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Technical paper

Impact of educational nursing program on reducing the level of anxiety and complications among patients undergoing cardiac catheterization

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Abstract

The current study
Aimed: to identify the impact of implementing an educational nursing program on reducing the level of anxiety and complications among patients undergoing cardiac catheterization.
Design: quasi-experimental design was used in this study. Setting: the Current study was conducted at Assiut University Hospital in the cardiac catheterization unit.
Subjects: 60 adult patients, age between 20 – 65 years, male and female, thirty for each group (study and control). The group of patients who received educational nursing program was considered a study group, while who received a routine care was the control group. Tools: four.
Tools: Structure Interview Questionnaire sheet, Hamilton Anxiety Rating Scale, Assessment of complications, & educational nursing program.
Results: there was the statistically significant difference between both groups regarding the level of anxiety and incidence of local complications.
Conclusion: giving written nursing program for patients more effective in decreasing level of anxiety for patients in the study group than the control group patients.
Recommendations: Permanent attendance of a specialized nurse in the cardiac catheterization unit is of great importance to instruct and apply the guidelines of the patients. Simple illustration booklet and pamphlets must be adequate and available for patients with Arabic explanation that helps the patient how to live safely.

Keywords: *Anxiety; Cardiac Catheterization; and Educational Nursing Program.*

1. Introduction

The circulatory system is a network of flexible tubes through which blood flows as it carries oxygen and nutrients to all parts of the body. The heart pumps blood that delivers life-sustaining oxygen and nutrients to 300 trillion cells. Each day the average heart beats 100,000 times and pumps about 2,000 gallons of blood (Adam, 2005 & Evans & Tippins, 2008). Cardiac catheterization is a test can include a coronary angiogram used to evaluate heart and blood pressure and blood flow in the chambers of the heart, blood flow in the coronary arteries, find out how well the heart valves work, and check for defects in the way the wall of the heart moves (Davidson & Bonow, 2011). Cardiac catheterization is done to evaluate chest pain and done on individuals who are having a myocardial infarction or a heart attack, & opening up blocked arteries (Swanton, 2003). Cardiac catheterization is performed for diagnosis and to evaluate systolic and diastolic cardiac function, congenital abnormalities, coronary artery lesions, rheumatic, and coronary vessels thrombus (Chulay & Burns, 2007).

The procedure performed in darkened a cool room. During the procedure the patient lies on a table special for this test, that can help take X-rays, by repositioning the table or moving the X-ray machine around the patient. The patient attached to equipment for continuous cardiac, blood pressure, and pulse oximetry monitoring, and then passing the catheter, from groin or arm into left side or the right of the heart. Patient awake during the procedure and asked the patient to cough and take a deep breath at certain times. Tell patient when to suffer from chest discomfort or trouble breathing must be reported to doctors (David, 2012).
During the test, the doctor injects contrast media into the left ventricle, the patient feel flushed or warm for a minute. Then the doctor can: measure oxygen, blood flow and pressure in chambers and large arteries around the heart, collect blood samples, examine the arteries of the heart; heart muscle biopsy could be taken. If the patient has a blockage, the angioplasty and a stent placed during the procedure. The test last half to one hour. Following the procedure, remove the catheter and direct pressure at the site of inser-

tion to stop bleeding. post procedure the patient should be monitored and assessed in the recovery room, and the patient must be rest and affected extremity must be immobilized (American Heart Association, 2007).

Patient preparation: patients admitted on the morning of the procedure to the hospital or one to three days before procedure according to their medical history. The nurse must do assessment to obtain baseline data which can be used for discharge planning (Lewis, et al., 2001). The nurse must teach the patient coughing and breathing exercises, foot and leg exercises, hygienic care, and preparation of insertion site by removing hair, clean the site with the antiseptic solution. Before procedure, the medications which reduce fluid volume and increase bleeding must be held by physician order. Medications that increase bleeding must be stopped before the procedure; include aspirin, (three to seven days); warfarin (Coumadin), (four to five days); and heparin, (four hours), and diuretics are stopped two days before the procedure. Ask the patient about any allergy from dye or any medications. The patient must be fasting (eat or drink fluids) eight to twelve hours before the procedure to prevent postoperative vomiting; oral hypoglycemic agents and insulin are decreased or stopped at the morning of the procedure, the staff member can ask the patient if they have questions related to the educational information that was distributed by the cath lab. (Williams & Hopper, 2001).

The nurse should explain the procedure, risks, and complications. The patient must be wearing a hospital gown and must be signed consent before the procedure is required (Kern, 2011). Before the procedure asks the patient the allergy to medications, reaction to contrast iodine and dye, medications may be affecting the procedure (Smeltzer & Bare, 2004). This procedure is performed to decide if the patient needs heart surgery (Kern, 2011). There are many risks occur with cardiac catheterization include: injury to a coronary artery, cardiac tamponade, the heartbeat may be irregular, heart attack, reaction to contrast dye, low blood pressure, and stroke (Hurst et al., 2004). Complications that may be occured include: infection, bleeding, and pain at sheath or IV insertion site, Kidney damage, blood clots, & damage to blood vessels (Kern, 2011).

Before to invasive procedures, the commonest patients suffer from anxiety. Anxiety is the worry of the unknown, disproportionate to the danger and related to the future. Cardiac cath lab nursing staff can make a truly wonderful impact on the physiological and psychological health of their patients by taking the time to consider their current educational approaches. Nurse working in cardiac cath unit needs to evaluate the contemporary approach to teach their patients earlier than method and do not forget what the literature supports as proof-based totally exercise to offer excellence in patient training. (Lewis, Heitkemper, & Dirksen, 2004).

Anxiety has been shown to cause excessive tiers of stress, creating delays in recovery and extended duration of stay within the hospital. The nurses have handled affected person physiological needs with great confidence, but patient psychological needs, such as the manifestation of anxiety, have now not acquired the equal attention (Lewis et al., 2004). Cupples and Martin (1996) who mentioned that pre-operatively patients who received educational nursing instructions help to decrease pain, gastrointestinal tract disturbances and much less degree of anxiety and period of hospital stay.

Education timing; the favorite time for teaching the patients is as early as possible. Harkness et al., (2003) found that sixty percent of patients felt their anxiety elevated over time and that sixty-eight percent of these patients desired contact within the first two weeks of getting to know that they would need a heart catheterization. The reality in a cath lab setting, however, is that patients arrive through various pathways, which means that the time available before the procedure for education varies substantially. Patients come as an outpatient admission from a heart specialist's office days to weeks in advance, as a same-day admission from a family practice admit or as an emergency admit for acute myocardial infarction. No matter how patients arrive at the cath lab, then the need for pre-cardiac catheterization education still exists (Chair & Thompson, 2003).

Complications were classified into sixteen categories, and each complication was grouped as mild, moderate, or severe complication. These complications are (arrhythmia, hypotension, vascular thrombus, embolism, vascular bleeding, urticaria, respiratory, fever, nausea, vomiting, cardiac perforation, balloon rupture, device or coil related, back pain, chest discomfort and dysuria). Severe complications included death and cardiac arrest (Ko Eun Lee et al., 2016).

1.1. Aim of the study

The current study aimed to identify the impact of implementing an educational nursing program on reducing the level of anxiety and complications among patients undergoing cardiac catheterization.

1.2. Research hypothesis

The level of post-cardiac catheterization anxiety and complications after implementation of the nursing program in the study group was lesser than the control group.

2. Subjects and methods

2.1. Design

Quasi-experimental study design was utilized in the study.

2.2. Setting

This study was carried out at Assiut University Hospital in the cardiac catheterization unit.

2.3. Sample

A convenience sample of 60 adult patients, their age ranged between 20 – 65 years, both male and females. The subjects divided equally into two groups, thirty for study and thirty for control groups. Patients were choosing randomized; the patient admitted to the department at the first month was assigned for a study and the second month was assigned for the control group and so for every next month. The study subject was received the nursing instruction, while the control group received routine care.

2.4. Tools

2.4.1. Structure interview questionnaire

It has been designed and used by the researcher according to a literature review to assess data for patients and is divided into two parts:

Part I: Demographic data e.g., patient sex, age, marital status, level of education, and occupation.

Part II: Medical data such as a) Medical history; as palpitations, chest pain, cough, dyspnea, extremity pain, and edema. b) Health habits such as the use of tea and coffee, smoking, and exercise. c) Assessment of risk factors such as obesity and diabetes mellitus. d) Physical examination: such as measuring of pulse and blood pressure, inspection cyanosis of nail beds, face, thorax, abdomen, and lower extremities, capillary refill, and edema.

2.4.2. Hamilton anxiety rating scale (HAR-A): (pre-test & post-test)

This scale was one of the first rating scales developed to measure the severity of anxiety symptoms. The scale compromised of fourteen items, each defined by a series of symptoms, and measures both psychic anxiety (mental agitation and psychological distress)

and somatic anxiety (physical complaints related to anxiety). The items assessed by the scale are tension, anxious mood, insomnia, fears, intellectual, depressed mood, somatic motor, somatic sensory, cardiovascular symptoms, respiratory symptoms, gastrointestinal symptoms, genitourinary symptoms, automatic symptoms, and behavior at interview. Each item is scored on a scale of zero (not present) to four (severe), with a total score of zero to fifty six, where less than eighteen indicates mild anxiety, eighteen to twenty-four indicates moderate anxiety, twenty-five to thirty indicates severe anxiety, and thirty one to fifty-six indicates too severe anxiety (Hamilton, 1959; Maier et al., 1988).

2.4.3. Assessment of complications: (on follow up after 3 weeks from discharge)

It was developed by the researchers to assess complications of cardiac catheterization depending on review of national and international references. It included; local and systemic complications as respiratory, circulatory, urinary, and gastrointestinal complications.

2.4.4. Educational nursing program

It has been designed to decrease post-operative patients' anxiety as well as complications. The researcher developed an educational nursing program according to the literature review, available resources, and patient assessment needs; this program included two major parts;

1) The first was concerning the cognitive skills:
- Information about the definition of cardiac catheterization, indications, complications, anatomy, and function of the heart, the definition of heart disease, and diagnostic procedure is done before the procedure.
- Nursing management; included information about perioperative nursing care.
- Information about the nutrition: it includes instructions about foods that are rich in vitamin C (tomatoes and citrus fruits) and the foods rich in iron (potatoes, beef, liver, dried fruits, and beans). Which help the patient become feel well and help in the wound healing. The fat in diet must be low; decrease salt in the diet, sodium intake should be [2-4] grams per day. The weight of the patient must be controlled (Williams & Wilkins, 2006).
- Discharge instructions: such as instructions about exercise and walking, shower, rest and sleep, nutrition, fluid intake, driving, lifting, work, smoking, and follow-up.

2) The second was concerning the practical skills, i.e. deep breathing and coughing exercise, leg exercise, hygienic care, and preparation of the insert site.

3. Methods

3.1. Administrative approval

To collect the data for current study an official approval and administration permission was obtained from the head of the cardiac catheterization unit; the aim of current study & program was to explain to patients.

3.2. Pilot study

A pilot study was conducted on ten percent (six patients) during August 2017. In order to evaluate applicability and clarity of tools and then it has been modified according to the result of the pilot study and included in the main study.

3.3. Ethical consideration

- The research proposal was approved by the ethical committee in the college of nursing, there is no danger for study patient during the application of the research, and oral consent has been acquired from patients or guidance. The researcher introduced themselves to patients and they have been assured the confidentiality of the collected data. Privacy of study subject was considered during the collection of data. The patient may be withdrawn at any time of the study.
- The validity of the content has been assured by five professionals' opinions from the cardiac catheterization department and nursing field at Assiut University. Modifications have been performed according to the opinion of them, and then the final format of tools was designed.

3.4. Data collection

The data were collected over a period of six months starting from October 2017 till the end of March 2018. The data collection was done in three phases:

3.4.1. Preparatory phase (assessment and planning phase): involved the following

- Through this phase, the researcher designed and tested an educational nursing program after extensive literature review (nursing textbooks, journals, internet resources, etc), Then content and construct validity for data collection tools were carried out.
- Prepare the contents of the educational nursing program, based on the assessment and the available equipment in the unit for its application
- Arrange for the educational nursing program schedule, based on the contents of the program, each patient was interviewed and teaching individually.

3.4.2. Implementation phase

- The patients interviewed from the researcher individually, took oral consent to participate, and answered the questions during the interview. The data collection of the patient which was done must be recorded for the study and control group.
- At initial interview the researcher explained the nature & purpose of educational nursing program. Preparing of instructional education place, teaching resource and media (images, Arabic handout; the content of program modified in Arabic language and give it to the patient) to help and facilitate the implementation of the educational program.
- Four teaching sessions were conducted for each patient in addition to the initial assessment session.
- **1st session;** teach the patient information about the anatomy and function of the heart, heart disease, definition of cardiac cath, uses, risk factors, complications & laboratory tests done before the procedure. The time needed for the first session was twenty-five to thirty-five minutes.
- **2nd session;** information about nursing care for procedure provided by researcher to patients included three parts:

Part (1): information about educational skills before surgery related to preparation such as teach the patient coughing and breathing exercises, foot and leg exercises, hygienic care, preparation of insert site, diet and fluids restriction at least 6-8 hours before procedure and bladder emptying. Started when patient arrival to the unit, recording patient's data about patient's height and weight, past medical history, and allergy status. Then some investigation must be done, such as electrocardiogram (ECG), pulse, blood pressure, and temperature must be measured.

Part (2): the patient must be provided with information about the day of the procedure; a blood sample should be sent to check that the patient's international ratio (INR) is below two. Inform the patients and their family about the procedure and what to expect and answer any questions that they might have and fully explain the procedure, its hazards, and benefits. Patients should fast as hospital protocol. In general, the fluids are allowed up to two

hours before anesthesia and light diet up to six hours. Allow patients to evacuate their bladder before the procedure. All documentation, including laboratory results and reports, are available to the cath lab staff.

Part (3): Information about nursing care during the procedure; once the patient arrives in the cath lab, he may be requested to lie down on the catheterization table. Electrode stickers could be located on his torso so that the ECG can monitor heart rate and rhythm during the procedure. A probe can be positioned on the patient's finger to monitor their blood oxygen saturation and blood pressure will be monitored intravascular during the procedure. The patient will be covered with sterile drapes. Once the patient lies on the table, both inguinal areas of the thighs will be liberally cleaned with an antiseptic solution. Then, the patient will be covered with sterile cloth, leaving the femoral artery uncovered. The patient should be warned that he might experience some burning as the anesthetic is being injected. Once the area is anaesthetized, an introducer sheath is inserted into the femoral artery. The patient feels tugging and pushing. Although most patients experience little or no discomfort during the procedure, patients should be advised to let staff know if the local anesthetic begins to wear off so that grater anesthesia may be administered. Patients should also be advised to let the staff realize if they are experiencing any angina or chest pain so that suitable analgesia can be administered. The patient should be alarmed that he may experience a temporary hot flash or flushing while the dye is being injected. The time used thirty to forty-five minutes for this session.

- **3rd session:** Information about post-procedure nursing management: Once the procedure is completed, the patient was returned back to the ward. On warding, the patient will be attached to a cardiac monitor and blood pressure cuff so that the nurse can obtain their baseline measurements. The nurse will check the puncture site; observe any bleeding, check the pedal pulse and the peripheral skin color and temperature of the limb below the puncture site. Whilst on bed rest, the nurse should observe the access site every half-hour for signs of bleeding, swelling or hematoma formation. The researcher advised the patient leg straight, and support the site of puncture when sneezing or coughing. When the patients feel any blood, wetness or stickiness should inform the nursing staff. The blood pressure and heart rate should be measured. After procedure patients must be taken fluid for the diuretic action of the contrast dye and prevent hypotension. If the patient is unable to drink, intravenous fluids should be administered. Patients should remain on bed rest as per hospital protocol. The patient should lie flat for one hour and sit up for two hours at forty-five degrees before being allowed to mobilize. Once the patient has mobilized and been observed for thirty to sixty minutes, without any complications, they can be discharged on the same day as the procedure. The time used for thirty-five to forty-five minutes for this session.
- **4th session;** provided information about discharge instructions about puncture-site care, and informed when observe bleeding at the site of puncture, sudden or severe pain at the puncture site, tingling or numbness & tachycardia should require a doctor's review. A discharge leaflet should be provided. Instruct the patient about the medication which must take it correctly after discharge from the hospital. Time used for each session about thirty-five to forty-five minutes. The end of each session the researcher was making discussion with the patient and feedback, the last session which include discharge instruction, which will take fifty to sixty minutes.

The implementation phase comprised the preoperative, postoperative, and during this phase, the exercise educational nursing program was implemented.

3.4.2.1. Pre-procedure

- Patients were equally enrolled in the study as control and study groups sequentially. The 1st patient's interview was used to explain the purpose and nature of the study, as well as patient agreement for voluntary participation, was obtained,
- The 1st sessions from the educational nursing program carried out in a 1st interview with the study group and take break 10 minutes between every session.
- The 2nd and 3rd sessions from the educational nursing program carried out in a 1st interview with the study group and take break 10 minutes between every session.
- The last session from the educational nursing program carried out in a 2nd, interview with the study group and take break 45 - 60 minutes.

3.4.2.2. Post procedure

- The 3rd interview with study group was at 2nd day postoperatively, and then one time daily during hospitalization for baseline data was obtained from the study and control groups patients.
- Before discharge, the investigator emphasized the importance of follow up visit for all subjects (study and control) and arranged with study group the time and place for follow up which were 2 weeks postoperatively in outpatient clinic at Assiut University Hospitals.
- Control group patients were exposed to the routine hospital nursing intervention, while study group patients were received pre-operative teaching about, deep breathing and coughing exercise, and legs exercise. The demonstration, and return demonstration were done. Posters were utilized to help patients to know well the information and practices given.

3.5.1. Evaluation phase

The last phase of the proposed educational nursing program is the evaluation phase. After implementation of the educational nursing program, the patient level of anxiety has been evaluated by the researcher through filling the tool (2) using Hamilton Anxiety Rating Scale (HAR-A) which carry out before and after implementation of the educational nursing program. The researcher through filling the tool (3) which carry out after 3 weeks from discharge has evaluated the complications.

4. Analysis of the results:

Data collected and entered by Microsoft Excel 2010 program, the SPSS version (20) (Statistical package for social science) used for statistical analysis of data. The frequency used to calculate count and percentage, where descriptive used to calculate mean + standard deviation for quantitative data.

5. Results:

Table (1): the current study results show that two third of the patients' in study group 66.7% was male, 83.3 % married, 76.7% their age from (50 - 60 years), 23.3 % were university educated, 46.7% were others working. While the patients' in control group 80.0 % male, 66.7% married, 50.0 % age from (50- 60 years), 23.3 % were a secondary school, As regard farmer and professional they were equally in control group 26.7 %.

Table (2): This table demonstrates that the more than two third of the sample in the study group have palpitation (90.0%), and (96.7%) have Fatigue. while all patients in the control group have palpitation and fatigue (100.0%). As regard the percentage of chest pain was equally in both groups (96.7%). As regard performing daily exercise more than half of the sample of the control group performing daily exercise (63.3%), while in study group (36.7%) have performing the exercise (36.7%). As regards smoking the more than half of the patients' in control group smoked (63.3%) while only (36.7%) of study group were smoked.

Table (3): Concern the body mass index; more than one third (43.3 % and 40.0% respectively) in control and study groups overweighed. The data revealed that a high percentage in both study and control groups (86.7% and 90.0% respectively) use anticoagulant. Concern for chronic obstructive pulmonary disease and use of antibiotics they were equally in study and control groups. The highest percentages of patients in the study and control group complain from hypertension (73.3% and 86.7% respectively).

Table (4): This table shows that the majority of the studied sample was having a normal abdomen thorax and color of face and nail beds. As regard lower extremities assessment; the highest percent of the studied sample was complaining of lower limbs edema and pain mostly of the pitting type.

Table (5): this table illustrated that there was the statistically significant difference between both groups regarding the level of anxiety.

Table (6): illustrated that there was a statistically significant difference between both the study and control group regarding incidence of local and gastro intestinal complications except paralytic ileus. As regard circulatory complications; myocardial infarction (23.3 %) followed by (20 %) of the control group had hypovolemic shock while both of these percentages were only (3.3 %) in the study group. Looking to respiratory complications (26.7%) of the control group developed pneumonia compared to only (0 %) in the study group, and finally there was no statistically significant difference between both groups as regard urinary complications.

Table 1: Distribution of the Scio-Demographic Patient Characteristics in Study and Control Group (N = 60)

Variable	Study (n= 30)		Control (n= 30)	
	No.	%	No.	%
1) Sex:				
• Male	20	66.7	24	80.0
• Female	10	33.3	6	20.0
2) Marital status:				
• Single	1	3.3	1	3.3
• Married	25	83.3	20	66.7
• Divorced	3	10.0	3	10.0
• Widowed	1	3.3	6	20.0
3) Age:				
• 18 - < 30 years	1	3.3	1	3.3
• 30 - < 40 years	1	3.3	6	20.0
• 40 - < 50 years	5	16.7	8	26.7
• 50- 60 years	23	76.7	15	50.0
4) Educational level:				
• Illiterate	5	16.7	6	20.0
• Read & write	6	20.0	6	20.0
• Primary	2	6.7	2	6.7
• Preparatory	4	13.3	5	16.7
• Secondary	6	20.0	7	23.3
• University	7	23.3	4	13.3
5) Occupation:				
• Not working	9	30.0	6	20.0
• Farmer	5	16.7	8	26.7
• Professional	2	6.7	8	26.7
• Hospital member	0	0.0	2	6.7
• Others	14	46.7	6	20.0

Table 2: Distribution of the Sample According to Common Cardiovascular Symptoms and Health Habits for Study and Control Group (N = 60)

Variable	Study (n= 30)		Control (n= 30)		P-value
	No.	%	No.	%	
Common cardiovascular symptoms:					
• Chest pain	29	96.7	29	96.7	--
• Palpitation	27	90.0	30	100.0	0.236
• Dyspnea	23	76.7	25	83.3	0.739
• Cough	20	66.7	11	36.7	--
• Edema	13	43.3	16	53.3	0.196
• Extremity pain	19	63.3	24	80.0	0.152
• Nocturnal dyspnea	11	36.7	14	46.7	0.118
• Fatigue	29	96.7	30	100.0	0.313
Health habits:					
• Use of tea and coffee	25	83.3	30	100.0	0.062
• Use alcohol	1	3.3	0	0.0	0.313
• Smoking	11	36.7	19	63.3	0.121
• Exercise	16	53.3	17	56.7	0.432

Table 3: Distribution of the Sample According to Risk Factors for Both Study and Control Group (N = 60)

Variable	Study (n= 30)		Control (n= 30)		P-value
	No.	%	No.	%	
Body mass index (BMI) classification:					
• Standard	10	33.3	6	20.0	0.959
• Overweight	12	40.0	13	43.3	
• Obese	8	26.7	11	36.7	
Diabetes	8	26.7	13	43.3	0.176
Hypertension	22	73.3	26	86.7	0.197
Chronic obstructive pulmonary disease	5	16.7	5	16.7	0.470
Previous cardiac catheterization	12	40.0	10	33.3	0.592
Admission to the ICU before surgery	16	53.3	12	40.0	0.037*

Use antibiotics	22	73.3	22	73.3	--
Use anti-coagulant	26	86.7	27	90.0	0.688

Table 4: Distribution of the Sample According to Physical Examination Pre Cardiac Catheterization for Both Study and Control Group (N= 60)

Items	Study (n= 30)		Control (n= 30)		P-value
	No.	%	No.	%	
I. Inspection:					
Face:					
• Pink	19	63.3	15	50.0	0.400
• Cyanosis	0	0.0	1	3.3	
• Pale	11	36.7	14	46.7	
Thorax:					
• Normal	25	83.3	19	63.3	
• Skeletal deformities	1	3.3	0	0.0	0.163
• Scars	3	10.0	4	13.3	
• Bruises	0	0.0	1	3.3	
• Wounds	1	3.3	6	20.0	
Abdomen:					
• Normal	18	60.0	16	53.3	0.772
• Distension	4	13.3	6	20.0	
• Scars	8	26.7	8	26.7	
Nail beds:					
• Normal	21	70.0	17	56.7	0.491
• Cyanosis	3	10.0	3	10.0	
• Clubbing	6	20.0	10	33.3	
Lower extremities					
• Normal	10	33.3	11	36.7	0.787
• Pale	11	36.7	17	56.7	0.121
• Pain	13	43.3	19	63.3	0.121
• Edema	11	36.7	16	53.3	0.194
• Ulcer	0	0.0	3	10.0	0.236
Jugular veins:					
• Normal	19	63.3	22	73.3	0.405
• Congested	11	36.7	8	26.7	
II. Palpation:					
Pulse:					
• Weak and thread	14	46.7	15	50.0	0.355
• Normal pulse	14	46.7	15	50.0	
• Hyper dynamic pulse	2	6.7	0	0.0	
Capillary refill:					
• Normal	20	66.7	20	66.7	--
• Delay	10	33.3	10	33.3	
Edema:					
• Not present	18	60.0	15	50.0	0.342
• Present pitting	6	20.0	11	36.7	
• Non-pitting	6	20.0	4	13.3	

Table 5: Distribution of the Sample According to Level of Anxiety for Both Study and Control Group Used (Hamilton Anxiety Scale (HAM-A) (N = 30)

Items	Study (n= 30)	Control (n= 30)	P-value
Pre-test:			
Mean ± SD	33.73 ± 9.38	42.23 ± 8.87	0.001*
Range	22 – 56	27 – 56	
Post-test:			
Mean ± SD	9.43 ± 3.54	22.43 ± 5.84	0.000*
Range	3 – 15	15 – 38	
P-value	0.000*	0.000*	

Table 6: Distribution of the Sample According to Complications for Both Study and Control Group on Follow Up after 3 Weeks from Discharge (N= 60)

Variable	Study (n= 30)		Control (n= 30)		P-value
	No.	%	No.	%	
Local complications:					
Bleeding	2	6.7	11	36.7	0.005*
Hematoma	4	13.3	17	56.7	0.000*
Pain	1	3.3	12	40.0	0.001*
Numbness	0	0.0	12	40.0	0.000*
Swelling	5	16.7	19	63.3	0.000*
Edema	10	33.3	20	66.7	0.010*
Infection	0	0.0	13	43.3	0.000*
Circulatory complications:					
Arterial or venous infection	1	3.3	3	10.0	0.605
Hypovolemic shock	1	3.3	6	20.0	0.108
Stroke	0	0.0	0	0.0	-----
Myocardial infarction	1	3.3	7	23.3	0.058
Respiratory complications:					
Pneumonia	0	0.0	8	26.7	0.008*
Respiratory failure	0	0.0	3	10.0	0.472
Gastrointestinal complications:					

Nausea & vomiting	3	10.0	12	41.4	0.006*
Constipation	0	0.0	13	43.3	0.000*
Paralytic ileus	0	0.0	0	0.0	-----
Urinary complications:					
Urinary retention	1	3.3	5	16.7	0.197
Urinary tract infection	1	3.3	3	10.0	0.605
Kidney failure	1	3.3	3	10.0	0.605

6. Discussion

Cardiac catheterization refers to a difference of procedures which can be used to diagnose coronary artery disease, abnormalities of the heart muscle (infarction or cardiomyopathy), and abnormalities in valves and congenital heart abnormalities (Kern, 2003). They're invasive procedures and done in a sterile fluoroscopy unit (cath lab) (Morton, Fontaine, Hudak, & Gallo, 2005). Even though in adults, cardiac catheterization is used to evaluate the vascularization of blood vessels and diagnose coronary artery disease (O'Grady, 2007)

There is a decreased mortality and morbidity related to cardiac catheterization. Analysis of complications in more than 200,000 patients indicated that the hazard of death becomes less than 0.1%, myocardial infarction less than 0.05%, stroke less than 0.07%, serious ventricular arrhythmia less than a half percent and major vascular complication (thrombosis, bleeding requiring a transfusion, pseudoaneurysm) less than one percent (Julian, Cowan, & McLenachan, 2005).

Anxiety may provoke angina before the start of the procedure, or the patient may drop their blood pressure and feel faint on arrival in the cath lab (Swanton, 2003). Therefore, depending on the hospital protocol, the patient may receive a mild sedative prior to the procedure (Morton, et al., 2005 & 2009).

The discussion of the current study was formulated in the following sequence: 1st part presents patient' characteristics, 2nd describes patient medical data and health habits, 3rd part describes risk factors, and 4th part describes physical assessment, and fifth describes the level of anxiety.

Part 1: Patient' Characteristics:

Current study reported that more than two third of the studied samples were male, married aged between fifty to sixty years. As regards the educational level, less than one-third of the patients were secondary and university educated, Anderson et al., (2005) agree with our study reported that the cardiac catheterization is more common in people aged forty to sixty.

Part II: Patient medical data and health habits:

As regard cardiovascular symptoms assessment, the majority of the samples in the study group have palpitation and fatigue. While all patients in the control group who participate have palpitation and fatigue. The results were in line with those of Spelman, (2000) who mentioned that, all patients with heart disease suffering from palpitation and fatigue. As regard consumption of tea and coffee, the result mentioned that the patients' in the control group more than study ones as regard use of tea and coffee. The highest percentage of the patients' in the control group had smoked more than study. These results are in agreement with those of Kern, (2005) and Delgado et al., (2001) who stated that the majority of the sample in study and control groups was smokers.

Part III: Risk Factors:

The current study assessed the risk factors affecting to the heart disease which contributed the patient must be performed a cardiac cath; more than one-third of the studied samples were overweight, the data revealed that high percentage in the studied sample have use anti-coagulant, and the majority of them were complaining from hypertension. According to Morton, et al., (2005) & Rosendorff, (2005); who mentioned that coronary heart disease and hypertension were found to be predictive for the development of congestive heart failure. Other hazards elements for at risk of chronic heart failure were obesity, smoking, and stress.

Azer et al., (2015) mentioned that there has been no statistically significant distinction among both the study and control group regarding body mass index (p-value 0.959) with less than half of the studied sample (forty percent) have been overweight, the general public of each the studied samples were hypertensive (73.3 % and 86.7 %) respectively, (forty percent) of the study group admitted previously to the ICU.

The present study, finding confirmed that more than 2/3 who participate in both groups had been using antibiotics, these consequences are in identical line with those of Trick et al., (2000) who emphasized that broad-spectrum antibiotics are prescribed before surgery. Paletta et al., (2000) reported that administration of antibiotics beginning one hour before the surgical operation and persevering with a post-operative period.

Part IV: Physical assessment variable:

The current study mentioned that the majority of the sample were having a normal finding regarding nail beds and face color, thorax, and abdomen. As regards lower extremities assessment; the majority of the studied sample were complaining of pitting edema in the lower limbs and pain. According to Punder (2005) and Kaplow and Hardin (2007) who reported that blood pressure and pulse are useful tools to assess cardiac output in heart disease.

Part V: Level of anxiety:

The present study reported that there has been a statistically significant distinction among both the study and control group regarding the level of anxiety this agree with Higgens et al., (2001) mentioned that patients who take knowledge pre-procedure are able to cope better during the actual procedure. According to Adam (2005), Koplow and Hardin (2007) who illustrated that preparation and teaching of patients have influence on response to hospitalization and surgery. Preparation and provision of information should start from the time of the surgeon's decision that surgery is required. According to Scott, (2004) he found that there are some deficiencies in cardiac cath lab literature. First, there is lack of current data associated with affected person anxiety and the impact of patient education on decreasing anxiety. Second, current patient education materials ought to be evaluated to make surly they are actually at a fifth-grade reading/comprehension level. Additionally, a suitability assessment of materials should be done to assess for content, literacy demand, graphics, presentation, learning stimulation or motivation, and cultural appropriateness.

Couples (1991) recommended that the patient must prepared and provide them information in the form of booklets, videos, and counseling sessions. Margereson and Riley (2003) added that preoperative education is given either on an individual or group discussion.

Part VI: Assessment of the complications:

As regarding local complications of the cardiac catheterization the present study illustrated that; nearly two thirds of the control group had edema and swelling, and a little more than half of them had hematoma, followed by infection, pain and numbness while in the study group less than quarter of them had local complications. As regard circulatory complications; less than one third of control group had myocardial infarction followed by hypovolemic shock while both of these percentages were only less percentage in the study group. Looking to respiratory complications less than one third of the control group developed pneumonia compared to only zero in the study group.

According to (Ko Eun Lee et al., 2016) who mentioned that the most frequent overall complication was fever, followed by gastrointestinal complications such as vomiting, respiratory complication, arrhythmia, vascular thrombus, and vascular bleeding.

The present study illustrated that there was a statistically significant difference between both the study and control group regarding incidence of local and gastro intestinal complications except paralytic ileus. This result was in agreement with Kaplow & Har-

din (2007) reported that patients who received educational program pre-operatively were shown to have less nausea, vomiting, pain and post catheterization complications.

7. Conclusion

The current study finding that giving written educational nursing program for patients is effective in decreasing level of anxiety and complications for patients in the study group than patients in the control group who have not received the educational nursing program.

8. Recommendations

From the results of the present study recommended; Permanent attendance of a specialized nurse in the cardiac catheterization unit is of great importance to instruct and apply the guidelines of the patients. Providing a written rehabilitation booklet is of great value in reminding patients of the rehabilitation guidelines. Advice patients for regular follow up at the regular time. Simple booklet and pamphlets must be adequate and available for patients to with Arabic explanation that helps the patient how to live safely.

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