Sci. J. Nursing/ Baghdad, Vol: 18,No.2, 2005.

Effect of Nursing Educational Program on Recovery Following CABG Surgery: Intervention Study

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Abstract

This intervention study is composed on 55 patients at Saddam Center for Cardiac Surgery (Aben-Albetar) throughout the period from 1st of July 1997 to 15th of January 1999. The study aimed to evaluate the effectiveness of constructed nursing education program on reduction of complications and improving recovery among patients with Coronary Artery Bypass Graft (CABG) surgery through the application of repeated measures. The sample is divided into 27 patients who received the nursing educational program (study group) and 28 patients who continued to receive regular care (controls). Based on previous research methods, were followed-up for 3 months after surgery. .To evaluate the effectiveness of the intervention education program , two major instrument were used, these instrument included knowledge test and self-efficacy check list. The knowledge given to the patient in study group prior to the implementation of the intervention program and re-tested at discharge and on three months after the operation and in the control group given knowledge test pre operative and re-tested at discharge and on three months after the operation. Self efficacy check list it was assessed at time of discharge and at first, second, and third month after discharge for the study and control groups. (6, 12)

The result revealed that marked improvement in health status of the study group compared to the control group. The patient's recovery was determined by percentages of indices of self-efficiency, and knowledge level. The indices were found to be higher for patients who received nursing education program throughout the period of study. In light of these findings, the investigator recommends that the implementation of an educational program by nurses for patient with open heart surgery and reinforcement of education during the follow-up period concerning to the patients' need.

الخلاصة

دراسة تداخليه اجريت على مرضى عمليات القلب المفتوح في مركز صدام لجراحة اقلب (ابن البيطار حاليا) للفترة ما بين الاول من شهر حزيران عام ١٩٩٧ وحتى الخامس عشر من كانون الثاني عام ١٩٩٩. كان هدف الدراسة تقويم فاعلية او اثر البرنامج التثقيفي التمريضي على شفاء او صحة المرضى بعد العملية. شملت العينة البحث على ٥٥ مريض من مرضى زرع الشرايين التاجية. وتكونت الدراسة من مجموعتين اختباريه تستلم البرنامج التثقيفي و عددهم ٢٧ مريض ومجموعه اخرى تعتمد على العناية الروتينية للمستشفى وهي الضابطة وتكونت من ٢٨ مريض وجرت متابعة للمجموعتين الاختبارية والضابطة ولمدة ثلاثة اشهر. ولتقويم البرنامج على شفاء المرضى تم اعداد استمارات وهي١- استمارة لقياس معلومات المرضى قبل و بعد العملية. ٢-استمارة رصد لقياس الحالة والحركية للمرضى بعد العملية وذلك عند خروج المريض من المستشفى و بعد الشهر الاول و الثاني و الثلث من العملية .

أظهرت نتائج الدراسة ان هناك تحسا كبيرا في الحالة الصحية للمرضى اللذين استلموا البرنامج التثقيفي بالمقارنة مع العينة الضابطة وقد كان ذلك واضحا على معلومات المرضى اللذين شملوا بالبرنامج التمريضي حيث اظهرت النتائج ان هناك دلالة معنوية عالية باحتمالية (٠,٠١) وما بين معلومات المرضى قبل و بعد البرنامج و كذلك دلت النتائج على ان هناك فرق معنويا كبيرا باحتمالية (٠,٠١) ما بين المجموعة اللذين شملت بالبرنامج و المجموعة الضابطة بعد ثلاثة اشهر من العملية.و عندما اعطيت فقرات الحالة الحركية درجات اظهرت النتائج دلالة معنوية عالية ما بين المرضى اللذين شملوا بالدراسة والمجموعة الضابطة لكل مراحل المتابعة. اوصت الدراسة على ضرورة تطبيق البرنامج التثقيفي من قبل الممرضات والممرضين للحصول عل شفاء اسرع والتقليل من معانات المرضى بعد العملية.

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Introduction

During the past 36 years, there has been a dramatic increase in the number of cardiac surgical procedures involving; the surgical treatment for valvular disease and coronary artery bypass graft. It is now well established in the United States and Great Britain [6], and in many other countries including our country [1]

The success of cardiac surgery is measured by low mortality, relief of symptoms and improvement in the quality of life [3, 11, and 15]. Although most of the patients do experience relief of symptoms after surgery as they become more active and independent [8 ,12]. The disability can be reduced through helping the patient and the family to understand the recovery process. This understanding can be enhanced through focus on some of the predictable problems that the patient may encounter during home recovery period that lasts (1-8) weeks and sometime lasting as long as 6 months after surgery [7,11]

Research findings indicated that the rate of recovery is related to lack of information of the patient before and after surgery [9] Therefore, patient education may contribute in facilitating home recovery, success of treatment and reduction of cost [14].

Several researchers have shown that patients with cardiac surgery need a lot of information about what they can expect during their recovery period at home. The need to provide information to patients before and after cardiac surgery is commonly accepted in clinical practice, while the lack of information during hospitalization and after discharge may delay recovery during this period [12, 13].

There is no evidence that reported studies which are related to the nursing intervention after open heart surgery are conduced in our country. Therefore, the researcher ought to design the present study because there is a pressing need to construct an educational nursing program for patients with open heart surgery and to study its effect on acceleration of post-operative recovery is a pressing need to construct an educational nursing program for patients with open heart surgery and to study its effect on acceleration of post-operative recovery.

The present study was designed to achieve the following objectives:

1. Construction of nursing educational program for patients undergoing coronary artery bypass graft (CABG) surgery.
2. Investigation of the nursing educational program effectiveness on patients with coronary artery bypass graft surgery through:
   a. Assessment of patient's knowledge. Through the utilization of knowledge test.
   b. Determination of self-efficacy. Through the use, of self-efficacy measurement.

Methodology

The study was concerned to examine the hypothesis that implication of inpatients educational program had an important role in accelerating the recovery of patients with CABG surgery

The intervention educational program was developed according to the reviewed of the related literature and previous studies, and based on the result of educational needs.

The educational program was designed to provide the patients with information after coronary artery bypass graft, relative to (1) Heart anatomy and physiology and simple aspect of surgical procedure, (2) Relaxation exercise and deep breathing, (3) Activities which include, walking program, exercise after operation and discharge, (4). Some problems that the patient may experience post surgery and how the patient managed it, such as weakness and fatigue, anemia, change in appetite, sleep disturbance, change in amount and odor of perspiration, incision discomfort or pain, incision drainage and muscle aches, (5) Diet

information, it is especially low cholesterol diet, and (6) Information on medications that he might use.

The study instrument was a questionnaire developed by the investigator for the purpose of data collection. It was consisted of tow part:

The first part:

was concerned with collection of basic socio-demographic and clinical data. Socio-demographic data was concerned with sex, age, marital status, educational status and occupational status.

Clinical data included pre-operative functional status of New York Heart Association (NYHA), past medical history, ICU length of stay, graft number, graft type, post operative complication and re hospitalization.

The second part:

Instruments were used to evaluate the effect of nursing educational program. These instruments included knowledge test and checklist

A -Knowledge test:

This test was composed of 20 correct and incorrect statements used to evaluate knowledge of patients. The test covered relevant points from the major content area of the education program. The true and false statements were 12 correct questions and 8 incorrect questions. Each question in the test had options (yes or no). For the purpose of this study, the number of correct responses on the knowledge questionnaire was used as the measure of the level of knowledge. The total scores of the test were 20 point.

The patients in study group were given knowledge test prior to the implementation of the intervention program and re-tested at discharge and on 3 months after the operation. Content of question remained the same for all three testing sessions.

The patients in control group were given knowledge test pre operative and re-tested at discharge and on three months after the operation.

B. Checklist of Self-efficacy

This tool was developed to evaluate recovery of patient while he was still at hospital and later at the first, second, and third month.

This tool was used to determine the activity level as it was measured by walking, going out of the house, working inside or around the house, stair climbing, lifting object, driving and back to work. Some items were measured on a 4-point type likert rating scale, and other items were measured on two points type likert rating scale. For the purpose of descriptive statistical analysis, the items were given scores. The rating scores concerning the 4 point type likert rating scale, were zero for don't walk or don't do this, 1 for walking inside the house or do this less than before disease, 2 for walking outside the house or do same as before disease and 3 walk outside the house a lot or do more as before disease. Other rating scores concerning (yes, no) were 1 for yes and zero for no. The total score of self-efficacy for each sample ranges from (0-13) at each time. When the total score was minimal, this means, low self-efficacy and vice versa.

The program, the checklist and the knowledge test were examined by the panel of experts for content clarity and adequacy. Responses of all experts indicated that all items within the instructions were relevant.

In order to determine the test re-test reliability for the knowledge test, a pilot study was carried out on 30 patients with CABG, for two different periods. Pearson coefficient of correlation was used. The reliability estimates for knowledge test was (0.83), the scale coefficient indicated that these measures were adequately reliable (Polit and Hanguler, 1995).

The pilot study is carried out at Saddam center for cardiac surgery during January and February of 1998. The pilot study is carried out on 10 cardiac patients. The patients were

selected randomly prior to the surgery, to pre-testing and the implementation of the intervention nursing education program and post knowledge test, the checklist, were applied at the discharge day and one month after the operation.

The results of the pilot study revealed that the educational program was clear and understandable; the question of the knowledge test was revised for content clarity.

The patients required 5-6 sessions to cover the intervention program. The time required for each session ranged from 10-25 minute

The samples of the study include all patients who attended the Saddam center for cardiac surgery, for CABG surgery patient during the period from March to December in 1998. Those who met the **inclusion** criteria were included in the study. The eligibility criteria for the sample inclusion the Patients who were able to speak and read Arabic, no previous cardiac surgery, who agreed to participate in the study and **Exclusion** Those patient, who had post-operative complications, such as heart block, angina, fever, uncontrolled arrhythmia and who have malignant type of arrhythmia.

The first 40 patients of CABG surgery included in the study group received intervention education program, then the remaining 40 patients were included in the control group who shared the same criteria of selection for the study group and were not exposed to the educational intervention nursing program. Out of eighty CABG patients who participated in the study and the control groups 25 patients were dropped out for following reasons: 6 patient did not complete all parts of the education program, 5 patient refused to participate after few days for unknown reasons, 6 patients did not complete the follow up, 3 patients died prior to their participation in the study, and five patients had experienced complications after being participated in the study.

The fieldwork of the present study was performed in two surgical units and surgical outpatient clinic. Surgical outpatient clinic received patients before surgery and provide follow-up to patients for at least 3 months after surgery.

The patients in the study and the control groups, who met the study criteria, were approached on 1-2 day before surgery and were invited for participation and explanation of the study objectives. The demographic data were obtained from both groups and the pre-knowledge test was conducted on the study group. Patients in the control group had received the regular methods. They included any information that the nurse or other staff members may have verbalized to patients about post operative recovery.

Teaching materials which were used in these sessions included models, illustration, discussion and provision of patient written information, which were consisted of the important issues of the major content area. All teaching was held by individual rather than group instruction because of the variability of the patient location. Teaching sessions of 10 – 25 minute each was performed to complete the program.

Results

The present study evaluated the effect of nursing educational program on 55 patients with coronary artery bypass graft (CABG) surgery.

Table (1) Socio demographic characteristics of the study and control groups' of the patients with CABG surgery.

Group	The Study group n=27		The Control group n=28		K.S
Characteristics	No.	%	No.	%	
Sex					
Male	27	100	27	96.43	(0.04)N.S.
Female	0	0	1	3.57	
Age					
30 – 40	1	3.70	1	3.57	(0.16)
41 - 50	11	40.74	8	28.57	
51 - 60	9	33.33	10	35.71	
61 – 70	4	14.81	9	32.15	
71 - 80	2	7.41	0	0	
Mean	51.48		55.57		
SD	9.3		7.7		
Marital status					
Single	2	7.41	0	0	(0.08)
Married	25	92.59	27	96.43	
Widowed	0	0	1	3.57	
Occupation status					
Unemployed	0	0	1	3.57	(0.16)N.S
Self employed	9	33.33	8	28.27	
Governmental employed	14	51.85	9	32.15	
Retired	4	14.82	10	35.71	
Level 0f education					
Read and write	7	25.93	12	42.86	(0.17) N.S
Intermediary School	4	14.18	4	14.29	
Secondary School	3	11.11	3	10.71	
College	13	48.15	9	32.14	

General description of the sample

Table (1) demonstrated characteristics of study and control groups for patients with (CABG) surgery. The analysis had revealed that the entire study group and a majority of the control group were males (96.43%), the mean age of cases was 51. 48± 9.3 while that of the control group was 55.57± 7.7

Concerning the marital status, the table showed that most of the patients in both groups were married. High percentages of cases are government employees (51.85%) of the control group were retired.

With regard to the education level high percentage of cases those who were college graduates (48.15%) and (42.68%) of the controls those who were able to read and write. No

statistical significant differences were observed with regard to sex age marital status, occupational status and level of education between two group (p>0.05).

Table (2) Clinical characteristics of patients with CABG surgery

Group / Characteristics	The Study Group n=27		The Control Group N=28		K.S.
	No.	%	No	%	
Pre operative functional Status					
I and II	3	11.11	2	7.14	(0.04)N.S.
III and IV	24	88.89	26	92.86	
Past medical history					
MI	17	56.67	14	41.18	(0.16)N.S
High B.p	6	20.0	11	32.35	
Diabetes	5	16.66	5	14.71	
ICU length of stay					
High B.p and diabetes	2	6.67	4	11.76	
Mean	2.51		2.35		
S.D	1.57		0.55		
Graft number					
1	2	7.41	3	10.71	(0.204)N.S.
2	6	22.22	11	39.26	
3	10	37	1	3.57	
4	9	33.33	5	32.14	
Mean	2.96		2.57		
S.D	0.94		0.92		
Graft type					
SVG & LIMA	23	85.19	25	89.29	(0.41)N.S
SVG	2	7.41	1	3.57	
LIMA	2	7.41	2	7.14	
Post operative period					
Mean	12.52		12.18		
SD	5. 69		3.53		
Re hospitalization					
One time	3	11.11	0	0	
Two time	0	0	1	3.57	
More than two	0	0	2	7.14	
Non	24	88.89	25	89.29	

Table (2) revealed that the high percentage was 88.89% of the study group and 92.86%of the control group which was related to the functional class III and Iv and (11.11%)of the study group and (7.14%)of the control group is related to class I and II. More than half of the study group suffered from previous myocardial infraction and only (41.18%) of the control group having such condition. 20% of the whole cases and 32.35% of the controls had hypertension. The mean length of stay at ICU is 2.5$\pm$1.57 for all cases and 2.35$\pm$0.5 for the controls.

Concerning bypass the table showed that high percentage of cases (37.04) had 3 grafts while 39.29% of the controls had 2 grafts . the data also indicated that (85.1) of the study group and (89.29%)of the control group had their graft from SVG and LIMA .The mean of the post

operative period of hospitalization was (12.51) day for the study group and (12.17) day for the control group.
Re hospitalization was reported as (11.11%) of the study group for one time and (10.71%)of the control group in which re hospitalization was reported two times and more. No statistical significant difference were observed between different variable representing clinical characteristics of both groups($p>0.05$).

Table (3) Mean score of the knowledge test for the study and the control groups with CABG surgery at pre, post 1 and post test 2.

Knowledge test scores Time	CABG			
	Study		Control	
	Mean	SD	Mean	SD
Pre test(1-2 day before operation)	9.11	1.78	8.25	1.35
Post test 1(at discharge)	17.41	1.39	8.86	1.77
Post test 2(3 months after operation)	17.55	1.35	9.28	1.78
F mixed – model (ANOVA)	(116.349) HS		(26.92) HS	

The results in table 3 indicated that the scoring was statistically significant higher at post – operative time at discharge and 3 months after operation as compared with scores at the pre - operative stage, for both study and control group. At it was observed, there were improvement in the level of knowledge from pre to post operative stages for both study and control groups.

Table (4) Distribution of functional capacity measurement and period of follows up of the study and the control patients with CABG surgery

Period of follow up		Post operative discharge		1 month after operation		2 month after operation		3 month after operation	
Functional capacity measurement	Group	No.	%	No.	%	No.	%	No.	%
Wound pain	St	26	100	25	29.59	20	74.07	18	66.67
	Co	28	100	28	100	27	96.43	26	92..86
		N.S.		N.S.		N.S		N.S	
Muscle pain (neck, shoulder back)	St	23	85.19	17	62.96	9	33.33	6	22.22
	Co	27	96.43	23	82.14	18	64.29	4	14.29
		N.S.		N.S.		S.		N.S.	

Fatigue	St	10	37.04	12	44.44	5	18.52	4	14.81
	Co	18	64.29	18	64.29	7	25.0	14	50.0
		S.		N.S.		N.S		N.S.	
Sleep disturbance	St	9	33.33	9	33.33	1	3.70	2	7.41
	Co	17	60.71	16	57.14	7	25.0	4	14.29
		S.		S.		S		N.S.	
Appetite	St	7	25.93	2	7.41	0	0	0	0
	Co	10	35.71	7	25.0	4	14.29	2	7.14
		N.S.		S.		S.		O.C.	
Wound discharge	St	7	25.93	6	22.22	1	3.70	1	3.70
	Co	5	17.86	8	28.57	3	10.71	0	0
		N.S.		N.S.		N.S.		N.S.	
Shortness of breath	St	6	22.22	8	29.63	6	22.22	7	25.93
	Co	8	28.57	10	35.71	4	14..29	10	35.71
		N.S.		N.S.		N.S.		N.S.	
Bowel motion Disorder	St	3	11.11	2	7.41	0	0	0	0
	Co	7	25	4	14.29	1	3.57	0	0
		N.S.		N.S.		N.S.		O.C.	
Leg incision,) disorder (edema) infection, pain)	St	3	11.11	6	22.22	3	11.11	0	0
	Co	6	21.43	14	50	8	28.57	8	28.57
		N.S.		S.		N.S.		S.	
Angina	St	0	0	1	3.70	0	0	0	0
	Co	0	0	2	7.14	0	0	2	7..14
		O.C.		N.S.		O.C.		N.S.	
Perspiration	St	2	7.41	1	3.70	1	3.70	1	3.70
	Co	4	14.29	2	7.14	2	7.14	2	7.14
		N.S.		N.S.		N.S.		N.S.	

Table (4) Showed that the health of study group was better than that of control group, but statistical difference was founded between percentage of various measurements of functional capacity which were observed for fatigue and sleep disturbance at post- operative discharge. During the first month of follow-up, still the condition of heath was better for cases, as determine by percentage of various functional capacity measurement, compared to the

controls .A statistically significant differences were found for sleep disturbances, appetite disturbance and leg incision only ($p \leq 0.05$)

During the second month, a statistical significant differences were observed for wound pain, muscle pain, sleep and appetite disturbance. During the 3rd month, still the health of cases were better than controls, but statistical significant differences were observed for percentages of wound pain , fatigue and leg incision only ($p \leq 0.05$).

Table (5) Distribution of the study and the control groups with CABG surgery by self efficacy and period of follow up.

Period of follow up		1 month after operation		2 months after operation		3 months after operation	
Self-efficacy measurements		**No.**	**%**	**No.**	**%**	**No.**	**%**
Stair clamping	St	23	85.19	20	74.07	24	88.89
	Co	4	14.29	14	50	19	67.86
		H.S*		S *		S. *	
Lifting object	St	11	40.74	17	62.96	20	74.07
	Co	7	25	12	42.86	13	46.43
		N.S.*		N.S *		S. *	
Driving**	St	0	0	1	5	16	80.0
	Co	0	0	2	11.11	7	38.89
		O.C		N.S. *		H.S. *	
Back to work	St	0	0	4	14.81	12	44.44
	Co	0	0	2	7.14	5	17.86
		O.C.		N.S.*		S. *	

S=the study group = 27 , Co=the control group =28 *= Obtained by using Z test for difference between two percentage (one tail), **=20 of the study group and 18 of the control drive car , O.C = Out of statistical comparison

Table (5) showed that the self –efficacy measurement as defined by stair climbing for the period of follow up after operation was better for the study group compared with the control group. Statistical analysis confirmed differences between both groups with regard to this variable ($p \leq 0.05$)

Regarding lifting objects, the health status of study was better, a statistical significant difference was observed between percentages of the third month only. A similar trend was observed for driving and returning back-to-work.

Table (6) Distribution of the study and the control group, for patient with CABG by functional capacity, self efficacy and period of follow up.

Response	Group	CABG				
		Study		Control		
	Period of follow up	Mean	SD	Mean	SD	C.S
Functional capacity	at discharge	3.85	1.63	5	1.56	H.S.
	1 month after operation	3.26	1.58	5.07	2.07	H.S.
	2 months after operation	1.63	1.01	3.68	2.33	H.S.
	3 month after operation	1.56	1.13	3.07	2.14	H.S.
		(1—3)H.S.		(1— 3)H.S.		
Self efficacy	1 month after operation	4.19	1.69	2.70	1.34	H.S.
	2 months after operation	5.26	2.12	4.39	1.59	S
	3 month after operation	7.81	2.32	5.75	2.30	H.S.
		(1—2)S (1—3)H.S.		(1—2)S (1—3)H.S.		

The study group =27, the control group = 28, (1—2) = from first month to second month, (1—3) =from first month to third month, by using t-test

To evaluate the health improvement of the study and control groups through scoring method, the data of table (6) revealed that the health of the study group with CABG surgery was better than that of the control group. A statistical significant differences were found between the study and the control groups of functional capacity, self-efficacy and period of follow up ($p \leq 0.05$).

The data also reveled that there was improvement of functional capacity measurement for the study and control groups, from discharge to 3rd month after operation. Highly

significant difference ($p \leq 0.05$), similar trend of improvement of self –efficacy was observed from the first month to 3rd month after operation.

Discussion

The result of table one and two revealed that the study and the control group were comparable with regard to various socio-demographic characteristics. Similar finding were reported by other researcher[4,6] who found that no statistical significant differences between the control and the experimental patients for age, sex, type of surgery, functional class as defined by the New York Health Association (NYHA) and duration of hospitality.

Patients, who participated in the intervention educational program demonstrated a significant increase in their knowledge when the pretest, the post test 1and post test 2 scores were compared .By comparing the knowledge test scores of the study and control group at 3 months after operation, the data showed highly significant difference ($p \leq 0.05$) (table 3). Similar finding have been reported by other study [4] who stated that participant, who were receiving the supportive educative telephone program, demonstrated significantly greater level of knowledge than that of the control group. Marshall et. al. (1986) revealed that the study and control group had higher total knowledge scores after surgery.

Data analysis had revealed that the study group had benefited from the educational program throughout the improvement in the self efficacy measurement during the period of follow-up.

Effectiveness of educational program was clearly observed through the results of table (4)Although the health status of the study group was better than that of the control group, the statistical significant differences were not found in various self-efficacy measurements. As for lifting object, driving and back to work, the finding showed significant differences during the 3rd month only ($p \leq 0.05$). This means that educational program was effective due to the provided instructions in the education program and the emphasized resumption of these activities after 3 month.

When the scoring of self- efficacy measurements, was used, (table 6) the data revealed highly significant differences between study and control group for CABG patient, during the period of follow up ($p \leq 0.01$). High determined for both study and control groups ($p \leq 0.01$). These results indicated improvement of the self-efficacy measurement for both the study and the control groups but nursing education program played more vital and essential part in such improvement.

These finding were supported by study[5] who found a dramatic rise in the experimental group for walking between 4 and 8 weeks ($p<0.05$) and between 8 and 24 weeks and also reported higher ability in lifting objects in 8 weeks post operatively.

Allen [2] stated that the measurement of the physical activity was somewhat higher in patients receiving special intervention than those receiving usual care.

Recommendations

1- Implementation of the educational program should be performed by nurses for patients with open heart surgery before and after the operation, as well as during the recovery period

2- Reinforcement of education during the follow-up period concerning to the patients needs.

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