
APPRAISAL OF KNOWLEDGE OF CARDIAC CATHETERIZATION PROCEDURES AMONG CARDIAC PATIENTS IN CARDIOLOGY UNIT OF TANTA UNIVERSITY EDUCATIONAL HOSPITAL, EGYPT

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ABSTRACT

Cardiac catheterization is a valuable diagnostic procedure which does a Comprehensive examination of how the heart and its blood vessels function. One or more catheters are inserted through a peripheral blood vessel in the antecubital artery or vein and or femoral artery or vein with x-ray guidance. The present study aimed to assess the knowledge appraisal cardiac catheterization procedures among cardiac patients in cardiology unit of Tanta Educational Hospital, Egypt. Fifty patients undergoing the procedure of cardiac catheterization were selected to participate in this study for two months. Single tools were used for collection of data that was necessary for this study as follows: Patient's Knowledge Assessment Regarding Cardiac Catheterization Questionnaire, which comprises of socio-demographic characteristics of study population and patients' knowledge regarding cardiac catheterization. More than half of the study samples were female, illiterate, within the age range of 51years and above. 46% of the samples were married. 52% had previous history of cardiac catheterization and 56% got sources of knowledge and information about cardiac catheterization from health workers. 66% of the patient had poor knowledge regarding the procedure of cardiac catheterization. The statistical analysis shows there is a significant relationship between level of knowledge, as cardiac patients shows poor knowledge as regards to the procedure of cardiac catheterization. Hence, awareness about this procedure could be as a result of advent of new technology in health care delivery.

Key words: Cardiac catheterization, cath lab, knowledge, catheterization procedure, Tanta.

INTRODUCTION

Heart disease is currently the leading cause of death throughout the western world. This widespread problem has twice as high mortality rate as does cancer, which ranks second to heart disease as a cause of death. Before 1900, infectious diseases and malnutrition were the most common cause of death; they have been gradually supplanted in some countries by chronic disease such as cardiovascular disease (Braun and Douglas, 2001). At the beginning of the 20th century, cardiovascular diseases accounted for less than 10% of all deaths worldwide. At its end, cardiovascular disease accounted for nearly half of all deaths in the developed world and 25% in the developing countries. In 1990, the world population stood at 5.3 billion. Cardiovascular disease accounted for more than 14.3 million deaths or 28.5% of the world 50 million deaths. Of these, 6.3 million were due to coronary heart disease, 45% of cardiovascular death and 4.4 million were due to stroke, 31% of cardiovascular (Mary and Ewan, 2001).

In the developing countries, an estimated 9 million person died of cardiovascular disease in 1990. By the year 2020, that figure will be more than double to 18 million person annually accounting for approximately three-fourth of all cardiovascular disease death worldwide. Coronary artery disease is one of the causes of death. Cardiac catheterization is a procedure that is used to ensure about detection of coronary artery disease. In the United States, about 2 million heart patients undergo cardiac catheterization every year, and this number is increasing because this diagnosis method is valid and accurate, which like other critical procedures causes stress and anxiety in patients (Aviles et al 2004).

In Egypt, a prospective study conducted in Cairo University Hospital from 2009-2011, 3500 patient underwent cardiac catheterization with 2500 for diagnostic procedure and 1500 for interventional procedure. The incidence of femoral artery pseudoaneurysm after a diagnostic catheterization was 4% and was 2.67% after an interventional catheterization. The presence of pain or swelling in the groin after catheterization is the most common presentation of femoral artery pseudoaneurysm (Husein *et al* 2013). In spite of efforts to optimize patient selection for cardiac catheterization depending on the clinical history, Coronary angiography offers clinicians both diagnostic and therapeutic opportunities as heart disease is the commonest cause of death over all the world, and coronary angiography is the standard for detection of coronary artery disease. Many patients undergoing angiography are found to have normal coronary arteries, results of biochemical blood tests and stress testing, the ratio of normal coronary angiography ranges from 10 to 20%, more in women than in men. Normal coronaries in patients with recurrent chest pain should not be considered a benign issue, as acute myocardial infarction can occur on top of normal coronaries (Ziad, 2011).

Cardiac catheterization is most commonly performed to examine the coronary arteries, because heart attacks, angina, sudden death, and heart failure most often originate from disease in these arteries. Cardiac catheterization may reveal the presence of other conditions, including enlargement of the left ventricle; ventricular aneurysms (abnormal dilation of a blood vessel); narrowing of the aortic valve; insufficiency of the aortic or mitral valve; and septal defects that allow an abnormal flow of blood from one side of the heart to the other (King et al 2008). Cardiac catheterization with coronary angiography is recommended in patients with angina (especially unstable angina); suspected coronary artery disease; suspected silent ischemia and a family history of heart attack; congestive heart failure; congenital heart disease; and pericardial (lining outside the heart) disease. Catheterization is also recommended for patients with suspected valvular disease, including aortic stenosis (narrowing) or regurgitation, and mitral stenosis or regurgitation (King et al 2008). Patients with congenital cardiac

defects are also evaluated with cardiac catheterization to visualize the abnormal direction of blood flow associated with these diseases. In addition, the procedure may be performed after acute myocardial infarction (heart attack); before major noncardiac surgery in patients at high risk for cardiac problems; before cardiac surgery in patients at risk for coronary artery disease; and before such interventional technologies and procedures as stents and percutaneous transluminal coronary angioplasty (PTCA) or closure of small openings between the atria (upper chambers), called atrial septal defects (Nicholaus *et al*/2001).

Knowledge is a general understanding or familiarity with a subject or state of awareness of a particular facts or situation. To enhance patients' knowledge, skills and self care performance, patient's education is the primary intervention used by nurses. For instance, Brown 1988 found that patient teaching brought positive outcome in diabetic adult because it increased patient's knowledge and self care behavior. In the study, it is noted that together with the individuals who have diabetes mellitus, hypertension and Cardiovascular disease as well as family history of cardiovascular disease have high knowledge base. Furthermore, when health risks are much noticed people often feel that they don't receive sufficient information (Rosen *et al* 2003). Although, knowledge alone may be sufficient to change behavior it is necessary for self-assessment of information to develop average points to promote behavior changes which are the first step in accepting a program to promote a healthier life style. Basic knowledge assessment as part of all health education and promotion projects during formative evaluation (Rosen *et al* 2003). Cardiac catheterization nurses have a crucial role in providing a direct care for patients as well as giving information for patient and their families. This information may affect the patients' awareness of the disease, therapeutic management and care. So this study was done to assess level of knowledge appraisal of cardiac patients towards cardiac catheterization procedures.

MATERIAL AND METHOD

Study Design

A descriptive cross sectional research design was used to conduct this study.

Sample size and technique

A convenient sample size of 50 adult patients was selected in this study based on statistical analysis. The sample size was calculated at $N = 50$ based on the following criteria; 95% confidence limit, 80% power of the study, expected level of correct knowledge of 50%

Research Instrument/tools

Self-constructed structured questionnaire tools were developed to assess the knowledge of cardiac patients who underwent the procedure of cardiac catheterization in cardiology department of Tanta University Educational Hospital after reviewing relevant literature. The self-structured questions contained 25 for assessing knowledge before, during and after the procedure of catheterization. A Scoring system was used where zero score was given for **wrong** and **don't know** answer, while one (1) score was given for **right** answer, total marks will be summed up and converted to percentages and patients' level of knowledge will be calculated as follows:

- Poor** = Less than 60%,
- Fair** = Between 60-74%
- Good** = Knowledge level 75% and above.

Validity and Reliability of the instrument

The tool was constructed by the researcher after reviewing relevant literature and is presented to the juries for vetting and to ascertain face and content validity. A pilot study was carried out before starting the data collection and it was done on five (5) patients (10%) of sample population to test the feasibility and applicability of the tools and necessary modifications was done. The tool is reliable with a reliability coefficient of 0.98

Ethical considerations

Informed written consent was obtained from cardiac patient to participate in the study after explanation of the study purpose; patient was informed about the privacy of information, confidentiality of data and their right to withdraw at any time of the study. A human subject research guideline is followed so as to protect patient from any harm or injury during the course of the study in line with Helsinki declaration, Belmont report and CIOMS 2012 declarations.

RESULTS

Table1. Frequency distribution of studied cardiac patients according to socio-demographic characteristics (n = 50)

Socio-demographic characteristics of studied cardiac patient.		(n=50)	
		n	%
Age 41- <50 - 50+		11	22.0
		39	78.0
		Mean=46 SD=±10	
Sex Male Female		23	46.0
		27	54.0
Educational status Illiterate Elementary school High school Graduate level or higher		30	60.0
		11	22.0
		6	12.0
		3	6.0
Occupation Civil servant Professional Craftsmanship Farmers		6	12.0
		14	28.0
		2	4.0
		28	56.0
Marital status Married Divorce Widow		23	46.0
		10	20.0
		17	34.0
Previous history of cardiac catheterization Yes No		26	52.0
		24	48.0
Source of knowledge about cardiac catheterization Friends Radio/TV Health Care Professional		20	40.0
		2	4.0
		28	56.0

This table reveals that nearly quarter (22%) of the patients were within the age range from 41- <50years, while (78%) were in the age range of 50years and above. Mean and standard deviation of the age distribution is 46 ± 10 . Also, in relation to sex, more than half of the patients were female (54%), (46%) were male and (60%) of the patients were also illiterate. In relation to marital status, 46% of the patients were married, (20%) were divorced and (34%) were widow. In terms of occupation, (58%) of the patients were farmers and more than half of the patients (52%) had previous history of cardiac catheterization and (56%) got source of information about the procedure of cardiac catheterization from the health care professionals.

Table 2. Frequency distribution of cardiac patients according to their knowledge about pre cardiac catheterization care.(n =50)

Knowledge about PRE-Catheterization information and care	n=50 Cardiac patient Responses			
	Correct(right) (n=28)		Incorrect(Don't know) (n =22)	
	n	%	n	%
(1) There is a separate cath lab for cardiac catheterization	37	74.0	13	26.0
(2)Cardiac catheterization is insertion of catheter into the heart	33	66.0	17	34.0
(3.) Cardiac catheterization is an invasive procedure for treatment of cardiac diseases.	35	70.0	15	30.0
(4.)The site of insertion is either brachial or femoral artery	39	78.0	11	22.0
(5.)Before the procedure, the nurse will clean and shave the area	37	74.0	13	26.0
(6.)Proper and adequate sterilization is done before the procedure	37	74.0	13	26.0
(7.)Before the procedure, the nurse put IV line for drug administration	16	32.0	34	68.0
(8.)The patient has taken nothing by mouth before the procedure	13	26.0	37	74.0
(9.) Informed consent should be obtained before the procedure.	20	40.0	30	60.0
(10.) Cardiac monitoring system is placed by the patient bed side.	13	26.0	37	74.0

This table shows that more than three quarter of the patients (78%), (74%), (74%), and (74%), (74%) have correct knowledge about the site of catheter insertion, the nurse must shave and clean site and proper and adequate sterilization, and don't know they must not taken nothing per mouth and cardiac monitor must be beside patient bed as a pre catheterization knowledge. Also, this table presents that more than half (60%) of cardiac patient who undergone cardiac catheterization don't know that they must signed informed consent. Because of previous history of repeated cardiac catheterization, it can be seen that approximately quarter of cardiac patient who underwent cardiac

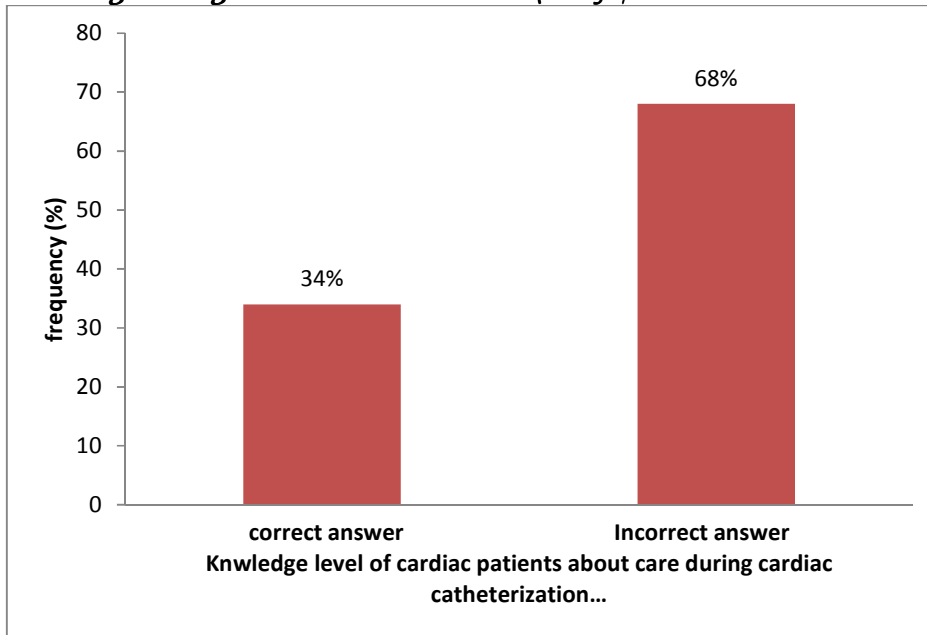
catheterization don't know the site of insertion, cleansing and shaving site and adequate sterilization as pre cardiac catheterization knowledge.

Table 3. Frequency distribution of cardiac patient according to knowledge about care during cardiac catheterization (n = 50)

Knowledge of cardiac patient during cardiac catheterization procedure.	(n=50) Cardiac patients responses			
	Correct (right) (n=14)		Incorrect (don't know) (n=36)	
	n	%	n	%
(1)A local anesthetic is usually given to numb the needle insertion site.	22	44.0	28	56.0
(2)There is a warm flush that follows injection of contrast medium.	10	20.0	40	80.0
(3)Patient is aware of physical sensation that will be experienced.	13	26.0	37	74.0
(4)Patient safety is taken into consideration during the procedure.	15	30.0	35	70.0
(5)Tissue biopsy is taken from different parts of the heart.	14	28.0	36	72.0
(6)Other laboratory and diagnostic investigation follows catheterization.	13	26.0	37	74.0
(7)Skin integrity and care is maintained throughout the procedure.	12	24.0	38	76.0

This table illustrates that majority (80%), and three quarter (76%), (74%), (74%), and (72%), (70%) of cardiac patients undergoing cardiac catheterization don't know that they may feels warm flush, skin integrity maintained as well as they need to be aware of physical sensation that will be experienced, other laboratory and diagnostic studies may be needed, biopsy is taken from different parts of the heart and finally patient safety is taken into consideration during the procedure respectively.

Fig 3-1 Frequency distribution of studied cardiac patients according to their knowledge during cardiac catheterization. (n =50)



This figure shows that majority of the patient (68%) had incorrect answers and don't know the questions asked during the cardiac catheterization care as shown above and only about one third of the patient (34%) could answer correctly as regards to questions asked during cardiac catheterization care.

Table 4. Frequency distribution of studied cardiac patient according to knowledge about post cardiac catheterization and care (n=50)

Knowledge about Post-cardiac Catheterization information and complications	(n=50) Cardiac patients responses			
	Correct (n=26)		Incorrect (n=24)	
	n	%	n	%
(1)Nursing care of patients helps in minimizing complications.	37	74.0	13	26.0
(2)Anticoagulants are given to patient to prevent complications during cardiac catheterization.	27	54.0	23	46.0
(3)Bed rest and immobilization of the affected extremity encouraged	31	62.0	19	38.0
(4)Ultrasound diagnosis is done for the repair of artery after catheterization.	27	54.0	23	46.0

(5)It is important to report any sign of bleeding after catheterization.	20	40.0	30	60.0
(6)Patient may experienced irregular heart beat after the procedure	21	42.0	29	58.0
(7)Follow-up care is advocated for recovery process and avoid complication	23	46.0	27	54.0
(8)Patient vital signs should be stable before transfer to the recovery room.	23	46.0	27	54.0

This table reveals that three-quarter of the patient, (74%) knows that nursing care of patient helps minimizes complications as regards to knowledge about post cardiac catheterization information and care. Also, nearly half of the patient (54%), (54%) and (54%), (54%) shows that anticoagulants are given to prevent complications, ultrasound diagnosis is done for the repair of artery after catheterization, and don't know that follow-up is advocated for recovery process and also don't know that patients vital signs should be stable before transfer to the recovery room. Furthermore, about two third (62%), (60%) of the patient knows that bed rest and immobilization of the affected extremity is encouraged and patient don't know the important of reporting any sign of bleeding after cardiac catheterization.

Tables. Comparing patients' knowledge before, during and after cardiac catheterization (n=50).

Cardiac patient Knowledge about the procedure of Cardiac Catheterization.(n=50)						χ^2	P
Pre-cardiac catheterization(N=20)		During-cardiac catheterization (N=14)		Post-cardiac catheterization care(N=16)			
n	%	n	%	n	%		
10	40.0	7	28.0	8	32.0	52.519	<0.001
5.60±2.983		1.96±2.321		4.18±2.899			

χ^2 p = Friedman chi square for Non-parametric test at p<0.001

n = number of cardiac patient

N = number of cardiac questions

This table shows a chi square relationship for comparison of more than two dependent variables. The mean knowledge of patient before catheterization 5.60±2.983, the mean knowledge during catheterization is 1.96±2.321 and the mean after the procedure of cardiac catheterization is 4.18±2.988. There are 25questions under knowledge category, with 10 questions before the procedure, 7

during the procedure and 8 after the procedure. On comparing the patient knowledge before, during and after the procedure, using Friedman chi-square for non-parametric test we got chi-square value of 52.519 with p value of <0.001 which is significant statistically. From this, we can state that there was a statistical significant relationship between patient's knowledge pre, during and post cardiac catheterization.

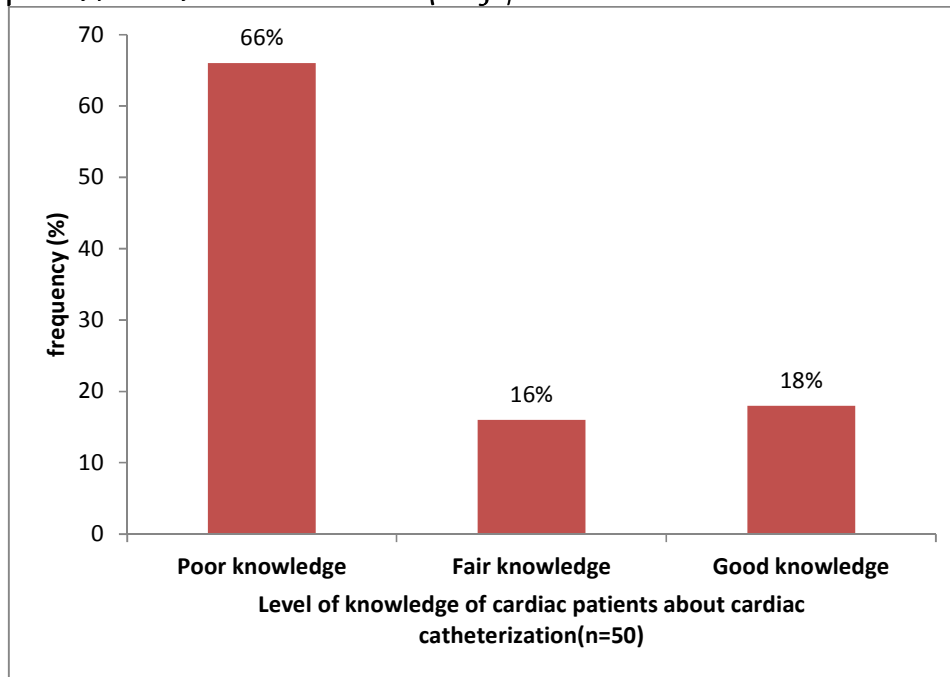
Table 6. Relationship between socio-demographic characteristics and Knowledge of Cardiac patient regarding cardiac catheterization (n=50)

Socio-demographic data	Patient Knowledge(n=50)						χ^2	P
	Poor (n=9)		Fair (n=33)		Good (n=8)			
	n	%	n	%	n	%		
Age:								
41-<50	1	2	10	20	0	0	4.204	0.122
50+	8	16	23	46	8	16		
Sex:								
Male	3	6	15	30	5	10	1.462	0.481
Female	6	12	18	36	3	6		
Education:								
Elementary & below.	4	8	30	60	7	14	10.54	0.005*
High sch. & above.	5	10	3	6	1	2		
Marital status:								
Currently married.	5	10	14	28	4	8	0.522	0.759
Currently unmarried.	4	8	19	38	4	8		
Occupation:								
Professional & employee.	4	8	6	12	3	6	3.190	0.203
Farmers.	5	10	27	54	5	10		
Prev. History of catheterization								
Yes	7	14	11	22	8	16	14.38	0.001*
No	2	4	22	44	0	0		
Source of Knowledge.								
Health Professionals	9	18	32	64	8	16	0.526	0.769
Others	0	0	1	2	0	0		

* χ^2 is significant at p = 0.001 and at p = 0.005

This table shows a relationship between socio-demographic characteristics and knowledge of cardiac patients regarding cardiac catheterization and nearly half of the patient have fair and good knowledge and had previous history of cardiac catheterization, and there is a statistical significant relationship with $\chi^2 = 10.539$ at $P=0.005$ for educational status and $\chi^2=14.387$ at $P=0.001$ for previous history of catheterization respectively, and 64% gained knowledge source through health care professional.

Fig 6-1 Distribution of level of knowledge of cardiac patients as regards to the procedure cardiac catheterization (n=50)



This figure illustrates that about two-third of the cardiac patients (66%) had poor knowledge as regards to cardiac catheterization, whereas (16%) had fair knowledge and only (18%) had good knowledge about cardiac catheterization.

DISCUSSION

Concerning socio-demographic characteristics of the cardiac patients: the finding showed that more than half of the studied cardiac patients were females. This finding was in agreement with **Haidinger et al., (2012)** and **Dracup et al., (2008)** who stated that risk factors for cardiovascular illnesses are higher in women than men. Also, this finding was consistent with **Dumont JP, (2006)** who stated that increased risk for vascular complications was found in female patients who were older than 70years, and had renal failure, underwent percutaneous intervention. This finding was contradicted by **Ziad and Mohammed, (2011)** in a study to

determine the incidence of normal coronaries on cardiac catheterization and its pattern of occurrence according to sex and age which has ratio of male to females 53.9% and 46.1% respectively. Normal coronary findings were reported to be much more common in females than in males **Abdelmoneim et al., (2009)** & **Alejandro et al., (2009)**. This finding was also contradicted with **Caldwell et al., (2007)** who posited that men were more inclined to believe in technology, which overrode concerns about patients undergoing invasive cardiac procedures and their relationship to perception of risks where male and female patients undergoing first cardiac catheterization from referral centre in Ontario, Canada was 1:1 respectively. This study was however contradicted with **Hirani and Newman, (2005)** who stated that women continue to believe that Coronary heart disease is mans' disease, so sex plays a central role in perception of illness.

Moreover, in the current study, it was found that more than three-quarter of the studied patients were within the age group of 50 years and above. This finding was in line with **Mansoorzadeh et al., (2014)** and **Bazarganipour et al., (2010)** and **Valiee et al., (2010)** who found that most of the patient are within age group 50-65years. The current study was however contradicted by **Ying Wu et al., (2011)** who posited that the most Chinese adults patients are within the age group 35-74 years. This findings was also contradicted by **Higgins et al., (2001)** in a study involving patients experience in preparing for coronary angioplasty where 8 men and 3 women were interviewed one month after discharge from the hospital in which participants described working through a problem solving process in response to the perceived health threat associated with undergoing coronary angioplasty

Furthermore, the current study shows that more than half of the studied cardiac patients' subjects were illiterates. This finding was in contrast to **Lawrence et al., (2012)** who recorded that nearly half of the patient had completed elementary school. Also, this finding was contradicted with **Dumont JP et al., (2006)** who recorded that the studied patients used were all given health education about patient health care. The finding also demonstrated that more than half of the studied subjects have occupation of farming and other manual work which needed physical effort. This finding was in agreement with **Liu (2006)** who found that majority of the patients were employed and have manual job. Also, this finding was however in-line with **Harper (2007)** who found out that most of the studied patients was employed.

Regarding marital status, the current studies revealed that nearly half of the studied cardiac patients were married which is in-line with **Lawrence et al., (2012)** who recorded that more than half of the participants were married. Also, findings from the current study showed that more than half of the studied subject had

previous history of cardiac catheterization. This finding was in-line with **Ron Waksman *et al.*, (1995)** who pointed that some of the studied subjects had previous history of revascularization procedure. This finding was however contradicted with **Conigliaro *et al.*, (2000)** who recorded that majority of the patients had not previously received revascularization and had not had a prior myocardial infarction. The findings of the current study also showed that more than half of the studied subject got source of information about the procedure of cardiac catheterization through the health care professionals. This finding is in-line with **Lawrence *et al.*, (2012)** who recorded that one-third of the patients having information for cardiovascular diseases and their screening method from health care professionals. This findings from the current study is also in congruent with **Ton *et al.*, (2011)** who stated that majority of the participants got information from the physician. Also, **Momtahan *et al.*, (2004)** recorded that while the participants were asking for information from media, nurses and friends, it is noteworthy that the saturation level for the information obtained from the Heart Institute Nurse is at 92%

Knowledge about Pre-catheterization information and care: The findings showed that more than three quarter of the studied cardiac patients knows that catheter is either inserted through brachial or femoral artery as regards to pre-catheterization information and care. The findings from the current study is in-line with **Barbara C, (2002)** who stated that majority of the cardiac patients knew the meaning of cardiac catheterization and majority of the cardiac patients knew someone who previously had undergone Coronary artery by-pass surgery. This findings of current study is also in-line with **Christine *et al.*, (2005)** who stated that patients educations, which involves informing the patients about his or her illness along with better understanding about wellness, became more important to the needs of patients seeking medical care. This findings of the current study is also in-line with **Hussein *et al.*, (2013)** who stated that the majority of operators perform femoral puncture guided by palpation and by superficial landmarks as the anterior superior iliac spine and the inguinal crease. Only a few operators perform the puncture with fluoroscopic guidance to locate the level of the head of the femur. The result could be puncturing the superficial femoral artery in obese individuals with a “redundant” inguinal skin crease.

Knowledge of patients about care during cardiac catheterization procedure: The findings from the current study indicated that more than half of the patients don't know that there is a warm flush that follows administration of contrast agents during the procedure of cardiac catheterization. This finding from the current study is in-line with **Dumont JP (2006)** Allergic reactions related to the contrast agent (dye) and anesthetics may occur in some patients during cardiac catheterization. Allergic reactions may range from minor hives and swelling to

severe shock. It is essential that the cardiac catheterization laboratory staff assume the responsibility for continuing the patient's education once they arrive in the lab. This finding was however contradicted with **Alexander et al., (2011)** who stated that warm flush experienced in minimally invasive cardiothoracic surgery with innovation in perfusion techniques, refinements of transthoracic echocardiography and the development of specialized surgical instruments and robotic technology, cardiac surgery was provided with the necessary tools to progress to less invasive approach.

Knowledge about Post-cardiac catheterization information and complications:

The finding showed that more than half of the studied cardiac patients knew that nursing care of patient helps minimizes complications after catheterization procedure. This finding is in congruent with **Christine et al.,(2005)** who stated that Prior to discharge, patients should be able to verbalize an understanding of the recommended self-care that will reduce post procedure complications (recurrent angina, bleeding, swelling in the groin). And that patients should understand Self-management and actions to take if signs and symptoms return (angina, arm pain, jaw pain, leg or foot pain).

Comparing patient knowledge before, during and after cardiac catheterization:

The current study findings revealed that there is a significant relationship when comparing patients' knowledge before, during and after the procedure of cardiac catheterization. This finding is in-line with **Oslon and DeFrain (2000)** who posited that during an educational session, the patient's belief system becomes very important because his spiritual beliefs and values are crucial factors in his ability to achieve the desired degree of wellness. If the patient trusts the caregiver's education, then his positive values will govern his desire to do the best he can for himself. After all, the spiritual wellbeing of any person includes courage, faith, hope, optimism and happiness

Relationship between socio-demographic characteristics and knowledge of cardiac patients regarding cardiac catheterization: The findings from the current study show that there is a statistical significant relationship between knowledge and both of educational status and previous history of cardiac catheterization. This finding is in-line with **Barbara, (2005)** who pointed that 8% of studied patients knew about cardiac catheterization and previously had Coronary artery by-pass surgery and had undergone PTCA. Also, this finding is in-line with **Ron Waksman et al (1995)** who pointed that some of the studied patients had previous history of revascularization procedures.

CONCLUSIONS

Based on the findings from the present study, it can be concluded that a significant knowledge deficit exist among cardiac patients as regards to the procedure of cardiac catheterization, as knowledge alone is sufficient to change behavior and influences individual choices of decision towards maintaining optimal health. The results show that patients had poor knowledge as regards to this procedure despite an increasing awareness of the advents of technology in health care system.

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