Effect of Health Education Program on Knowledge and Self-Care Ability of the Patients Regarding Coronary Artery Bypass Surgery at Khartoum State 2015-2019

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Abstract

A study to explore the effect of health education on recovery following patients after CABG Surgery. Background: Coronary Artery Disease (CAD) is one of the major public health problems in developing countries. CAD in Sudan is showing an increasing trend. Coronary artery bypass graft surgery improves the quality of life of CAD patients and helps them to return to normal life, and the early Recovery period presents a number of challenges for patients, corers, and Nurse. Objectives to explore the effects of an educational program on patient knowledge and self-care ability of the patients following coronary artery bypass surgery Method: This was A Quasi, interventional and hospital-based study, including pre-, post, and follows up tests with a control group, conducted for the period: September 2014 to June 2019. Patients were recruited consecutively to the cases and control using convenience sampling. It consists of 76 patients, 41 as cases and 35 in control. Who had undergone CABG surgery in Khartoum State. A Questionnaire and checklist were used to monitor the effect of an educational program. Result: The results showed marked improvement in knowledge and performance between pre and post-test for the study group, p = (0.001) in the health status of cases in comparison to the control group. The indices were observed to be higher for patients who received a nursing educational program throughout the study period P= (0.002) .Conclusion: Our study revealed marked improvement in the health status of the cases by comparison to the control group.

Keywords: CABG, Care's ability, Education programme, Knowledge, Patient.

Introduction

Cardiovascular disease (CVD) is the leading cause of death in all over the world. According to the American Heart Association (AHA) statistics, the cardiovascular disease is ranked number one killer of people in the United States [1]. The situation is equally serious in Europe, where CVDs cause over four million deaths. According to the World Health Organization (WHO), 30% of all deaths (15.3 million deaths) as well as coronary artery disease (CAD) [2] in 2020. According to global and regional projections of mortality and burden of disease, CAD will remain the leading cause of death for the next 20 years [3]. No recent data on CAD in Sudan were available, but it is quite obvious that there is a significant rise in the incidence of CAD [4]. The statistics of Ahmed Qassim heart Centre showed a rise in the number of coronary arteries bypass grafts (CABG) from 15 in 1998 to 120 in 2017. This significant change can be attributed

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to increased prevalence rates of hypertension, diabetes, smoking, and low physical activity. Coronary Artery Bypass Graft (CABG) is a common surgical treatment for cardiovascular disease. [5] Coronary artery bypass graft surgery is a lifesaving intervention, but the early recovery period presents a number of challenges for patients, careers, and nurses [6]. Early and adequate discharge planning based on in-depth knowledge of the post-discharge experience will help to ensure optimal recovery [7] The education and counseling needs of cardiac surgery patients and family members vary over time and with the type of surgery, length of hospitalization, degree of social support, personal understanding of the surgery, and presence of Co-morbidities and personal preference [8]. An individual's to be oriented, and ability to take care of themselves and physically active post-operatively need pre-operative health education [9]. Health education for post-CABG is an essential component of nursing care aimed at assisting patients in caring for themselves at home following discharge from the hospital [10]. Education provides patients with the information required to understand their condition, surgery, and recovery; to prevent and manage post-surgical symptoms; and to decrease/reduce hospital readmission, morbidity, and mortality rates [11]. The burden of the coronary artery disease.

Due to their high prevalence, CVDs impose a high social and financial burden on individuals, families, and healthcare systems around the world. This health burden is accompanied by a deleterious economic impact. However, despite the significant and growing health and economic burden in low and middle-income countries, CVD and related chronic diseases are not included by most stakeholders in their investments and commitments to improving the health of the world's people [12]. Future increases in CVDs are expected soon in developing countries. According to the Global burden of Disease Study, a 55% rise would occur in CVD attributable loss, between 1990 and 2020, in developing countries [13].

Materials and Methods

The materials and methods begin by presenting the research design, followed by the setting and duration of the study, sample, sample size, data collection technique and tools, phases of the study, validity, and reliability of instruments, and ethical consideration.

Study Design

This is a prospective experimental study with pre-post and follows up tests and a control group.

Study Period

The study was conducted during the period from September 2015 to June 2019.

Study Setting

Study setting Included three hospitals, Alshab Teaching Hospital, Sudan Cardiac Center, and Ahmed Qassim Teaching Hospital. Those hospitals were chosen because they are the main national governmental cardiac hospitals located in Khartoum State, Sudan. They are also privileged with good human equipment facilities.

Study Population

All adult patients presenting to the previously mentioned cardiac hospitals for CABG surgery during the period between 2015 to 2019 were enrolled in our study.

Sample Size and Sampling

Sample Size

The study sample represented a total coverage of coronary bypass graft patients fulfilling the inclusion criteria, which were 138 patients. From the Sudan Cardiac Centre, the participants were 45 patients at the Ahmed Qasim hospital the participants were 56 patients at the Alshapp Teaching Hospital the participants were 37 patients.

Sampling

By convenience i.e., All patients satisfying the above inclusion criteria were enrolled. Since the total number of CABG patients in the three centers per year is small, convenience sampling was considered to be suitable for this study. Moreover, convinces sampling eliminates selection bias.

Data Collection Tools and Technique

Instruments` validity and reliability: The study instruments were two components (a questionnaire and a checklist). Both instruments were developed by the investigator after in-depth consultation of the literature and the construction of a draft. Validation of the instruments was accomplished via review of that draft with the supervisor, then a subsequent appraisal with two relevant experts, and finally, by subjecting those instruments to a pilot test on a test sample of 10 participants from Ahmed Qassim Hospital. Those participants were not included in the study later. The response rate of that pre-study test was 95%, and the average time for the questionnaire filling was found to be 15-20 minutes.

Test participants` comments regarding clarity, repetition, and embracement question were taken into account, and necessary modifications to the final shape and content of the study instruments. Internal consistency was assessed with the Alfa Cronbach`s test producing a confident of 95%.

Phases of the Study

Pre-intervention phase: A Baseline survey was conducted.

Intervention phase: Started from (May to July-15/5 /2017), the education was given through lectures, small group work, demonstration and Booklets, Brochures, Posters, Bedside teaching, Videos, Lectures regarding knowledge and self-care ability of post CABG patients.

Post Intervention Monitoring: The researcher started a post-test after a memory gap of three months. The same tools we are using to compare between pre and post intervention program which were conducted to evaluate the effect of the program on knowledge and self -care ability for post CABG patient.

Ethical Considerations

An official letter was taken from the National University of ELRibat to the hospital authorities. Approval from the Khartoum State Ministry of Health was also obtained. Approval from administrative authorities of Cardiothorathic center.

Result and Discussion

Although the fact that a total of 138 patients from three hospitals were eligible for the study, only 71 participants completed the study to the end.

The data in this study were arranged and analyzed under the following sections.

Participants Socio-demographic Data

As shown in Table 1, Socio-demographic variables age, gender, occupation, and other clinical characteristics in both group's study groups (cases) and control were comparable. There is a statically significant difference between the two-group p-value = 0.15, 0.22, 0.25. The males were majority than the female in study group 36 (87.8) and control 27 (77.1) group p-value = 0.22. A similar percentage risk factors of CAD for both study groups more in male than similar female result found in the literature review [14]. According to their education level, there is the statically significant difference. Our study showed that the majority for both study group 31 (75.6%) and control 25 (71.4%) groups were educated, and this is one important factor that made the participant more cooperative during the study period. P-value =0.016.

Table 1. Social, Demographic Characteristics of the Case 41 and Control 35 Group (Patients) from the Three Cardiac Centers (Alshab Teaching Hospital, Ahmed Qassim Teaching Hospital, Sudan Cardiac Center) during the period of September to December 2017

Characteristic	Case Control		P value
	n (%)	n (%)	
Age			
< 45 years	1 (2.4)	0 (0.0)	0.15
45-60 years	20 (48.8)	20 (57.1)	
> 60 years	20 (48.8)	15 (42.9)	
Total	41 (100.0)	35 (100.0)	
Gender			
Male	36 (87.8)	27 (77.1)	0.22
Female	5 (12.2)	8 (22.9)	
Total	41 (100.0)	35 (100.0)	
Education			
Not educated	7 (17.1)	8 (22.9)	0.016
Pre university	31 (75.6)	25 (71.4)	
University	3 (7.3)	2 (5.7)	
Total	41 (100.0)	35 (100.0)	
Occupation			
Free business	10 (24.4)	15 (42.9)	0.25
Employee	14 (34.1)	8 (22.9)	
Retiree	17 (41.5)	12 (34.3)	
Total	41 (100.0)	35 (100.0)	
3-7 days	31 (75.6)	20 (57.1)	
> 7 days	3 (7.3)	6 (17.1)	
Total	41 (100.0)	35 (100.0)	
Body mass index (BMI)			
Underweight (< 18.5)	3 (7.3)	2 (5.7)	0.52
Normal (18.5-24.9)	15 (36.6)	13 (37.1)	
Overweight (25-29.9)	19 (46.3)	15 (42.9)	
Obese (>=30)	4 (9.8)	5 (14.3)	
Total	41 (100.0)	35 (100.0)	

Clinical Characteristics of Patients with CABG Surgery

As shown in Table 2, The majority of patients in both study group case and control show no statically significant difference among Clinical characteristics (myocardial infarction, diabetes mellitus and hypertension0 *p* value= 71, admission to ICU p value=0.46, admission to hospital p value= 0.28, number of grafts p value= 0.31, and body max index p =0.52).

Table 2. Clinical Characteristics of the Case 41 and Control 35 Group (Patients) from the Three Cardiac Centers (Alshab Teaching Hospital, Ahmed Qassim Teaching Hospital, Sudan Cardiac Center) during the period of September to December 2017

Medical history	Case	Control	P value
Diabetes mellitus	13 (31.7)	8 (22.9)	0.71
Hypertension	12 (29.3)	12 (34.3)	
Myocardial infarction	16 (39.0)	15 (42.9)	
Total	41 (100.0)	35 (100.0)	
Duration of admission in intensive care unit			
3 days	12 (29.3)	13 (37.1)	0.46
3-7 days	27 (65.9)	17 (48.6)	
> 7 days	2 (4.9)	5 (14.3)	
Total	41 (100.0)	35 (100.0)	
Number of grafts			
One	13 (31.7)	8 (22.9)	0.31
Two	13 (31.7)	10 (28.6)	
Three	9 (22.0)	12 (34.3)	
> 3 grafts	6 (14.6)	5 (14.3))	
Total	41 (100.0)	35 (100.0)	
Duration after admission to hospital			
3 days	7 (17.1)	9 (25.7)	0.28
3-7 days	31 (75.6)	20 (57.1)	
> 7 days	3 (7.3)	6 (17.1)	
Total	41 (100.0)	35 (100.0)	

Knowledge of the Participants

The data in Table 3 shows that the participants in both groups were having low knowledge scores. The mean value of the participants' knowledge score was 9. 5±7. 01 before implementation of intervention programs for cases, compared to 9. 63±7. 00 among control group, p-value = 0.14 > 0.05 (CI 95%). The lack of significant difference in knowledge indicates comparability at the pre-intervention stage of the case and control group.

Table 3. Comparison of the Mean Scores of the Knowledge of the Participants (Case (n=41) and Control (n=35). Group) with CABG Surgery before Educational Program

	Group						
	Case		Control		Case	Control	P value
Total knowledge	N	%	N	%	Mean±SD	Mean±SD	
Poor	10	24.4	9	25.7			
Medium	11	26.8	7	20.0			
Good	15	36.6	12	34.3	9.5±7.01	9.63±7.00	0.14
Very good	5	12.2	7	20.0			
Total	41	100.0	35	100.0			

Acceptable knowledge of patients scored and mean regarding coronary artery disease, surgical operation, and related issue was found to be significantly different concerning all items of the questionnaire (pre and post-test for the study group (n=41)) Table 4.

Table 4. Comparison of the Mean Scores of the Knowledge of the Participants (Case Group) with CABG Surgery before and after the Educational Program (n=41)

Knowledge Items	Pre	Post (n=41)	SE	CI 95%		T	df	P
	Mean ±SD	Mean±SD		Lower	Upper			
Basic information	1.61±1.53	3.29±1.25	0.31	-2.30	-1.07	-5.45	80	0.005
Medications	1.17±1.16	2.51±0.90	0.23	-1.80	-0.89	-5.86	80	0.004
Lifestyle	2.71±1.60	4.02±1.52	0.35	-3.00	-1.63	-6.71	80	0.002
Postoperative information	1.05±1.14	2.63±0.70	0.21	-2.00	-1.17	-7.60	80	0.001
Preoperative information	4.12±3.24	7.66±2.95	0.69	-4.90	-2.17	-5.16	80	0.005

The data in Table 5 shows that the cases that participated in the interventional educational program showed a significant increase in their knowledge when comparing the pre-test and post-test. The mean value of knowledge score was 9. 5±7. 01 before the intervention compared to 20.12 ± 5.63 after the intervention, *p*-value = 0.001 indicates an increase of total knowledge of the patients after implementation of the educational program. A similar previous conducted study revealed that knowledge score has increased in the experimental group compared to the control group, and there is a statistically significant difference in the mean knowledge of the experimental and control groups (*p* =0.006) [15].

Table 5. Comparison of the Overall Knowledge Scores, Grades of the of the Participants (Case Group) with CABG Surgery before and after the Educational Program

Total knowledge	Group						
	Pre		Post		Pre	Post	P-value
	N	%	N	%	Mean±SD	Mean±SD	
Poor	10	24.4	0	0.0	9.5±7.01	20.12±5.63	0.001
Medium	11	26.8	2	4.9			
Good	15	36.6	13	31.7			
Very good	5	12.2	26	63.4			
Total	41	100.0	41	100.0			

Acceptable knowledge of patients scored and mean regarding coronary artery disease, surgical operation, and the related issues was found to be significantly better concerning all items of the questionnaire (posttest for study and control groups) Table 6.

Table 6. Mean Score of the Knowledge Post-Operative Test for Study Group and Control Groups with CABG Surgery

Items	Case Group (n=41)	Control Group (n=35)	SE	CI 95%		T	df	P
	Mean±SD	Mean±SD		Lower	Upper			
Basic Information	3.29±1.25	1.77±1.61	0.3	0.9	2.2	4.6	74	0.001
Medications	2.51±0.90	1.26±1.22	0.2	0.8	1.7	5.2	74	0.002

Lifestyle	4.02±1.52	1.51±1.70	0.4	1.8	3.2	6.8	74	0.006
Postoperative Issues	2.63±0.70	1.06±1.19	0.2	1.1	2.0	7.2	74	0.001
Preoperative Issue	7.66±2.95	4.03±3.38	0.7	2.2	5.1	5.0	74	0.003

The overall knowledge grade of the patients was poor, medium, good, and very good by 0%, 4.9%, 31.7%, and 63.4% of them respectively at post-intervention measurement, while among the control group, these grades were scored by 25.7%, 20%, 34.3% and 20.0% of the patients in the control group respectively. The mean value of total knowledge was 20. 12±5. 63 after implementation of intervention compared to 11. 14±8. 16 among none intervention control group. T value was 5.0, P-value = 0.002 < 0.05 (CI 95%) indicates significant Postoperative self-efficacy and functional capacity measurement After implementation of the program. Post-operative self-efficacy and functional capacity of the intervention group were measured using the checklist, stressing on the items that indicate the improvement such as walking, stair clamping, bathing, return to work, etc. in addition to the items that measure the functional capacity of the patients such as pain, appetite, angina, shortness of breathing, etc.

The data in Table 7 Comparing the participants` mean score of knowledge about coronary arteries disease and operation management, it was 20. 12±5. 63, for the study group, and 11. 14±8. 16 for the control group. Those who participated in the interventional educational program showed a significant increase in their knowledge P value = 0.002. Similar findings have been reported in Iraq, which examined pre-operative patient education and reported statistically significant differences in knowledge and self-care behavior, performance among patients who received individualized teaching and those who received standardized education [16]. Another A Similar conducted study shows that the Patients who participated in the intervention educational program demonstrated a significant increase in their knowledge when the pretest, the posttest 1 and posttest 2 scores were compared. By comparing the knowledge test scores of the study and control group at 3 months after the operation, the data showed a highly significant difference ($p \leq 0. 05$) [17].

Table 7. Distribution of the Patients, According to Differences in their Total Knowledge Scored and Mean Regarding Coronary Artery Disease, Surgical Operation and Related Issue (Posttest for Study and Control Groups)

Total knowledge	Group				Cases	Control	P-value
	Cases		Control		Mean±SD	Mean±SD	
	N	%	N	%			
Poor	0	0.0	9	25.7	20.12±5.63	11.14±8.16	0.002
Medium	2	4.9	7	20.0			
Good	13	31.7	12	34.3			
Very good	26	63.4	7	20.0			
Total	41	100.0	35	100.0			

With reference to Figure 1, it is clear that there was a clear improvement in the functional capacity measures gradually from the first month postoperatively with minimum improvement, then a slight improvement in some of the patients and by the end of the third-month, improvement was observed in most of the patients in self-efficacy. The same was observed regarding functional capacity measurement.

The effectiveness of the educational program was clearly observed through the result of Figure 1, the overall total post-operative self-efficacy and functional capacity of the patients (case) was poor, medium, good, and very good by 19.5%, 22%, 51.2%, and 7.3 by comparing the score of the control group 25.7%, 40%, 31.4%, and 2.9%. P value = 0.021 < 0.05 (CI 95%) indicates an increase of total post-operative self-efficacy and functional capacity of the patients after implementation of the intervention. The result revealed that marked improvement in the health status of the study group compared to the control group. A Similar finding has been reported by another study stated that participants, who were receiving the supportive educative telephone program, demonstrated a significantly greater level of knowledge than that of the control group. A study revealed that the study and control group had higher total knowledge scores after surgery the patient's recovery was determined by percentages of indices of self-efficiency and knowledge level [16, 18]. The indices were found to be higher for patients who received a nursing education program throughout the period of study [19].
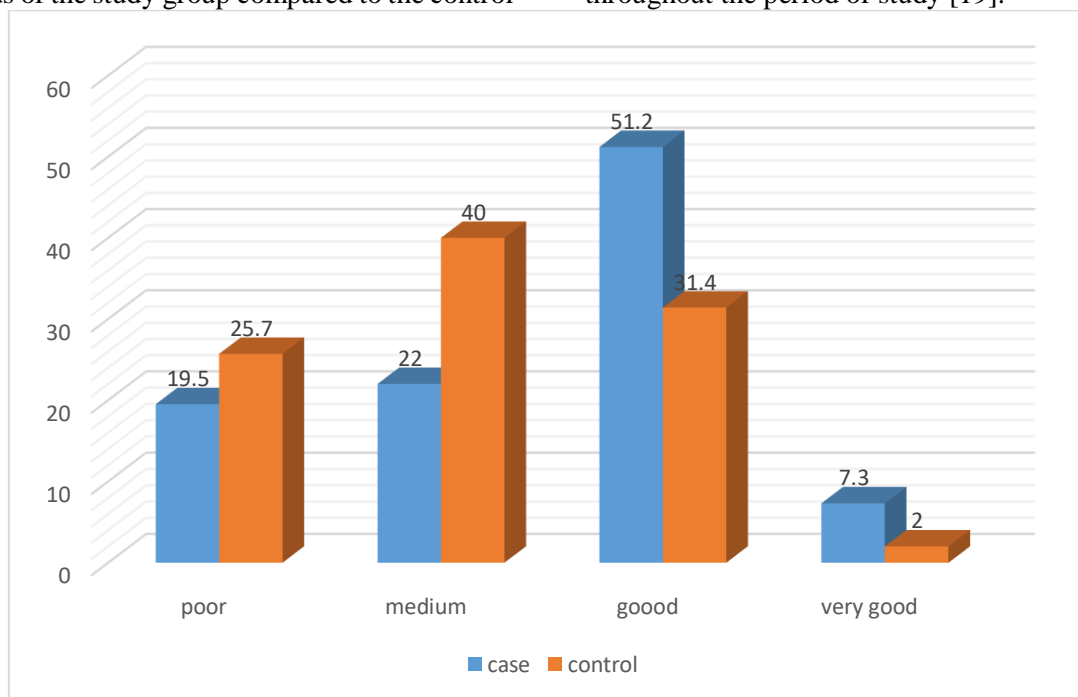
P value = 0.021 < 0.05 significant difference

Figure 1. Distribution of the Patients, According to Differences in their Total Post-operative Self-efficacy and Functional Regarding Coronary Artery Disease (Case and Control Group)

A Similar result was reported by other studies, which examined the effects of the elements of educational characteristics on knowledge, behavior, and symptom frequency also reported statistical significant differences between patients who received educational interventions through combined media, on a one-to-one basis as opposed to the use of one medium in a group setting [20].
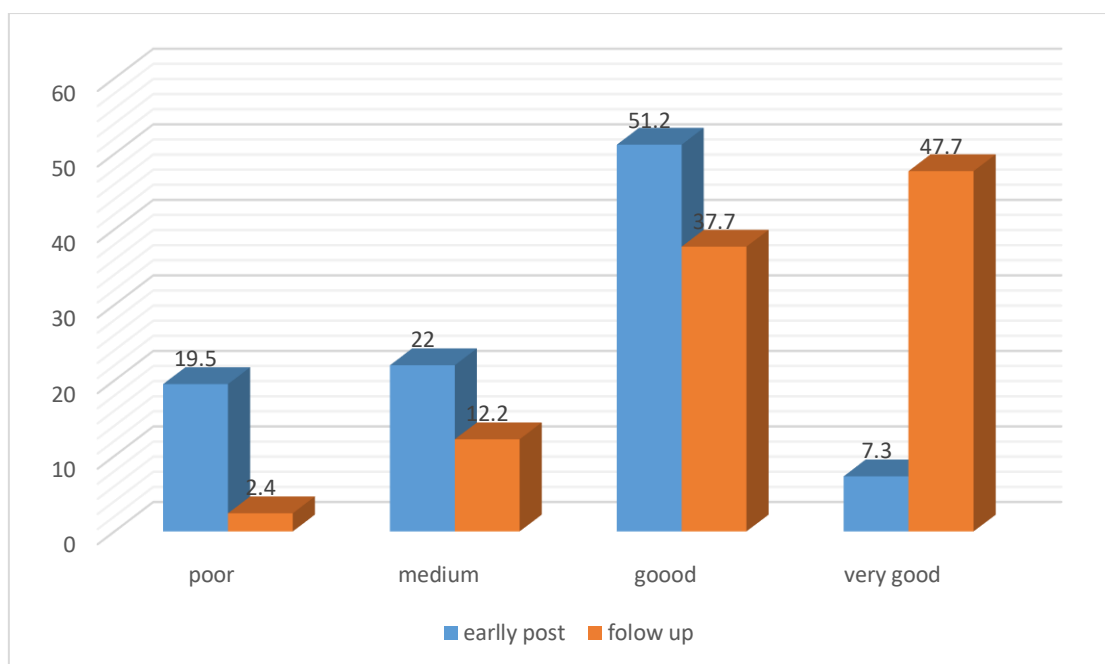
Figure 2. The CABG Surgery Patients` Differences in the Score Grades of their Self-efficacy and Functional Regarding in the Early Post-operative Test Compared to the Late (Follow up) Postoperative Test, P value = 0.001

Program through the improvement in the self-efficacy measurement during the study period. After implementation of the program, postoperative self-efficacy and functional capacity of the study and control group were measured using the checklist, stressing on the items that indicate the improvement such as walking, stair clamping, bathing, return to work, etc.; in addition to the items that measure the functional capacity of the patients such as pain, appetite, angina, shortness of breathing, etc. With reference to There is a statistically significant difference in self-efficacy between case and control group P-value = 0.002, and there is no significant Functional Capacity P value = 0.487. The same was observed regarding functional capacity measurement Tables 8.

Table 8. Distribution of the Patients, According to Differences in their Late Post-operative Self-efficacy and Functional Capacity Measurement (Post Intervention Group and Control Group)

Items	Post (n=41)	Control (n=35)	SE	CI 95%		T	df	P
	Mean±SD	Mean±SD		Lower	Upper			
Self-efficacy	4.73±2.36	2.91±2.44	0.55	0.72	2.92	3.30	74	0.002
Functional capacity	4.46±2.73	4.00±3.05	0.66	-0.86	1.78	0.70	74	0.487

Conclusion and Recommendations

Conclusion

1. The structured teaching program was planned and implemented, and its effectiveness was evaluated by pre and two serial post-program tests. The study results stated that the use of a structured teaching program managed to increase the knowledge and self-care ability of post CABG patients. These findings had already been reflected in our present study.

2. The assessed baseline level of knowledge and self-care ability of CABG patients

regarding coronary bypass graft surgery was not enough.

3. A training program was designed and executed to improve the low knowledge and self-care ability levels of the participants (intervention group).

4. The training program contained theoretical and practical components and was carried out over a three-month period.

5. An early evaluating post-training program test revealed a significant improvement of knowledge among the cases and mild improvement in the control group. While self-care ability revealed mild improvement in both the intervention group and the control group.

6. A late (three months) post-program assessment to assess the self-care ability for both groups there was significant different improvement observed between intervention and control group.

The nurses play a vital role in the treatment of the patients in all community settings as they are close to the patients and their families during all processes of the disease. This study proved that our health education program organized by the nurses for the patients after cardiac surgery improves patient's knowledge concerning their illness and awareness of behavioral changes to prevent a new event or readmission to the hospital.

Recommendations

1. CABAG patients should routinely be assessed regarding their health status.

2. An appropriate pre-operative educational program for those patients should be planned and implemented in all cardiac centers.

3. Reinforcement of that education program during the follow-up period suiting the patients` needs may also be necessary.

4. Various teaching and educational methods should be used in order to accurately implement the pre-operative education program.

5. Further and national studies in the same field are recommended by the researcher.

Author Contributions

1. All authors contributed to the overall study concept, design, and procedures. Mohamed Idriss drafted the manuscript.

2. Mohamed Idirss1*, Osama Mohamed Elsanousi2, Amair Siddig Alhussein3 carried out the procedures.

3. For the formative research study. The pilot study was carried out by Mohamed Idriss

4. Osama Mohamed Elsanousi2, Amair Siddig Alhussein3 contributed as supervisor and co-supervisor to the intervention content.

All authors have read and approved of the manuscript.

and hospital staff for their valuable suggestions and moral and last but not least the researcher's sincere thanks to each and every patient of three cardiac centers who were very cooperative and showed willing to participate in the study which leads the investigator to complete the study and make it success.

Conflicts of Interest

The authors declare no conflict of interest.

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