

Effect of Implementing a Self-Management Educational Program on Clinical Outcomes of Patients Post Coronary Artery Bypass Graft Surgery

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Abstract: Coronary Artery Bypass Graft (CABG) is the most durable and complete treatment of ischemic heart disease, It has been shown to be a highly effective intervention for the relief of angina, improving quality of life and for some patients prolonging life. While CABG surgery can be very hard on the body, the patient will be served far better by engaging in self-management program starting from the recovery period. In general, CABG self-management program covers topics related to: medication management, activity performance, nutrition, signs and symptoms of complications, and pain management. Aim of the study: the aim of the study was to evaluate the effect of implementing a self-management educational program on clinical outcomes of patients post coronary artery bypass graft surgery. Research design: Quasi-Experimental design was utilized in this study. Subjects: The study includes 40 patients who are assigned to CABG surgery and scheduled for operation. Setting: Tanta Main University Hospital, Gharbia governorate, and conducted at cardiothoracic surgery department and followed up in outpatient clinics at the same hospital. Tools: Five tools were used Tool I: Biosociodemographic and physical assessment, Tool II: Coronary artery bypass graft surgery knowledge assessment, Tool III: visual numeric pain scale. Tool IV: Nutritional assessment tool. Results of the present study revealed that there were highly statistically significant differences between both study and control groups post CABG self management program regarding knowledge, nutrition and functional abilities. Conclusion: It can be concluded that engagement in self management program and early exercise post CABG surgery is very effective on improving patients' clinical outcomes including pain severity, nutritional status and functional abilities. Recommendation: Patient undergoing CABG surgery should be instructed to follow self management program immediately post operation, as well as during follow up in addition to, stressing the importance of engagement in early exercise for prevention of post CABG complication.

Keywords: CABG surgery, self management program, clinical outcomes.

1. INTRODUCTION

Coronary artery bypass graft surgery is the most durable and complete treatment of ischemic heart disease. Nearly 400 000 coronary artery bypass graft surgery (CABG) procedures are performed annually in the United States. It has been shown to be a highly effective intervention for the relief of angina, improving quality of life and for some patients prolonging life. However, in the months and years that follow surgery, patients who have undergone CABG remain at risk for subsequent ischemic events as a result of native coronary artery disease (CAD) progression and the development of vein graft atherosclerosis. Moreover post CABG patients are relatively older and frailer with multiple cardiopulmonary and other comorbidities ⁽¹⁾.

Nursing knowledge in the area of cardiac diseases has significantly changed in the last decade and thus, current emphasis is mainly on rehabilitation and self management as the main strategies for health promotion. Self management is more than patient education most individuals need help and encouragement to actively participate in their care and successfully perform a variety of tasks. So-called self management, is the systematic provision of education and supportive interventions by health care staff to increase patients' skills and confidence in managing their health problems, including regular assessment of progress and problems, goal setting, and problem solving support⁽²⁾.

Self-management programs assume a complex sequence of effects. Developers expect these programs to change patients' behavior by increasing the patients' self efficacy and knowledge. Studies have investigated CABG patient self management interventions in producing changes in knowledge and performance of self-care behaviors and symptom frequency, to reduce the occurrence of post CABG symptoms and complications; and to enhance recovery and overall quality of life and ultimately to reduced costs^(3,4). **Therefore**, this study was carried out to evaluate the effect of implementing a self-management educational program on clinical outcomes of patients' post coronary artery bypass graft surgery.

Aim of the study is to evaluate the effect of implementing a self-management educational program on clinical outcomes of patients post coronary artery bypass graft surgery.

Research hypothesis:

- Patients who attend self management educational program about post CABG surgery care exhibited a higher total knowledge mean score than patients who didn't.
- Patients who follow self management educational program about post CABG surgery exhibited a higher mean score of pain control than those who didn't.
- Patients who follow self management educational program about post CABG surgery exhibited a higher mean score of nutritional control level than those who didn't.
- Patients who practiced post CABG early exercise program exhibited a higher mean score of physical activity level than those who didn't.
- Patients who follow self management educational program about post CABG surgery able to carry out physical activities independently than those who didn't.

Operational definition:

- **Self Management educational program** is an educational program that was provides patients in post CABG surgery with instructions related to self management that included: physical exercise, medication, and nutrition management, in order to help them to modify their behavior, and encouraging self monitoring.
- **Clinical outcomes in this study** were measured by pain control, independent functional ability, and improved knowledge means score and information related to management of nutrition, and medication. In addition to starting post surgery early exercise.

2. MATERIALS AND METHOD

Materials:

- 1) **Research design:** A quasi experimental research design was utilized to conduct the current study.
- 2) **Setting:** The present study was conducted at cardiothoracic surgery department of Tanta Main university Hospital, Gharbia governorate.
- 3) **Subjects:** A convenience sampling of forty adult patients who were scheduled for coronary artery bypass graft surgery were selected based on Epi-info program that estimate the sample size
- 4) The study sample was selected randomly and divided equally into two equal groups 20 in each, study and control group. **Study group I:** received self management program and routine hospital care, and **Control group II:** received only routine hospital care.

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Tools: Five tools were used for this study:

Tool I: Biosociodemographic and Physical Assessment: This tool was developed by the researcher after reviewing related literature⁽⁵⁾ to obtain baseline data, and to assess patients' hemodynamic stability. It was consisted of two parts as the following:

Part I: Patient's Sociodemographic Characteristics, **and Part II:** Patients Clinical Data

Scoring system: Finding was compared against normal values.

Tool II: Coronary artery bypass graft surgery knowledge assessment:

This tool was developed by the researcher based on a review of related literature⁽⁶⁻⁷⁾, to assess patients' knowledge regarding post CABG surgery. It was include questions about disease, self management, activity performance, nutrition, signs and symptoms of complications. In addition to medication, pain management, and the follow up schedule.

The scoring system was vary between correct and complete answer that will be given a score of (3), correct incomplete answer was given a score of (2) and score (1) was given for wrong or no answer.

The mean percentage of the total score was classified as follows:

- Less than 60% = Poor knowledge.
- 60% to less than 75 % = Fair knowledge.
- 75% and More = Very good knowledge.

Tool III: Visual Numeric Pain Scale:

The visual numeric pain scale (VNS) was developed by Ritter et al (2006)⁽⁸⁾, to measure pain intensity. It is a standardized numeric linear scale, and included height and shading of bars associated with each numeral.

The VNS was anchored by terms describing pain severity extremes with 0 representing no pain and 10 representing severe pain .

Scoring system: scores range from 0 to 10, where zero means no pain and ten means worst pain.

Tool IV: Nutritional Assessment tool

This tool was adopted by the researcher from Bayyumi et al (2004)⁽⁹⁾, and it was consisted of three parts: **Part one:** Three days dietary recall, **Part two:** Anthropometric measurement, **Part three:** laboratory investigation. Each item was checked within 48 hours post admission.

Scoring system: Finding was compared against normal values.

Tool V: functional Abilities Assessment:

This tool was developed by the researcher after reviewing related literature⁽¹⁰⁻¹¹⁾, and was used to assess how surgery affects patients' functional abilities'. It was included data about mobility, cleaning/household tasks, social activities, work related activities and other activities.

Every participant was expressed his/her degree of limitation due to surgery on a five point likert scale ranging from zero to four.

The higher score means that surgery not interfered with patients' functional abilities, on other hand the lower score means that surgery interfered with post CABG patients' functional abilities.

Method

1- Written approval:

- Before conduction of the study an official letter was submitted to the ethical committee at the Faculty of Nursing, Tanta University for obtaining permission to carry out the study in the selected setting

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- An official letter from the Faculty of Nursing was submitted to the general director of Tanta Main University Hospital and to the head of the Cardiothoracic Surgery Department of the above mentioned hospital for obtaining permission to carry out the study after complete explanation of the study aim.
- 2- Informed consent was obtained from the patients and the right to refuse participation or withdraw from the study at any time was respected.
- 3- Patients' anonymity, confidentiality of the collected data and privacy was maintained during implementation of the study.
- 4- Tool I part one, tool II, tool III, tool IV part one, and tool V was translated into Arabic
- 5- **Validity testing:** All tools were submitted to five experts in the field of cardiology, and medical surgical nursing for content validity and the necessary modifications was carried out accordingly.
- 6- **Reliability** of all tools was tested after translations into Arabic using the cronbach's coefficient alpha. The reliability of tool one part I, tool one part II, tool two, and tool three, in addition to tool four part II and part III, and tool five were acceptable (0.92, 0.93, 0.79, 0.85, 0.74, 0.82 and 0.86 respectively).
- 7- **A pilot study** was carried out on 10% of the study sample to assess clarity and applicability of the tools and to identify the difficulties that encountered during data collection. Those patients were excluded from the study subjects.
- 8- **Data collection was as follows:**

- After securing the administrative approval, the data collection was started, and continued for a period of 15 months from April 2018 to July 2019.
- The data was collected from control group patients first, then the study group patients to prevent data contamination.
- The study was carried out through four phases; assessment, planning, implementation, and evaluation phase.

I- Assessment phase:

- Initial assessment was carried out for every patient in both study and control group, individually after carefully listening and documenting his / her history, in addition to assessment of patients' functional abilities, and patients' knowledge related to CABG surgery, using I, II, IV and V tools.
- The assessment session was ranged from 30-60 minutes on individual basis.
- Subsequent assessment was done after 4 weeks in order to evaluate patient's progress.

II- Planning phase:

- Based on the data collected from the assessment phase and literature review, the self management program goals, priorities contents, and expected outcomes was developed by the researcher. Moreover a colored booklet in Arabic language and illustrated posters was developed by the researcher to be distributed to each patient in the implementation phase .
- Goals and expected outcomes of the program:
 - Improved in knowledge mean score about post CABG self management.
 - Patients' functional abilities to be performed independently.
 - Achieve a higher level of pain control.
 - Start exercise post-surgery early and correctly.

III- Implementation phase:

- The developed self management protocol was implemented individually for each patient in the above mentioned setting pre surgery.

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- Purpose of the study was explained to each participant of the study group. A colored booklet was distributed to each patient; information was explained through, interactive discussions, demonstrations, and redemonstration.
- Patients also asked to bring one of the family members to attend the demonstration.
- It was consisted of the following:

1- Patients education sessions:

- **Three sessions** of patients' education was carried out to provide the patients with knowledge and skills. The duration of each session lasted approximately from 30 to 40 minutes depending on the patient' assessment.
- An illustrated booklet in Arabic language was used as teaching learning aid during each session. The patients were asked to refer the booklet for remembering the instruction and being a motivator for following it.

The first session: It was introductory session for establishing of relationship, and for orient the patient about the importance, content, and schedule of the program.

The second session: It was included of theoretical information about:

1. Coronary artery disease and its risk factors.
2. Coronary artery disease symptoms and signs acute exacerbation.
3. CABG surgery purpose and technique.
4. How to deal with post CABG surgery signs and symptoms.
5. When to seek emergency medical care.

The third session: included information about:

1. Description of medications action, correct use and side effects.
2. Appropriate and healthy cardiac diet.
3. Emphases on the need for regular follow up.

Phone contact was maintained between the researcher and patients to ensure follow up visit in outpatient clinics and program application answer quires.

2- Post CABG exercise program.

The exercise program was designed after reviewing of the related literature ⁽¹²⁾ to promote progressive activity were carried out in all studied patients 2 hours post operative in the morning and evening shift " night shift was excluded to promote the patients rest" until patients discharged.

- The heart rate during exercise was monitored and not allowed to exceed 20 b above the resting value.

IV- Evaluation phase:

- Every Patient in the study and control group was re-evaluated immediately and four weeks post implementation of the educational program using tools I, II, III, IV, and V to evaluate the effectiveness of self management educational program in improving mean score of total knowledge, pain control, and nutrition control level, also patients' ability to carry out physical activities independently than patients who didn't attend.

3. RESULTS

Table (1): Frequency Distribution of Patients for Both Control and Study Group According to Sociodemographic Characteristics.

As for age, it can be noticed that more than (55%) of the studied patients was among the age group of (50 - 60 years), distributed as 50% control group and 60% in the study group without statistically significant difference $\chi^2 = 0.364$,

P = 0.409). **Regarding the patient's sex**, the result reveals that around two thirds (60%) of patients were males, distributed as 55% in the control group and 65% in the study group. The difference was not statistically significant ($\chi^2 = 0.366$, P = 0.0845). **In relation to the level of education**, it was observed that the highest percentage (40%) in the control group had secondary level of education and (35%) in the study group were read and write, with statistically significant difference (p = 0.000*). **As regards the marital status**, it was cleared that more than three quarter of both control and study groups were married representing (85%, 75%) respectively.

Concerning patients' occupation, it is obvious that nearly one third of the studied patients were housewives (32.5%), representing 35% in the control group, and 30% in the study group, with no statistical significance. **In relation to smoking history**, it was observed that nearly one-half (52%) of patients were smoker, distributed as 60% of the study group, and 45% of the control group. The difference was not statistically significant ($\chi^2 = 0.309$, p = 0.547).

Table (1): Frequency Distribution of Patients for Both Control and Study Group According to Sociodemographic Characteristics.

Sociodemographic characteristics	Control Group N = 20		Study Group N = 20		Total N = 40		Significance Test
	N	%	N	%	N	%	
Age (years)							
>30	4	20	3	15	7	17.5	$\chi^2 = 0.364$ P = 0.409
>40	6	30	5	25	11	27.5	
50-55	10	50	12	60	22	55	
Sex							
Male	11	55	13	65	24	60	$\chi^2 = 0.366$ P = 0.845
Female	9	45	7	35	16	40	
Level of education							
Illiterate	5	25	6	30	11	27.5	FET = 13.300 P = 0.000*
Read & write	6	30	7	35	13	32.5	
Primary + Preparatory	1	5	0	0	1	2.5	
Secondary	8	40	6	30	14	35	
Education of the average	0	0	1	5	1	2.5	
Marital status							
Single	1	5	2	10	3	7.5	$\chi^2 = 0.625$ P = 0.588
Married	17	85	15	75	32	80	
Divorced	0	0	0	0	0	0	
Widow	2	10	3	15	5	12.5	
Occupation							
Not work	2	10	3	15	5	12.5	FET = 2.080 P = 0.556
Businesses	3	15	2	10	5	12.5	
Clerical work	3	15	3	15	6	15	
Manual work	4	20	2	10	6	15	
Retired	2	10	3	15	5	12.5	
House wife	6	30	7	35	13	32.5	
Smoking history							
Yes	9	45%	12	60%	21	52.5%	$\chi^2 = 0.309$ P = 0.547
No	11	55%	8	40%	19	47.5%	

NB * N= Number

χ^2 = Chi-Square.

FET= Fisher's exact test

*Significant difference at P level ≤ 0.05

Figure (1, 2) Illustrate Comparison between Control and Study Group Post CABG Surgery regarding Patient's Knowledge of CABG Surgery Pre/Post Self management Educational Program Implementation.

Concerning knowledge of CABG surgery, it was found that the majority (90%) of control group had poor knowledge regarding CABG surgery pre/post self management program, however the study group showed marked improvement in their knowledge post application of self management program as more than two third of them had poor knowledge pre self management program changed to (80%) had very good knowledge regarding CABG surgery post self management program, with significant difference ($\chi^2= 26.409, P = 0.000^*$). Furthermore, it was observed that there was significant difference between control and study group post self management program implementation ($\chi^2= 51.002, P = 0.000^*$).

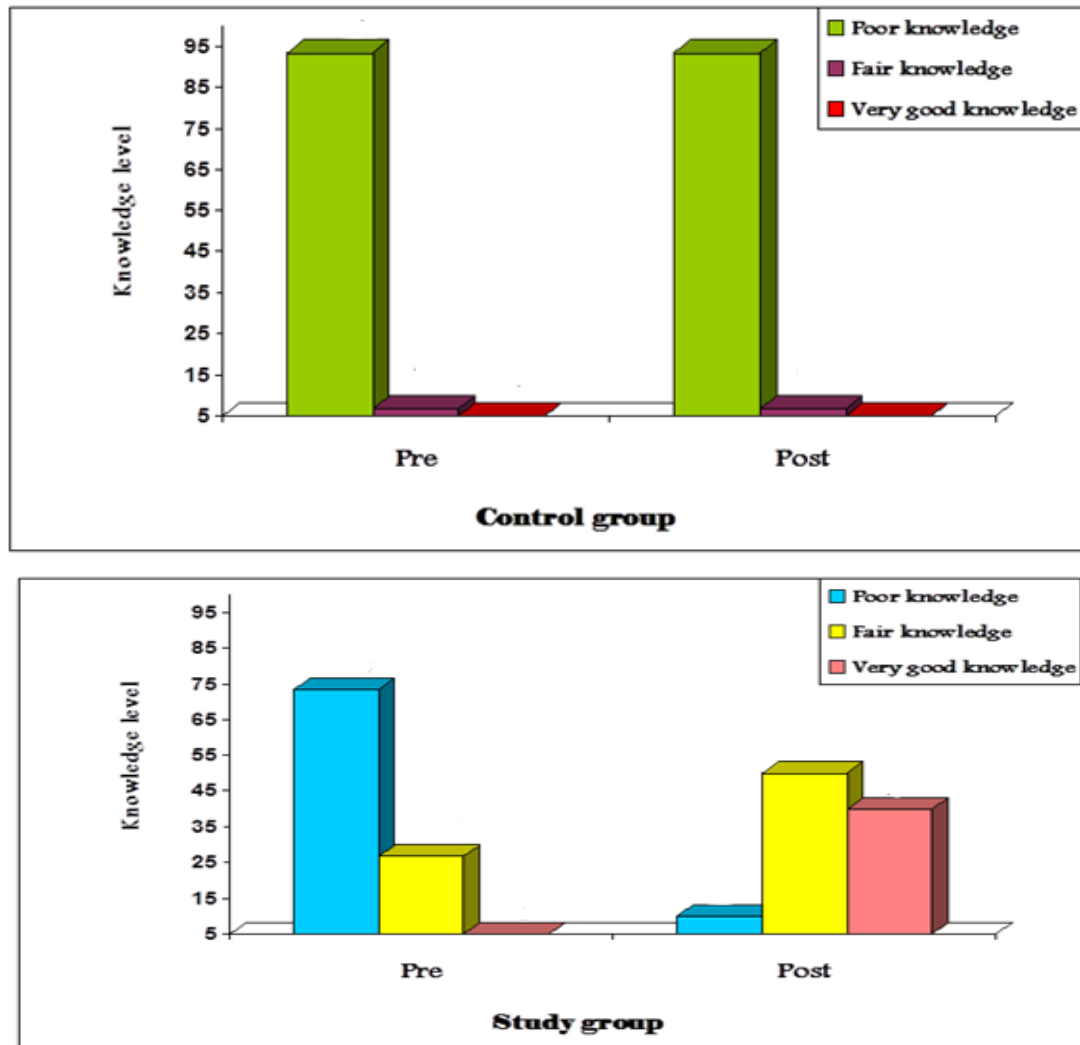
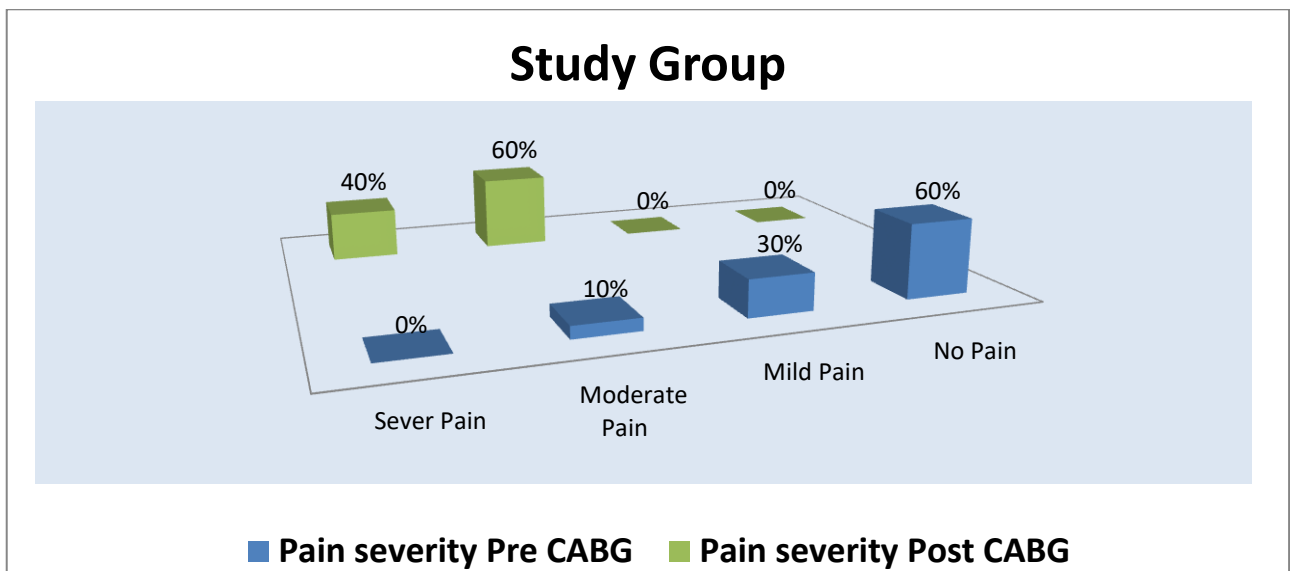
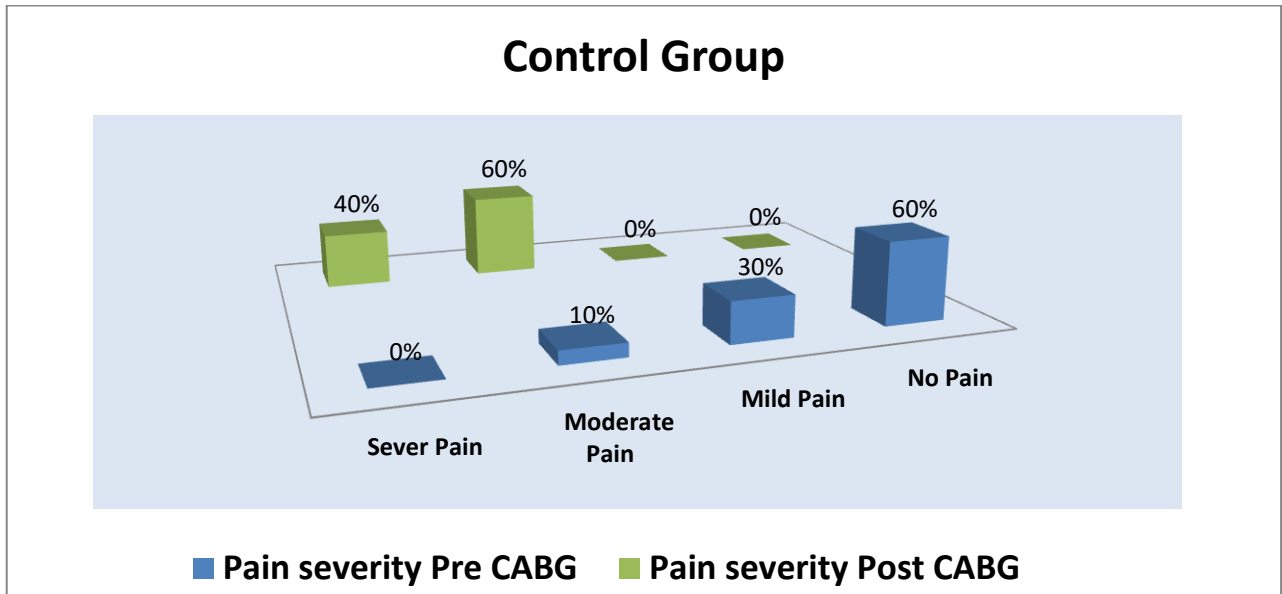


Figure (1, 2) Comparison between Control and Study Group Post CABG Surgery regarding Patient's Knowledge of CABG Surgery Pre/Post Self management Educational Program Implementation.

Figures (3, 4): Comparison between Control and Study Group Pre/Post CABG Surgery regarding Pain Severity Post Self Management Educational Program Implementation. This figures portrays that, moderate pain was the most (60%) common severity category encountered by control group post CABG surgery. This percentage improved in the study group to (70%) mentioned mild pain post CABG surgery, but this improvement did not show significant differences within groups. On the other hand, there was highly significant differences between control and study group post CABG surgery (FET=24.932, p= 0.001*)



Figures (3, 4): Comparison between Control and Study Group Pre/Post CABG Surgery regarding Pain Severity Post Self Management Educational Program Implementation.

Table (2): Shows Frequency Distribution of The Study Group regarding the Exercise Variance Post CABG Surgery Patients. It was found that about one third of the study group performed the exercise program with some difficulties in the first session, contrary the majority of them easily performed the exercise in the last session.

Table (2): Frequency Distribution of The Study Group regarding the Exercise Variance Post CABG Surgery Patients.

Program steps	1 st session				2 nd session			
	D		P		D		P	
	NO	%	NO	%	NO	%	NO	%
HOB elevated to 45	0	0	20	100	0	0	20	100
Step 1: breathing exercise	4	20	16	80	0	0	20	100
Step 2: P-ROM								

A: Passive exercise of the upper extremities	6	30	14	70	2	10.0	18	90.0
B: Passive exercise of the lower extremities(ankles)	7	35.0	13	65.0	2	10.0	18	90.0
Step 3:active assistive ROM	8	40.0	12	60.0	0	0	20	100
Step 4: ROM	7	35.0	13	65.0	5	25.0	15	75.0
Step 5: Early mobilization								
A – dangling position	8	40.0	12	60.0	5	25.0	15	75.0
B – stand patient at bed side with assist	6	30.0	14	70.0	4	20.0	16	80.0
C – Walk with assistance	6	30.0	14	70.0	3	15.0	17	85.0
D – Walk independently	6	30.0	14	70.0	3	15.0	17	85.0

HOB= Head of Bed P-ROM= Passive Rang of Motion

Table (3): Shows Differences between the Study and Control Group Pre, Post, and Four Weeks Post Self Management Educational Program Implementation regarding Their Unhealthy Diet. It was observed that the entire of study and control group used unhealthy food as margarine or butter, add salt and sugar to food and drink tea or coffee more than four cups/day. These changed to be more healthy diet post CABG surgery by four weeks. For the study group the majority of them didn't eat preserved food, didn't eat high fat food daily, didn't use margarine or butter, and didn't add salt to food (75.0, 100.0, 70.0, and 70.0) respectively.

Table (3): Differences between the Study Group and Control Patients Pre, Post, and Four weeks Post Self Management Educational Program Implementation regarding Their Unhealthy Diet.

Unhealthy Food habits	Pre				Post immediately				After 4 week			
	Study (n=20)		Control (n=20)		Study (n=20)		Control (n=20)		Study (n=20)		Control (n=20)	
	No	%	No	%	No	%	No	%	No	%	No	%
Eat preserved food												
Yes	16	80.0	14	70.0	2	10.0	12	60.0	5	25.0	9	45.0
No	4	20.0	6	30.0	18	90.0	8	40.0	15	75.0	11	55.0
Eat high fat food daily												
Yes	17	85.0	18	90.0	0	0	0	0	0	0	15	75.5
No	3	15.0	2	10.0	20	100.0	20	100.0	20	100.0	5	25.0
Use margarine or butter												
Yes	20	100.0	19	95.0	0	0	0	0	6	30.0	17	85.0
No	0	0	1	5.0	20	100.0	20	100.0	14	70.0	3	15.0
Add sugar & eat sweets												
Yes	20	100.0	20	100.0	9	45.0	12	60.0	7	35.0	17	85.0
No	0	0	0	0	11	55.0	8	40.0	13	65.0	3	15.0
Add salt to food												
Yes	20	100.0	20	100.0	7	35.0	16	80.0	6	30.0	15	75.5
No	0	0	0	0	13	65.0	4	20.0	14	70.0	5	25.0
Drink tea or coffee												
> 4	20	100.0	20	100.0	2	10.0	4	20.0	10	50.0	20	100.0
< 4	0	0	0	0	18	90.0	16	80.0	10	50.0	0	0
Drink water /day												
+ 6 glass	8	40.0	9	45.0	16	80.0	11	55.0	17	85.0	11	55.0
_6 glass	12	60.0	11	55.0	4	20.0	9	45.0	3	15.0	9	45.0

Table (4): Differences between the Study Group and Control Group Pre, Immediately Post, and Four weeks Post Self Management Educational Program Implementation regarding Nutritional Assessment Parameter. This table portrays that there were no significance differences between control and study patients group pre, and post CABG regarding nutritional assessment parameter. While there were a highly significance differences between control and study patients group post four weeks of CABG regarding nutritional assessment parameter BW, BMI, TSF, and MUAC (P = 0.05*, 0.04*, 0.02* and 0.05*) respectively.

Table (4): Differences between Study and Control Group Pre, Post, and Four weeks Post Self Management Educational Program Implementation regarding Nutritional Assessment Parameter.

Items of nutrition assessment	Pre				χ^2 (P)	Post				χ^2 (P)	Follow up 4 weeks				χ^2 (P)
	Control		Study			Control		Study			Control		Study		
	N	%	N	%		N	%	N	%		N	%	N	%	
Body weight															
70>80	4	20.0	2	10.0	1.5	3	15	3	15	4.3	3	10	5	25	7.4
81>90	7	35.0	8	40.0	0.6	9	45	8	40	0.09	11	55	8	65	0.05*
91+	9	45.0	10	50.0		8	40	9	45		7	35	7	10	
Body mass index															
<30	2	10.0	5	25.0		2	10.0	5	25.0		5	25.0	5	25.0	
30>35	7	35.0	5	25.0	3-6	7	35.0	5	25.0	3-6	5	25.0	5	25.0	2.5
35>40	5	25.0	3	15.0	0.2	5	25.0	3	15.0	0.2	6	30.0	4	20.0	0.04*
40+	6	30.0	7	35.0		6	30.0	7	35.0		4	20.0	6	30.0	
Triceps skinfold (TSF)															
< 10	4	20.0	2	10.0		4	20.0	2	10.0		2	10.0	2	10.0	
11>15	7	35.0	8	40.0	13.3	7	35.0	8	40.0	13.3	6	30.0	10	50.0	9.5
>16	9	45.0	10	50.0	0.2	9	45.0	10	50.0	0.2	11	55.0	8	40.0	0.02*
Mid upper arm circumference (MUAC)															
<26	3	15.0	2	10.0	6.8	3	15.0	2	10.0	9.1	2	10.0	0	0.0	4.8
26>28	8	40.0	7	35.0	0.9	8	40.0	9	45.0	0.05*	8	40.0	11	55.0	0.06
>28	9	45.0	11	55.0		9	45.0	9	45.0		10	50.0	9	45.0	

χ^2 = Chi-Square.

*Significant difference at P level \leq 0.05

Table (5): Differences between the Study and Control Group Pre, Immediately Post, and Four weeks Post Self Management Educational Program Implementation regarding Nutritional Assessment laboratory Investigations.

It was observed that there were no significance differences between control and study group during pre/post CABG regarding laboratory investigation. On the other hand, the laboratory investigation results for the studied patients group was improved four weeks post CABG surgery, with presence of a highly significance differences between control and study group regarding total cholesterol, HDL, and LDL (P = 0.009*, 0.003*, and 0.04*) respectively.

Table (5): Differences between the Study and Control Group Pre, Immediately Post, and Four weeks Post Self Management Educational Program Implementation regarding laboratory Investigations.

Items of nutrition assessment	Pre				χ^2 (P)	Post				χ^2 (P)	Follow up 4 weeks				χ^2 (P)
	Control		Study			Control		Study			Control		Study		
	N	%	N	%		N	%	N	%		N	%	N	%	
Total cholesterol															
<200	5	25.0	3	15.0	12.2	5	25.0	5	25.0	5.3	5	25.0	7	35.0	12.06
200	12	60.0	9	45.0	0.2	12	60.0	10	50.0	0.4	10	50.0	12	60.0	0.009*
240+	3	15.0	8	40.0		3	15.0	5	25.0		5	25.0	1	5.0	
High density lipoprotein															
>40	11	55.0	12	60.0	0.8	11	55.0	12	60.0	3.8	10	50.0	16	80.0	9.7
<40	9	45.0	8	40.0	0.06	9	45.0	8	40.0	0.5	10	50.0	4	20.0	0.003*
low density lipoprotein															
<130	3	15.0	10	50.0	10.8	4	20.0	12	60.0	7.75	8	40.0	13	65.0	5.6
130>160	11	55.0	5	25.0	0.1	10	50.0	8	40.0	0.2	7	35.0	5	25.0	0.04*
160+	6	30.0	5	25.0		5	25.0	0	0.0		5	25.0	4	20.0	
Hemoglobin															
< 10	11	55.0	8	40.0	7.5	11	55.0	10	50.0	5.9	9	45.0	7	35.0	4.3
>10	9	45.0	12	60.0	0.6	9	45.0	10	50.0	0.7	11	55.0	13	65.0	0.9

χ^2 = Chi-Square.

*Significant difference at P level \leq 0.05

Table (6): Differences between the Study Group and Control Group Four Weeks Post Self Management Educational Program Implementation regarding Functional Abilities.

This table illustrates differences between the study group and control group four weeks post CABG surgery regarding functional abilities. It was clear that there were highly significant differences between control and study group in relation to bathing, dressing upper body, washing hair, and toileting (P= 0.011*, P= 0.003*, P= 0.039*, P= 0.007*) respectively.

Concerning mobility, a general improvement could be observed within the study group as all of them were able to move indecently in activities as moving out of the bed, bending over from standing, and climbing stairs with highly significant differences (P= 0.003*, P= 0.000*, P= 0.053*) respectively.

In relation to kitchen activities, a general improvement in its aspects could be observed within the study group, with highly significant differences in relation to lifting something off shelf which is above and washing dishes (P= 0.009*, P= 0.042*) respectively

As regards cleaning and household activities, a general improvement in all aspects of these activities was observed within the study group, with highly significant differences (P= 0.021*, P= 0.000*, P= 0.009*, P= 0.000*, P= 0.023*) respectively. The same trend was observed as regards leisure /Social activities and other activities.

Table (6): Differences between the Study Group and Control Group Four Weeks Post Self Management Educational Program Implementation regarding Functional Abilities.

Functional Abilities	Post 4 weeks												Significance test	
	Control						Study							
	Done with help		Done with difficulty		Done independently		Done with help		Done with difficulty		Done independently		Pre	Post
	No	%	No	%	No	%	No	%	No	%	No	%		
Self care activities														
• Bathing.	0	0	14	70.0	6	30.0	0	0	0	0	20	100.0	$\chi^2=5.454$	P = 0.011*
• Dressing upper body.	6	30.0	10	50.0	4	20.0	0	0	3	15.0	17	85.0	$\chi^2=1.071$	P = 0.003*
• Putting shoes/socks.	0	0	17	85.0	3	15.0	0	0	11	55.0	9	45.0	$\chi^2=6.763$	P = 0.679
• Washing hair.	0	0	20	100.0	0	0	0	0	8	40.0	12	60.0	$\chi^2=4.021$	P = 0.059*
• Toileting.	0	0	4	20.0	16	80.0	0	0	0	0	20	100.0	$\chi^2=5.454$	P = 0.007*
• Feeding.	0	0	0	0	20	100.0	0	0	0	0	20	100.0	--	--
• Combing.	0	0	0	0	20	100.0	0	0	0	0	20	100.0	--	--
• Brushing teeth.	0	0	0	0	20	100.0	0	0	0	0	20	100.0	--	--
Mobility														
• Moving out of the bed.	0	0	15	75.0	5	25.0	0	0	0	0	20	100.0	$\chi^2=5.115$	P = 0.003*
• Bending over from standing.	3	15.0	13	65.0	4	20.0	0	0	0	0	20	100.0	$\chi^2=16.862$	P = 0.000*
• Climbing stairs.	5	25.0	12	60.0	3	15.0	0	0	0	0	20	100.0	$\chi^2=5.520$	P = 0.035*
• Walking in home.	0	0	0	0	20	100.0	0	0	0	0	20	100.0	--	--
• Walking outside home.	2	10.0	14	70.0	4	20.0	0	0	3	15.0	7	35.0	$\chi^2=3.529$	P = 0.571
• Traveling on public transport.	13	65.0	7	35.0	0	0	14	70.0	3	15.0	3	15.0	$\chi^2=7.666$	P = 0.021*

χ^2 = Chi-Square.

*Significant difference at P level ≤ 0.05 .

Continue Table (6): Differences between the Study Group and Control Group Four Weeks Post Self Management Educational Program Implementation regarding Functional Abilities.

Functional Abilities	Post																Significance test							
	Control										study													
	NA		Need AA		Done with help		Done with difficulty		Done independently		NA		Need AA		Done with help		Done with difficulty		Done independently		Pre	Post		
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%				
Kitchen activities																								
• Lifting something off shelf which is above.	11	55.0	9	45.0	0	0	0	0	0	0	0	0	13	65.0	2	10.0	0	0	0	0	5	25.0	$\chi^2=8.191$	P = 0.042*
• Preparing meals	11	55.0	9	45.0	0	0	0	0	0	0	0	0	13	65.0	2	10.0	0	0	5	25.0	0	0	$\chi^2=4.925$	P = 0.177
• Taking hot drinks from kitchen to another room.	11	55.0	9	45.0	0	0	0	0	0	0	0	0	9	45.0	0	0	0	0	0	0	11	55.0	$\chi^2=4.315$	P = 0.115
• Washing dishes.	11	55.0	9	45.0	0	0	0	0	0	0	0	0	13	65.0	0	0	0	0	7	35.0	0	0	$\chi^2=13.311$	P = 0.009*
Cleaning and household activities																								
• Doing general house work.	11	55.0	5	25.0	3	15.0	1	5.0	0	0	13	65.0	0	0	0	0	0	0	7	35.0	7	35.0	$\chi^2=8.307$	P = 0.021*
• Washing clothes.	11	55.0	9	45.0	0	0	0	0	0	0	13	65.0	0	0	5	25.0	2	10.0	0	0	0	0	$\chi^2=26.19$	P =
• Bed making.	11	55.0	5	25.0	3	15.0	1	5.0	0	0	13	65.0	0	0	0	0	0	0	7	35.0	0	0	$\chi^2=20.34$	P =
• Sweeping.	11	55.0	9	45.0	0	0	0	0	0	0	13	65.0	0	0	5	25.0	2	10.0	0	0	0	0	$\chi^2=29.33$	P =
• Cleaning/dusting.	11	55.0	0	0	6	30.0	1	5.0	2	10.0	13	65.0	0	0	0	0	0	0	0	0	7	35.0	$\chi^2=24.048$	P = 0.023*

χ^2 = Chi-Square. Significant difference at P level ≤ 0.05

NA= Not applicable or not done

Need AA=

Need ambulatory aid

Continue Table (6): Differences between the Study Group and Control Group Four Weeks Post Self Management Educational Program Implementation regarding Functional Abilities.

Functional Abilities	Post																		Significance test			
	Control										study											
	NA		Need AA		Done with help		Done difficulty		Done indecently		NA		Need AA		Done with help		Done difficulty		Done indecently			
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	Pre	Post
Leisure /Social activities																						
• Going out socially.	0	0	10	50.0	7	35.0	3	15.0	0	0	0	0	0	0	0	0	0	0	20	100	$\chi^2=11.588$	P = 0.000*
• Playing with children.	0	0	0	0	5	25.0	13	65.0	2	10.0	0	0	0	0	0	0	0	0	20	100	$\chi^2=16.000$	P = 0.000*
• Visiting friends/relatives.	0	0	20	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	100	$\chi^2=18.095$	P = 0.001*
Work related activities																						
Tasks you have to do in your work	3	15.0	17	85.0	0	0	0	0	0	0	5	25.0	0	0	0	0	0	0	15	75.0	$\chi^2=26.198$	P = 0.000*
Other activities																						
• Telephone use.	0	0	0	0	0	0	3	15.0	17	85.0	0	0	0	0	0	0	0	0	20	100	-	-
• Shopping.	0	0	4	20.0	13	65.0	3	15.0	0	0	0	0	0	0	0	0	0	0	20	100	$\chi^2=30.416$	P = 0.000*
• Responsibility for own medications	0	0	0	0	0	0	3	15.0	17	85.0	0	0	0	0	0	0	0	0	20	100	$\chi^2=16.000$	P = 0.003*

χ^2 = Chi-Square.

*Significant difference at P level ≤ 0.05

NA= Not applicable or not done

Need AA= Need ambulatory aid

5. DISCUSSION

If medical therapy fails in patients with ischemic heart disease, only coronary artery bypass graft (CABG) surgery will guarantee patient survival and health. Although most patients report improved health after CABG surgery, many have mentioned that recovery and rehabilitation is a process that has short- and long-term complications. A comprehensive self management program based on physical activity that represents multifaceted interventions aimed at improving prognosis by means of healthy lifestyle modifications, daily decision-making by the patient involves more than simple treatment choices or compliance with medical regimens. Programs such this shown to be highly beneficial in (CABG) patients^(13,14). **Therefore**, this study was carried out to evaluate the effect of implementing a self-management educational program on clinical outcomes of patients' post coronary artery bypass graft surgery

Regarding the characteristics of study sample, findings of the current study indicated that the prevalence of CAD was greater among **males than females**; this may be contributed to the effect of estrogen as a protective mechanism against the development of atherosclerosis. As well as aging makes people less physically active and more sedentary, this can interpret the results of this study that revealed the highest percentage was among **the age group** of (50 - 60 years)⁽¹⁵⁾.

In contrast according to data of Reduction of Atherothrombosis for Continued Health (REACH)⁽¹⁶⁾ registry, the mean age of the Asian patients referring for CABG surgery was 64.7 years, while that of the North American patients was 70.1 years. Thus, the mean age of the current studied patients was lower than that of Asian and North American ones this may be attributed to lack of patient awareness with CAD gravitating factors, considering the low mean age of the Egyptians patients for CABG surgery. **Married personal** are more exposed to psychological stress, as so it was found that the highest percentage patients were married. This is in agreement with Elbiaa (2014)⁽¹⁷⁾ who reported that the highest percentage of CABG in her study were male, married, and in the age group of more than 50 years.

As references to level of education, occupation and residence, the finding of the current study revealed a statistical significant relationship between control group and study group as the highest percentage of control group had secondary education while the highest percentage of study group are illiterate, or read and write. As well as, the finding of the present study demonstrated that the highest percentages of both groups are house wife. Moreover, the majority of the studied patients in both groups their residence was rural, this may be due to lake of health services in these sectors.

Level of education, occupation and residence must take in consideration in self management program and teaching plan as it determined patients' current level of understanding, capacity and motivation for learning new information, language and literacy constrain. Also family norms and believe have an impact in learning process ⁽¹⁸⁾. Kozan et al (2014) ⁽¹⁹⁾ recommended to becoming aware of patients own culture and believes and their influences, in addition to developing and maintaining an attitude of respect for the broad range of culture deference's.

In relation to smoking history, it was found in the current study that about half of the study sample was smoker. **Smoking** adversely affect cell lining of the coronary arteries and the dysfunction of these endothelial cells contributes towards the narrowing of arteries. So blood flow is reduced, increase heart rate, hypertension and the body demand for oxygen, all will increase the length of stay after surgery ⁽²⁰⁾. In the same manner Chrysohoou et al (2013) ⁽²¹⁾ found that smoking has been associated with negative effects on clinical outcomes.

Otherwise, Nazari et al (2013) ⁽²²⁾ found that patients with history of smoking had significantly high incidence of postoperative pulmonary complication and longer duration of mechanical ventilation. They pointed out that smoking cause the small airway in the lung to narrow making them more prone to collapse and leading to increased susceptibility of infection, coughing, pulmonary complication and longer duration of mechanical ventilation.

In relation to knowledge of CABG surgery included CAD contributing factors, signs and symptoms and CABG surgery in addition to following all aspect of therapeutic regimen including diet, quit smoking, activity, medication, pain relieve methods, in the present study, it was found a highly significant improvement of studied patients knowledge post self management program this may be related to the reinforcement and motivation given to patients through consecutive sessions, using illustrated colored booklet, that increase patients' awareness about their condition ⁽²³⁾. This is in agreement of Bolarinwa et al (2016) ⁽²⁴⁾ who found that applying nursing intervention postoperatively plays a major role in patients' recovery, self motivation, increasing locus of control, and readjustment and direct the internal desire to positive way.

Medication is prescribed as a life saving and complain relieving and improving patients health to become well, as indicated by Reeder (2014) ⁽²⁵⁾. These support the results of present study as it portrays that there was a highly statistical significant between control and study group patients pre/post self management program regarding their awareness with post operative medication. Otherwise information about medication given through self management program may be sufficient to increase patient awareness about importance of following prescribed medications ⁽²⁶⁾.

The CABG surgery pain can lead to many complications such as respiratory complications, occurrence of depression and delirium that can increase length of stay (LOS) in the post CABG period. According to the present study results, there was a highly significant regarding patients' knowledge of **pain relieving methods** this was demonstrated in the improvement of **pain level post surgery** for the studied patients this is in agreement with Karachi et al (2011) ⁽²⁷⁾ reported that post CABG patients who were aware of the importance of pain relief methods and the impact pain had on recovery were prompt to report and request for pain relieving medications. This is a classic example of 'seeking help' as a strategy to relieve pain symptoms.

Moreover, the present study results represented that the pain levels in the study group was lower than pain level post CABG in the control group this related to deep breathing exercise directly post extubation, and early mobilization. In addition to the release of peripheral and central beta endorphins, that has been associated with changes in the pain sensitivity in the study group due to performing the exercise program ⁽¹¹⁾. This result was supported by Dhansay et al (2013) ⁽²⁸⁾ who reported a significant decrease in sternal pain, with greater satisfaction from the exercise intervention compared with those who didn't receive the exercise.

It was documented that there was an association between the high pain levels and lung volumes, patients with more pain had greatest decrease in lung volume and impair breathing patterns that consider a limiting factor for mobility, which in turn can influence the performance of deep breathing and effective cough ⁽¹²⁾. In contrast Pretorius et al (2010) ⁽²⁹⁾ found that there was no significant relationship between the chest pain intensity, changes in pain rating and performance of exercise or early mobilization.

Regular exercise has proved to increase muscular function and stimulate the body's ability to consume and utilize oxygen, improve the capacity of blood vessels to dilate in response to exercise, ventricular diastolic function and neurohormonal activation. Additionally increase aerobic fitness level and respiratory function may improve symptoms

and physical functioning over time⁽¹¹⁾. The present study indicated that most of the studied group performed the **exercise program** with some difficulties in the first session, this may be attributed to the pain of incisional wound in sternal and graft, and contact with many tubes, contrary the majority of them easily performed the exercise in the last session. This in agreement with Choo (2014)⁽³⁰⁾ who illustrated that active but not resistive range of motion of extremities is also well tolerated post CABG surgery as long as activities don't stress or impair healing of sternal incision while patient become stable and early ambulated from bed.

Overall even intense cardiac interval training was safe and effective in the CABG surgery patient population, but that lower levels of exercise also provided benefit. Patients need to adopt an individualized and feasible exercise routine after CABG surgery to achieve maximal recovery benefit and prevent progressive atherosclerotic disease⁽¹¹⁾.

In relation to functional abilities the finding of current study revealed general improvement for studied group functional abilities (self-care activities, mobility, kitchen activities, cleaning and household activities, leisure /social activities. and work related activities), with highly significant differences between control and study group after four weeks regarding self-care activities, these directly related to instruction given through self management educational program, which influence on the importance of movement, and directs to the permissible level of activities. Moreover it increased psychological well-being, reduce depression in CABG patients through possessing a high level of self efficacy which influence the improvement of patients' behavior, and increase confidence in coping with recovery experiences⁽¹⁰⁾.

On the other hand, effective nursing intervention is important for CABG patients after surgery to increase their desire and change their behavior to comply with prescribed regimen. Furthermore patient who are oriented with every thing about changes in their lifestyle after discharge are more likely to engage in activities that promote physical well-being as mentioned by Waller et al (2008)⁽³¹⁾.

Moreover the study of Kulik and Shrank (2011)⁽³²⁾ stressed that following the cardiac surgery the patient must be encourage to slowly resume an active life, while minimize the risk associated with overexertion. These increase endurance, strength, and flexibility of joints and muscles. In addition improve functioning of heart, decrease patient complains, improve vital signs and circulating system. Additionally AIM-HIGH et al (2011)⁽³³⁾ Investigators for Post-CABG Bio behavioral outcome showed that good nursing intervention, was associated with improved functional status and quality of life (physical and social) post CABG in both men and women, which is important for preventing progressive worsening of CAD, maintaining independence and avoiding hospitalizations.

The current study results indicated general improvement of the studied patient functional abilities post self management program during follow up period. This results was supported by Bouchard, et al. (2015)⁽³⁴⁾ who mentioned that patients who did not **exercise** more than 2 times a week had significantly lower physical and social functional status outcomes than who exercised more than 2 times each week. In addition, moderate exercise was associated with reduced shortness of breath, fatigue, and improve autonomic stability.

The impact of self management program on nutritional assessment parameter (body weight, BMI, TSF) in the current study is somewhat unexpected as there were highly significant differences between control and study group after four weeks while immediately and after two weeks there wasn't significant differences. The possible explanation for this is that all patients in control and study group underwent same hospital management regarding diet and mobility, on the other hand studied patient group who was participate in self management program was motivated to decrease their body weight by changing their dietary habits and engaged in daily routine exercise as walking sport⁽¹⁵⁾.

In a study by, Shaw and Mamen (2010)⁽³⁵⁾, similar decreases in body fat percentage were seen post the intervention, attributable to the decrease in body weight and fat percentage points toward a reduction in fat mass. The possible explanation for this is that participants engaged in aerobic training increases energy expenditure by activation of lipolysis and affects the reduction of body fat percentage⁽¹²⁾. The same finding was found in the study of Rooy and Coopoo (2017)⁽³⁶⁾ in their study about Change in patient nutritional knowledge following coronary artery bypass graft surgery. A study conducted on postmenopausal women further indicates that reductions in weight improves the physical and mental Health Related Quality of Life (HRQoL) domains and leads to a positive change in self perceived health status. Similarly, reductions in waist circumference were also observed among this group of participants⁽³⁷⁾.

Diets low in carbohydrates can effectively improve hypertriglyceridemia. High protein intake, along with a high consumption of fruits, vegetables, and nonfat dairy products, can improve blood pressure. Commonly; pharmacological treatment is needed for hypertension, diabetes mellitus, and dyslipidemia despite lifestyle changes, for patients with advanced degrees of obesity⁽³⁸⁾.

In relation to laboratory investigation related to nutritional assessment (cholesterol, HDL, LDL), the finding of present study indicated that, there were no significant differences post program implementation this may be attributed to the fact that before discharge the patient in both groups have the same care regarding medication and diet so the result difference regarding (cholesterol, HDL, LDL) didn't appear. This is in agreement with Nocerino et al (2013)⁽³⁹⁾ who found in her study of post CABG patients, that there was no significant improvement in physical outcomes parameter (BW, BMI, LDL, and cholesterol level) of study group than those of control group before hospital discharge.

Otherwise, there was significant improvement for study group than control group during follow up period. This improvement was directly related to modification of study patient diet to balanced heart healthy diet that is instructed through post CABG self management program and consisted of (limited fat intake, saturated fat reduced to less than 7% of total caloric intake which lead to decrease low density lipoprotein cholesterol and total cholesterol. This was in agreement of Teoh, and Lamy (2010)⁽⁴⁰⁾ who found in their study there were Significant improvements noted in the nutrition knowledge score although all components measured exhibited improvements in cholesterol reduction and low fat food these significant improvements in nutrition knowledge points toward effective education being delivered during the intervention. Cardiac rehabilitation has proved to be effective in changing lifestyle habits in a holistic way and this study further shows an improvement in nutritional knowledge based on sound educational principles.

Moreover, diet rich in omega-3 fatty acid was encouraged because of its benefits to the heart in decreasing viscosity of plasma, prevent of adhesion of blood platelets and prolong bleeding time which in turn reduces risk of recurrence of coronary occlusion. While the key objective of self management program is to develop and improve **post-operative pain levels, nutritional status and ADLs** are significant indicators for evaluating the changes in physical and psychological wellbeing of post CABG patients. Additionally non-pharmacological interventions, such as exercise training and psycho-education, have a positive physiological and psychological effect in early outpatient rehabilitation in patients who have undergone CABG surgery⁽⁵⁾.

It can thus be assumed that self management program encompassing lifestyle intervention, education and psychological support results in faster recovery of health and desired performance of the CABG patient. Furthermore, most CABG patients benefit from participating in a structured, comprehensive self management program, especially when it includes components such as early exercise program⁽²⁻³⁾.

6. CONCLUSION

Based on the present study findings, it can be concluded that:

Finding of the present study illustrated that implementation of a self management educational program had been proven a positive effect regarding **patients knowledge** in all aspect of CABG including definition, sign and symptoms of complication, and dealing with it. Also it was found a highly improvement of the studied patients in relation to their feeling of pain post CABG surgery

Regarding functional abilities, the finding of current study revealed general improvement for studied group functional abilities. Moreover, the majority of the studied patients was changed their unhealthy eating habits to be more healthy eating habits, and use of therapeutic diet post CABG self management program implementation.

7. RECOMMENDATIONS

In light of the current study findings, the following recommendations are suggested:

- Patient should be assessed frequently
- Patient undergoing CABG surgery should be instructed to follow self management program immediately post operation.

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- Illustrated colored booklet about CABG self management should be available and distributed for all patient post CABG surgery.
- Greater emphasis should be placed on patient education regarding post CABG self management.
- Guidelines regarding post CABG self management should be available in each ward.

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