFF item was rated 1 to 3, 3 as the highest score and 1 as the lowest score. The item scores were summed up and each solution had a maximum score of 9 and a minimum score of 3. For example, solution number 1 due to having the feasibility of implementation in the research environment was scored 3. However, its score for the other two criteria was 2, so its final score was 7. Thus, all 58 solutions were scored and those that received the highest score, based on SFF (score 8-9), were used for the next step (11 solutions were finalized in the first action cycle). In the fourth step, a group of 31 patients with ACS entered the action cycles. Next, the solutions with the highest score were performed. Eventually, in the fifth step, the evaluation was conducted. Evaluations were conducted periodically during the ward meetings, patient visits, and follow-up phone calls. Several focus group sessions were held with the participants to receive their feedback on the outcomes of the intervention. Besides, two summative quantitative evaluations were performed by the researchers to assess the impact of the interventions on readmission rates. The evaluation took place simultaneously at the start of action research. One month after the start of action research and based on the evaluation results, necessary revisions were made. Because the action research goal was not achieved in the first cycle, the second cycle was held with the implementation of the

first cycle measures and solutions with scores 6-7 based on SFF. The final evaluation was carried out 6 months after the start of the study.

Participants included 31 patients with ACS, ten cardiac nurses, a cardiologist, one nursing faculty member, a head nurse, and an educational supervisor. Inclusion criteria for these patients were being hospitalized for the first time due to cardiac causes, being diagnosed with ACS, having no cognitive problems, and having alertness, and having no need for surgical intervention in the first admission. Exclusion criteria for patients were their unwillingness to continue in the study. Patients who had been admitted from 1 March 2013 to 19 April 2014 and met the inclusion criteria were recruited in this study. The first author who worked at the hospital was responsible for monitoring readmissions. The study setting was the CCU of Shohadaye Lenjan hospital. This hospital is located in Zarrinshahr city and is a medical center in the southwest of Isfahan province. The hospital has no cardiac rehabilitation department and all patients receive routine training at the time of discharge. The CCU has 8 beds and 11 nurses and patients are visited daily by a cardiologist. Each nurse is responsible for taking care of three to four patients in each shift. Patients do not receive post-hospital follow-up visit after discharge and they are referred to a cardiologist to have regular checkups. In this study, several actions were performed in each cycle. Actions performed in the first cycle were as follows: Establishing a discharge monitoring team (consisting of a senior nurse, a cardiologist, and a faculty member specialized in ACS) and allocating a mobile number from 4:00 P. M to 8:00 P. M to track patients and to get advice from a nurse. Face-to-face education was performed for each patient at the time of discharge by the monitoring team. This education comprised of information about self-care at home, including physical activity limitation, diet, sexual activities, pain management, stress management, and time of return to work. Patients were asked to refer to the hospital at the first week after discharge (check-up 1). In this phase, a physical examination was done and patient's symptoms were evaluated, and patient's biography was obtained by the senior stuff nurse. Patients requiring a visit were visited by a senior nurse or referred to a cardiologist. In the absence of a problem in the first checkup, the patient was followed-up via phone call by the nurse in the second week after discharge (check-up 2). In the event of difficulty in phase 2, the patient was asked to refer to the hospital in the same week to have Electrocardiography (ECG) assessment and cardiac monitoring after walking a distance of 100 m for 5 minutes. The patient was also monitored in terms of hemodynamic impairment, arrhythmia, pain, and shortness of breath in the post CCU. In the event of arrhythmia, shortness of breath, or any other symptom, a referral was made to the team physician. If there was no problem in the second checkup, then the patient was followed up via the phone at the third week after discharge by the nurse (third checkup). Patients were asked to refer to the hospital at the fourth week after discharge (checkup 4). In this checkup, a physical examination was done and patient's symptoms were evaluated, and patient's health assessment was done by the senior nurse. In addition, the required diagnostic tests and modification of drug recommendations was done in this phase and readmission was suggested based on the cardiologist's view.

One month later, the evaluation showed that we had not reached the goal of the study, which was the readmission rate of less than 15%. Therefore, the second cycle was initiated. In the second cycle, in addition to the first cycle actions, a free and 24-h telephone line was assigned for patients to contact nurses. In addition to the patient monitoring team, all nurses participated actively in the education of patients during admission and hospitalization. The patient was educated several times before being discharged. Education was done face-to-face and individually, and all taught topics were written and given to the patient. Nurses were encouraged by the supervisor for more cooperation. A cardiac rehabilitation workshop was held for 2 days and a total of 8 h for all cardiac nurses, and a certificate of in-service training was issued for them with the assistance of the supervisor and head nurse. Referral of the patient to the hospital education unit was made (a unit to educate all patients and plan group education classes) to participate in group education programs when it was necessary. Families were involved in the care of the patient. Nurses provided a pamphlet to the family about abandoning cigarette, medication consumption, weight loss, diabetes control, and other related risk factors. Patient referral to the hospital was made in the second month after discharge (phase 5) and a physical examination was done for each patient by the follow-up nurse. When necessary, patient referral to the doctor was made for necessary diagnostic tests and modification of the medication recommendations. Patient were followed-up via phone call 3 (assessment 6), 4 (assessment 7), 5 (assessment 8), and 6 (assessment 9) months after being discharged in order to check their pain and other symptoms, compliance with diet and drug regimen, and activity level. In the event of a problem in any of the checkup, the patient and her/his family were referred to the hospital. At each visit to the hospital, re-education of the patient and families about the patient's diet, lack of tension, recognition of cardiac pain, and times of referral to the doctor were done by the senior nurse. Patient and family examination at each visit was done by the nurse of the team and referral to the counselor was made in case of the need for emotional support or family problems. Referral of the patient to the hospital support institution was made by the nurse and the team physician in the event of a financial problem and follow-up actions were done by the health worker of the

hospital. Referral of patients to a dietitian was made if necessary. Patients were advised to do exercise daily and the extent of activity was specified for each of them by a cardiologist.

To collect data on patients' referral and readmission, a demographic questionnaire and a checklist were used. The demographic questionnaire included information on age, gender, diagnosis, length of hospital stay, history of hospitalization, and related risk factors (lack of exercise, hyperlipidemia, hypertension, diabetes, overweight, and smoking). The checklist contained three diagnostic sections (unstable angina, ST-segment elevation myocardial infarction, and myocardial infarction without ST elevation), readmission (within 0-1 month, between 1-6 months), and the cause of readmission (palpitation, shortness of breath, chest pain, weakness, and other symptoms). The checklist was compiled based on readmission medical files, the most common reasons for readmission, and psychometric principles. We designed the demographic questionnaire and checklist based on Readmissions Data Collection Fact Sheet and studies by Harris *et al*., and Khalife-Zadeh *et al*.,[2,14] Face validity and qualitative content of the questionnaire and checklist were verified by four faculty members, five cardiac nurses, and two cardiologists. The reliability of the checklist was estimated to be 0.92 based on Cronbach's alpha coefficient. Data were analyzed using SPSS version 16 (SPSS Inc., Chicago, IL). p value <0.05 was considered significant. In addition, qualitative evaluation was performed by interviewing and collecting the experiences of staff and patients during the study using open-ended questions such as "Please talk about the results of the actions you have taken in the last months" and "How do you feel about this?" Data were analyzed using a content analysis approach developed by Grenheim and Lundman. Semistructured in-depth interview was the main method used for data gathering. Interviews were conducted with five nurses (one nurse with less than 5 years of experience, two nurses between 5 to 10 years of experience, and two nurses with more than 10 years of experience) and three patients. Interviews were conducted during the nurses 'shifts or the nurses' breaks and in the nursing pavilion. In this phase, three categories were extracted, namely lack of support, empowerment of nurses, and patients interaction [Table 1].

Despite the fact that the nurses said that the quality of their care had improved in the first cycle of action research, we did not reach our goal. Therefore, it was attempted to find the next solutions altogether and started the second phase by reflecting on the learned lessons in the first cycle. Despite the high level of nurses' cooperation, it was decided to involve patient and her/his family more during treatment course. Group reflection lasted 1 month in the present study. In this phase, the results, solutions, and challenges obtained in the first cycle were discussed during two group reflection sessions. Constant monitoring was performed over data collection and recording. Groups and their tasks were also controlled and feedbacks were elicited. Then, data were analyzed and categorized [Table 2]. Selecting valid and reliable instruments and performing analysis at a minimum confidence level of 95% and test power of 90% assured the results of the study. In this study, five criteria introduced by Herr and Anderson *et al*. were used to validate the study findings. These criteria include process validity, democratic validity, outcome validity, conversational validity, and catalytic validity.[15,16] Attempts were made to identify the problems through constant reflection sessions and high involvement of the participants using two rounds of action plane, triangulation. Participants were actively involved in all steps of the study. Strategies for improving the trustworthiness of the study included prolonged involvement of participants, continuous sharing of results in meetings, periodic control of the results by the core research team, and presentation of the results at conferences for peer review by an expert group (three nurses with MSc degree and CCU experience and a faculty member). Although qualitative research finding cannot be transferable, the researcher tried to create thick descriptions.

Ethical considerations

The written informed consent was signed by the patients. The principles of confidentiality and anonymity were considered with care.

Results

In this study, 52% of patients were male and 48% were female. The mean age of patients was mean 53.4 (11.6). In terms of marital status, 92% of them were married and 8% were divorced or widowed. Regarding education, 40% were illiterate, 16% had elementary education, 32% had a high school education, and 12% had a university education. In terms of cardiovascular risk factors, 80% did not have adequate physical activity, 36% had hyperlipidemia, 40% had hypertension, 32% had diabetes, 20% were overweight, and 36% were cigarette smokers. In addition, it was found that 8% of the patients did not know about their hypertension, hyperlipidemia, and diabetes, and they were informed of these risk factors after being hospitalized. Before the research, 34% of them had the history of admission due to the noncardiac causes (e.g., surgery, diabetes and influenza) [Table 3].

The researchers tried to include all the family members, so the characteristics of the patients' family were not a priority. The first cycle of action research lasted for a month, and the readmission rate was reported as 35.40% (11 patients out of 31 patients) in this period. Given an optimal readmission rate below 15%, this rate was not desirable. Therefore, the second cycle was planned and implemented. Given that the readmission rate may be higher within 30 days of discharge,[17] the patients were

Table 1: Main themes and categories of improving care challenges

Some participant's statement	Codes	Subthemes	Themes
"*…I was hospitalized for ten days and did not allow my children to meet me just from behind the window. I felt lonely.*" (participant 3)	To be alone- Disease tolerance- Lack of understanding	Feeling of loneliness on the path to disease and healing	Lack of support
"*I was bewilderment about what would happen, I did not know what to do …*"(P1)	Bewilderment- Chaotic life	Feeling confused	
"*The doctor did not tell me anything during the visit. I also asked him, he just said you will be fine, relax. How can I be relaxed when you do not say anything to me?*"(P 4)	Not getting enough information from the doctor- Not getting enough information from the family	Insufficient information	
"*The doctor is much more powerful than us (nurses), so we practically cannot work like a real team. Because the vertical hierarchy is too much.*"(P6)	Low power of the nurse compared to the doctor- Fear of reprimand- Officials bullying	Fear of the doctor and systemic problems	Empowerment of nurses
"*Even in university, we (nurses) are not well trained. In 4 years of study, we are told that we only have to follow the doctor's orders…*"(P9)	Low self-esteem- Improper training of nurses in the university	Lack of nurses' self-confidence	
"*During these 10 years of work, I went to in-service training every year, but none of them added any knowledge to me. They do not have good content and teachers…*"(P 8)	Lack of updated information- Routine work	Insufficient knowledge	
"*On these two occasions when I was admitted to the CCU, I saw how good and skilled the nurses were.*"(P1)	The doctor knows better than the nurse- Patient trust in nurse skills	Trust to the knowledge and skills of nurses	Patients interaction
"*The fact that I was complete bed rest and could not even go to the bathroom, bothered me a lot*".(p2)	Complete bed rest-Pain- Unknown environment	Adaptability with new conditions	
"I had previously been admitted to the internal ward. But neither the nurses nor the doctors cared so much. In the CCU, both the nurses and the doctors really cared about me and I was satisfied."(p5)	Adequate attention from nurses- Adequate attention from doctor-Continuous monitoring-	The patient's sense of self-worth	

Table 2: Researcher's reflection during the research

I entered the ward, While changing the shift. The evening shift nurse explained that one of the relatives, who had a heart attack previously, felt a palpitation. They called a doctor and visited him at home. It was not a heart problem. After hearing this, I was thinking about how to conduct a home visit. So, I decided to have more meetings with the hospital manager and the cardiologists in this regard.

followed up in the next 6 months in the second action research cycle. During the second cycle, the readmission rate was reported as 12%. It was desirable, and the paired t-test results revealed a significant difference compared to the first cycle. The main reasons for readmission in both cycles are given in Table 4.

Discussion

The results of this study showed the positive effect of the action research program on the rate of readmission. In the first cycle, which lasted for 1 month, the readmission rate was about 35%, which was not favorable. In the second cycle, solutions with scores 6 and 7 were implemented and the result was desirable. In a systematic review by Naylor *et al*. (2011), successful solutions to reduce hospitalization were provided by nurse leaders.[18] In the present study, a senior nurse working in the same workplace was responsible of implementing the solutions because she understood the environment and could attract other nurses, hospital officials, and doctors collaborations. The first cycle measures were patient-centered, whereas in the second cycle, the family of patients and nurses was more active focused. Therefore, when the partnerships and empathy of other members of the health-care team and family were provided, the program was more successful. Families need to be supported to be able to play their supportive role properly and correctly. Hwang also states that the patient's family may need to be protected to reduce the negative effects of care on their health as they may need trust and financial support.[19] Therefore, the nurses' role is also highlighted to support the patients' families. As a result, the best actions are those that attract family participation, besides nurses' and medical staff participation.

One of the reasons that the patient-centered action achieved a higher score was the belief in the patient's role in care compared with the nurses' role. Although the role of the patient and his/her ability are very important, the support of the patient by family and medical staff gains higher importance in the acute condition. Another factor leading to the success of the second cycle was the enhancement of nurses' knowledge. Nurses in this study had a high ability to care for patients with cardiovascular diseases, but their knowledge was not up to date. Therefore, a 2-day cardiac rehabilitation workshop was held in the second cycle to their knowledge and attitudes toward the need for rehabilitation. At the end of the workshop, nurses evaluated the desirability and necessity of the workshop using the Likert scale (low: 0-25%, moderate: 25-50%, good:

Table 3: Demographic characteristics of the patients

Variable	*n* (%)
Patients	
Age	
20-39 years	5 (16)
40-59 years	22 (71)
>60 years	4 (13)
Gender	
Male	16 (52)
Female	15 (48)
Education level	
Illiterate	10 (32)
Under diploma	18 (58)
Higher than diploma	3 (10)
Risk factors	
Low physical activity	20 (80)
Hyperlipidemia	9 (36)
Hypertension	10 (40)
Diabetes	8 (32)
Overweight	5 (20)
Smoking	7 (28)
Health-care team	
Age	
20-40 years	10 (71)
40-60 years	4 (29)
>60 years	0
Gender	
Male	5 (36)
Female	9 (64)
Occupation	
Nurse	10 (72)
Physician	1 (7)
Supervisor	1 (7)
Head nurse	1 (7)
Faculty member	1 (7)

Table 4: Cause of hospitalization in the first and second cycles

Cause of hospitalization	Cycle 1 (*n*=31) *n* (%)	Cycle 2 (*n*=25) *n* (%)
Palpitation	1 (3.22)	4 (16)
Shortness of breath	1 (3.22)	2 (8)
Chest pain	2 (6.45)	1 (4)
Weakness and fatigue	3 (9.67)	7 ((28)
Other symptoms (pain in jaw and tongue, and numbness of left hand)	24 (77.41)	11 (44)
p, paired *t*-test	31 (100)	25 (100)
$p<0.001$		
t: 2.136		

75-50%, high: 100-75%). About 93% of nurses agreed with the desirability of the workshop (75-100%) and 95% of them believed that the need for the workshop was 75-100%. In a study by Khorasani *et al*., the majority of participants found that in-service training was useful and appropriate for improving their clinical performance.[20] Chaghari *et al*., stated that in-service training of nurses played an important role in improving their quality of care.[21]

We also found that the greater participation of nurses in the second cycle and their greater interaction with patients and their families caused the enhancement of their empathy with the patient and their families, awareness of stressful conditions, and the need for more empathy and intimate relationship. Kahriman states that empathy can play an important role in providing comprehensive nursing care. Besides, nurses can provide closer caregiving relationships, care, communication, and interactions to help them adapt to their physical and emotional problems.[22]

In this study, the provision of nurse-led training to patients and families at the time of a care visit made the patient feel worthwhile to the family. In the Wong's study, the interaction of patients' family and the treatment team was important in providing care, especially in critically ill patients.[23] In addition, patients were satisfied to be followed up after being supported by health-care staff and the family. Studies by Tan and Lima also showed that post-discharge education could have beneficial effects on the patient's functional status and satisfaction.[24,25] Falvo suggested that health-care staff could provide support to the family by taking into account the patient family needs and circumstances during patient education.[26] In addition to provision of a supportive source for the patient, the family was more relaxed and their empowerment was promoted by being involved in the treatment process. However, it should be acknowledged that empowerment will lead to critical thinking, informed decision making, and independence.[27]

Actions taken in this action research were not only addressed the education of the patient and his/her companions, but also the participation of nurses and family, patient's physical activity, and exercise, a cardiologist visit, medical recommendations, referral to the nutritionist, and follow-up consultations via the phone were considered. Improvements in physical and mental status can contribute to reduction of the hospitalization rate. Research findings showed that participation in cardiac rehabilitation programs could reduce the incidence of readmission in patients with ACS.[28,29] Although the methodology of the above studies was different from that used in the current research and most of them were experimental and clinical trials, their findings were consistent with ours. On the contrary, family participation in patient education as well as rehabilitation can reduce patient's anxiety.[30] Reducing the level of patient's anxiety as a result of his/her family involvement can lead to better outcomes because the patient feels that he/she is

supported by the family. Reducing the readmission rate can also reduce the costs of hospital services, and the number of hospital visits, consequently increasing the quality of nursing care and the satisfaction of the hospitalized patients.

One of the limitations of this study was that no specific criteria were existed for the readmission of the cardiac patients and the doctor hospitalized the patient due to reasons, such as fear of legal issues and hospital mortality committees and escape from responsibility, quenching the fear and anxiety of families about recurrence of cardiac problems, and history of hospitalization in the CCU in previous days .Therefore, the readmission rates were not in the control of the researcher.

Conclusion

On the basis of the results of this study, the readmission rate was about 35% in the first cycle lasting for 1 month, which was not favorable. In the second cycle, solutions with scores 6 and 7 were implemented and the readmission rate reduced to 12%, which was favorable. The solutions mentioned in this study can be used to reduce the rate of readmission and improve the quality of care in hospitals. Additionally, hospitals far from the provincial capitals and with low facilities can use the participatory action research methodology mentioned in this research to solve the most important problems that they are encountered. Given that the management of chronic diseases is important in Iran and throughout the world, it is recommended that participatory action research be conducted to improve quality of care and reduce readmission rate in patients with chronic diseases. Discovering possible solutions with the participation of stakeholders in therapeutic settings that has feasibility, flexibility, and suitability can lead to improved care quality and reduced readmission rate in patients with ACS, especially if the families of the patients also participate in action cycles. Readmission of patients can be prevented through conducting action research studies and the contribution of the healthcare and family members.

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It is suggested mention the university that the approved project was taken from that.

Conflicts of interest

Nothing to declare.

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