



بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

*Shendi University*



*Faculty of Graduate Studies and Scientific Research*

# Evaluation of Nurses Knowledge about Preparation of Patient under- Going Cardiac Catheterization.

*Athesis Submitted in partial fulfillment for the requirements to master degree in  
medical surgical nursing.*

**By:**

***Faiza Ahmed Saeed Mousa***

B.Sc. Nursing science- University of Shendi

**Supervisor:**

***Dr. Motwakil Imam Awadelkareim Imam***

MB BS (Shendi University)  
Consultant Physician  
Elmek Nimer University hospital  
Assistant Professor of Medicine  
Shendi University

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قال تعالى:

Zوقل رب زدني علماً

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# *Dedication*

*I would like to dedicate this work*

*To my parents, for their affection and inspiration at every stage  
of my life and career, without their support I would not be where  
I am today.*

*To my husband, who gave me strong power to reach my aims,  
and he is always there when I need his.*

*To my son Ali, for waiting for me long days to spend some happy  
moments with him.*

*To my Brothers and sisters whom shared with me the pleasure  
and sadness.*

# *Acknowledgement*

*The first of all thanks to Allah who guided me to start this thesis and gave me the strength to continue my learning process.*

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*My deepest gratitude goes to all staff of faculty of Nursing and staff of Shendi University*

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*I couldn't afford to forget thanking all my colleges who happily participate in this study.*

## List of abbreviation

Abbreviation	Meaning
ACS	Acute coronary syndrome.
AV	Atrioventricular.
CAD	coronary artery disease
CHD	Congestive heart disease.
CO	Cardiac output.
HOCM	Hypertrophic obstructive cardiomyopathy.
MI	Myocardial infarction.
NICE	National Institute for Health and Clinical Excellence.
PA	Physician's Assistant.
PCI	Percutaneous coronary intervention
PTCA	Percutaneous transluminal coronary angioplasty.

## **Abstract:**

### **Back ground:**

Cardiac catheterization is widely used for diagnostic evaluation and therapeutic intervention in the management of patients with cardiac disease. The nurse's role in precatheterization teaching and intracatheterization and post catheterization care is well recognized.

### **Objectives:**

To evaluate knowledge of nurses about preparation of patients undergoing cardiac catheterization in the period extended from July to the October 2014.

### **Methods:**

This descriptive cross sectional study was conducted in almek Nimer, 30 nurses were participated in this study , The data was collected by structured questionnaires which composed of 28 questions and , It analyzed by stastical program social science (SPSS) .

### **Results and conclusion:**

It was concluded that the 20candidate (63.3%) of study group the qualification was bacaloia,15candidate (50%) have poor knowledge about meaning of cardiac catheterization , and most of study group have good knowledge about complication and home self care .

### **Recommendation:**

It was recommended that Nurses should train to deal with patient undergoing cardiac catheterization and Increase nurse awareness about preparation of patients undergoing cardiac catheterization to reduce risk of complication and improve quality of care through in-services

educational programs, workshops, continuous training and conference committee in and outside of Sudan.

## ملخص الدراسة:

### مقدمه:

تعتبر القسطرة القلبية اكثر استخداما لتشخيص وتقييم مرضي أمراض القلب 0 ودور الممرض مهما في معرفه العنايه قبل واثناء وبعد عملية القسطرة القلبية.

### الاعراض :

أجريت هذه الدراسة الوصفية في مستشفى المك نمر الجامعى بهدف تقييم معرفه الممرضين بتحضير المريض قبل عملية القسطرة القلبية فى الفترة التي إمتدت من شهر يوليو إلى شهر أكتوبر2014م.

### الطريقة:

شملت الدراسة 30 ممرضا(20 انثي و10ذكور)من مركز القلب بمستشفى المك نمر الجامعي بشندي(السودان)0

إستمرت الدراسة 4 شهور خلال الفترة التي إمتدت من شهر يوليو إلى شهر أكتوبر2014م.

### النتائج و الخاتمة:

اظهرت الدراسة ان 20ممرض(63.3%) من افراد مجتمع الدراسة من حملة البكلاريوس ,وان 15ممرض(50%) لديهم معرفه ضعيفه عملية القسطرة القلبية وأن معظم افراد مجتمع الدراسة يملكون المعرفة الجيدة عن المضاعفات والعنايه الذاتيه بالمنزل.

### التوصيه:

وأوصت الدراسة إلي تدريب الممرضين الذين يتعاملون مع مرضي القسطرة وزيادة مستوي وعي الممرضين بالتحضير قبل عملية القسطرة وذلك لتقليل مخاطر المضاعفات لتحسين نوعية الرعاية المقدمة من خلال إدخال برامج تعليميه , ورش عمل وبرامج تدريب مستمره داخل وخارج السودان والمشاركة فى المؤتمرات .



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## **Introduction:**

Cardiac catheterization is widely used for diagnostic evaluation and therapeutic intervention in the management of patients with cardiac disease. Cardiac catheterization is usually accomplished by percutaneous methods (the Seldinger technique). Direct exposure of the vein and artery (Sones technique) may also be used. The percutaneous method is used for the femoral artery and vein; direct exposure is used for the brachial artery and basilica vein. All chambers and vessels may be cannulated using either approach, and both approaches have high degrees of safety. Although physician preference often dictates which approach is used, specific factors may favor the use of one approach over the other. The percutaneous femoral approach is preferred because of its speed and repeatability and because arteriotomy and arterial repair are not required. Its use is indicated in cases of decreased or absent radial or brachial pulse. When tight aortic stenosis makes retrograde catheterization difficult or impossible, the percutaneous transseptal approach is used for left heart catheterization. The direct brachial approach is indicated in cases of known vascular disease of the abdominal aorta or iliac or femoral arteries, or thrombotic disease of the femoral veins or inferior vena cava. Severe hypertension, a wide pulse pressure due to aortic regurgitation, and anticoagulant therapy are associated with an increased risk of bleeding when the percutaneous approach is used. In cases of severe obesity, the direct approach is used for better visualization and control of bleeding. A disadvantage of the direct approach is that it can be repeated only once or twice. Arterial thrombosis occurs more frequently with this approach, and the patient must return for removal of the sutures. The nurse's role in precatheterization teaching and intracatheterization and post catheterization care is well recognized. <sup>(1)</sup>

Cardiac catheterization developed as a result of 50 years of clinical effort. The first documented cardiac catheterization was performed by Werner Forssman in 1929<sup>(1)</sup>. Guided by fluoroscopy, Forssman passed a catheter into his own right heart through an antecubital vein walked upstairs to the radiology department and confirmed the catheter position by radiograph. The techniques of right and left heart catheterization were developed during the 1940s and 1950s. In 1953, the percutaneous techniques of arterial catheterization were introduced by Seldinger, and in 1959, selective coronary arteriography was introduced by Sones and colleagues.<sup>(1)</sup>

Cardiac catheter is procedure require extensive knowledge and practice and high quality of nursing care pre and post cardiac catheterization so I conduct my study to Evaluate nurses knowledge about preparation of patient undergoing cardiac catheterization to improve quality of performance.

Important advances related to cardiac catheterization included the development of quantitative angiography for determination of cardiac output (CO) and ejection fraction; therapeutic interventions, including percutaneous transluminal coronary angioplasty (PTCA), laser therapy, atherectomy, stent placement, electrophysiologic mapping, and catheter ablation for the management of arrhythmias; and valvuloplasty. Although noninvasive diagnostic techniques have an important role, cardiac catheterization remains the most definitive procedure for the diagnosis and evaluation of coronary disease<sup>(1)</sup>.

Cardiac catheterization, also called an angiogram, is a test that uses long, thin, hollow tubes called catheters to make x-ray pictures of your heart and its blood vessels. The test also determines how well your heart muscle and its valves are performing. Cardiac catheterization helps your physician to diagnose diseases of your heart—clogged arteries, heart valve defects, or

heart muscle damage. Sometimes, a cardiac catheterization confirms that the heart is normal and provides reassurance that symptoms are not related to the heart. If problems are identified by the catheterization procedure, the test will help your physician develop a treatment plan. To better understand why the test is being performed, you need to know the basic workings of the heart and understand the diseases that can affect and threaten your heart.<sup>(3)</sup>

Cardiac catheterization can also be useful in diagnosing congenital heart problems that are present at birth. For example Septal defects are “holes in the heart” that allow the blood to move abnormally from the left side of the heart to the right side (or vice versa). Congenital valvular lesion like Valve problems can also be congenital and other indication.<sup>(3)</sup>

## **Justification:**

The incidence of coronary artery disease to grow as majority of death from the disease. Early detection of risk factor and disease reduce patient risk of complication. Tran catheter aortic valve replacement (TAVR) via the transfemoral (TF), transapical (TA), or even the transaortic (TAO) approach in high-risk or inoperable patients is quickly becoming a safe and effective modality for the treatment of symptomatic severe aortic stenosis (AS). However, in this selected group of patients, those with anatomical or physiologic constraints preventing TF, TA, and conventional TAO TAVR, alternative sites of access must be explored. Here, we report a successful TAVR in an inoperable patient with severe AS using a distal abdominal TAO approach via a synthetic graft-conduit. © 2013 Wiley Periodicals, <sup>(2)</sup>.

Cardiac catheter is procedure require extensive knowledge and practice and high quality of nursing care pre and post cardiac catheterization so I conduct my study to Evaluate nurses knowledge about preparation of patient undergoing cardiac catheterization to improve quality of performance.



## **General objective**

To evaluate of nurses knowledge about preparation of patient under -going cardiac catheterization, pre and after operation.

## **Specific objective**

- To determine knowledge of nurses about indication and purpose of cardiac catheterization.
- To identify nurses knowledge about preparation of patient before CARDIAC catheterization.
- To identify nurse knowledge about common complication.
- To identify nurse knowledge about teaching patient home –self care.

## Literature review

The cardiovascular system consists of the heart, which is an anatomical pump, with its intricate conduits (arteries, veins, and capillaries) that traverse the whole human body carrying blood. The blood contains oxygen, nutrients, wastes, and immune and other functional cells that help provide for homeostasis and basic functions of human cells and organs. <sup>(5,6)</sup>

The heart, encased and cushioned in its own serous membrane, the pericardium, lies in the middle mediastinal compartment of the thorax between the two pleural cavities. Two thirds of the heart extends to the left of the body's midline. The heart consists of four muscular chambers, two atria and two ventricles, and associated structures. The right heart (right atrium and ventricle) receives blood from the body and pumps it into the low-pressure pulmonary arterial system, whereas the left heart (left atrium and ventricle) receives blood from the lungs and pumps it into the high-pressure systemic arterial system. Interatrial and interventricular septa separate the right and left atria and ventricles from each other. The coronary (or atrioventricular [AV]) sulcus (groove) is the external landmark denoting the separation of the atria from the ventricles. The AV sulcus encircles the heart obliquely and contains coronary blood vessels, cardiac nerves, and epicardial fat. The aorta and pulmonary artery interrupt the AV sulcus anteriorly. The anterior and posterior interventricular sulci separate the right and left ventricles on the external heart surface. The crux of the heart is the point on the external posterior heart surface where the posterior interventricular sulcus intersects the coronary (AV) sulcus externally and where the Interatrial septum joins the interventricular septum internally. <sup>(1)</sup>

The pumping action of the heart usually maintains a balance between cardiac output and venous return. Cardiac output (CO) is the amount of blood pumped out by each ventricle in one minute. The normal adult blood

volume is 5 liters (a little over 1 gallon) and it usually passes through the heart once a minute. Note that cardiac output varies with the demands of the body.<sup>(7)</sup>

The cardiac cycle refers to events that occur during one heart beat and is split into ventricular systole (contraction/ejection phase) and diastole (relaxation/filling phase). A normal heart rate is approximately 72 beats/minute, and the cardiac cycle spreads over 0.8 seconds. The heart sounds transmitted are due to closing of heart valves, and abnormal heart sounds, called murmurs, usually represent valve incompetency or abnormalities.<sup>(8)</sup>

Blood is transported through the whole body by a continuum of blood vessels. Arteries are blood vessels that transport blood away from the heart, and veins transport the blood back to the heart. Capillaries carry blood to tissue cells and are the exchange sites of nutrients, gases, wastes, etc.<sup>(9)</sup>

The major coronary arteries in humans are the right coronary artery and the left coronary artery, sometimes called the left main coronary artery. These arteries branch from the aorta in the region of the sinus of Valsalva. They extend over the epicardial surface of the heart and branch several times. The branches usually emerge at a right angle from the parent artery. The arteries plunge inward through the myocardial wall and undergo further branching. The epicardial branches exit first. The more distal branches supply the endocardial (internal) myocardium. The arteries continue branching and eventually become arterioles, then capillaries. Partially because the blood supply originates more distally, the endocardium is more vulnerable to compromised blood supply than is the epicardial (outer) myocardium.

The right coronary artery supplies the right atrium, right ventricle, and a portion of the posterior and inferior surfaces of the left ventricle. It supplies

the AV node and bundle of His in 90% of hearts, and the sinus node in 55% of hearts. The left main coronary artery arises from the aorta in the ostium behind the left cusp of the aortic valve. This artery passes between the left atrial appendage and the pulmonary artery and then typically divides into two major branches: the left anterior descending artery and the left circumflex artery. The left anterior descending artery supplies portions of the left and right ventricular myocardium and much of the interventricular septum. The circumflex artery supplies blood to parts of the left atrium and left ventricle. In 45% of cases, it supplies the major perfusion of the sinus node; in 10% of cases, it supplies the AV node. The circumflex artery exits from the left main coronary artery at a near right angle and courses posteriorly in the AV groove toward, but usually not reaching, the crux. Most of the venous drainage of the heart is through epicardial veins. The large veins course close to the coronary arteries. Two veins sometimes accompany an artery. The major veins feed into the great cardiac vein, which runs alongside the circumflex artery, becomes the coronary sinus, and then empties into the right atrium. An incompetent (incompletely shut) semilunar valve called the valve of Vieussens marks the junction between the great cardiac vein and the coronary sinus. A similar structure, the thebesian valve, is also incompetent and is found at the entry of the coronary sinus into the right atrium. Venous blood from the right ventricular muscle is drained primarily by two to four anterior cardiac veins that empty directly into the right atrium, bypassing the coronary sinus<sup>(1)</sup>.

### **Cardiac catheterization:**

Catheterization is a procedure used to diagnose and treat various forms of heart and vascular disease. The procedure is performed in an area of the hospital called the catheterization laboratory, or “cath lab.” A doctor who specializes in performing this procedure will insert long, thin tubes called

catheters into blood vessels in your arm, leg or neck. The catheters are then threaded up to your heart or other vessels. The catheters are used to measure pressures in different parts of the circulation and the amount of blood that the heart is pumping. Using X-ray dye and special equipment, the doctor is able to take pictures of the heart and circulation. The dye can show whether a material called plaque has narrowed or blocked any of your arteries. You will receive sedative medication and a local anesthetic to help you remain comfortable throughout the procedure<sup>(4)</sup>.

A catheter is a thin, flexible, hollow tube. Cardiac catheterization is where a very thin plastic catheter is passed into the chambers of the heart. The catheter can also be passed into the main blood vessels of the heart (the coronary arteries). You lie on a couch in a catheterization room. An X-ray machine is mounted above the couch. A catheter is inserted through a wide needle or small cut in the skin into a blood vessel in the groin or arm. Local anesthetic is injected into the skin above the blood vessel. Therefore, it should not hurt when the catheter is passed into the blood vessel. The doctor gently pushes the catheter up the blood vessel towards the heart. Low-dose X-rays are used to monitor the progress of the catheter tip which is gently manipulated into the heart chambers (ventricles and atria) and/or coronary arteries. You may be able to see the progress of the catheter on the X-ray monitor. You cannot feel the catheter in the blood vessels or heart. You may feel an occasional 'missed' or 'extra' heartbeat during the procedure.<sup>(10)</sup>

Catheterization is used to diagnose and/or treat various heart and/or vascular conditions. The most common type of heart disease for which catheterization is performed is coronary artery disease (CAD). This is a condition in which plaque (atherosclerosis) builds up within the arteries that supply blood to the heart muscle. When the coronary arteries are blocked by

plaque build-up (often called stenosis or occlusion) and/or a clot (thrombus), blood and oxygen do not reach the heart muscle in adequate amounts<sup>(4)</sup>

Cardiac catheterization with a venous or arterial long-line catheter allows:

- Injection of radio-opaque dye for angiography.
- Measurement of intracardiac pressures and oxygen saturations.
- Passage of electrophysiological instruments.
- Passage of angioplasty and valvuloplasty balloons.

The catheter is manipulated under fluoroscopic guidance. The patient is usually awake and on a cardiac monitor throughout. Most diagnostic studies are conducted as day cases. <sup>(11)</sup>.

### **Indication:**

Indications for coronary angiography are classified for specific clinical presentations, including asymptomatic patients, symptomatic patients, atypical chest pain of uncertain origin, and acute myocardial infarction (MI). Class I indications are those for which there is general agreement that coronary angiography is indicated. Class II indications are “conditions for which coronary angiography is frequently performed, but there is a divergence of opinion with respect to its justification in terms of value and appropriateness.

In asymptomatic patients, class I indications include the following:

1. Evidence of high risk on noninvasive testing, including exercise ECG, thallium scintigraphy, radionuclide ventriculography, and quantitative two-dimensional echocardiography
2. High-risk occupations that involve the safety of others, including airline pilots, bus drivers, truck drivers, and air traffic controllers, or

occupations that require sudden vigorous activity, such as firefighters or police officers.

3. Successful resuscitation from cardiac arrest that occurred without obvious precipitating cause.

In patients with symptoms thought to be due to CHD, class I indications include the following:

1. Angina pectoris inadequately responsive to medical therapy, thrombolysis, PTCA, or coronary bypass surgery
2. Unstable angina pectoris
3. Prinzmetal or variant angina pectoris
4. Angina pectoris in association with high-risk results on noninvasive tests, history of MI or hypertension with ST segment depression, intolerance to medical therapy, occupation or lifestyle that necessitates diagnosis, or episodic pulmonary edema or symptoms of left ventricular failure without obvious cause
5. Before major vascular surgery
6. After resuscitation from cardiac arrest or from sustained ventricular tachycardia in the absence of acute MI<sup>(1)</sup>

**Class I indications after MI include the following:**

1. Within 6 hours of onset of symptoms in patients who are candidates for PTCA and in whom intravenous (IV) thrombolysis is contraindicated
2. After 6 hours of onset of symptoms but before hospital discharge in patients with recurrent chest pain, suspected mitral regurgitation, or ruptured interventricular septum causing heart failure or shock or suspected sub acute cardiac rupture

3. During convalescence in patients who have angina at rest or with minimal activity, congestive heart failure, left ventricular ejection fraction less than 45%, evidence of myocardial ischemia, on laboratory testing, or non-Q-wave MI.<sup>(1)</sup>

### **Contra-indications:**

Once consent has been given, there are no absolute contra-indications to cardiac catheterization. The outcome of the procedure should have potential benefit greater than the risk associated with the procedure. However, a widespread risk-averse strategy to angiography may be preventing higher-risk patients from having revascularization procedures.<sup>(12)</sup>

Relative contra-indications include:

- Severe hypertension.
- In shocked patients (for example, in acute gastrointestinal hemorrhage).
- Severe anemia.
- Acute renal failure.
- Severe congestive cardiac failure.
- Allergy to the contrast medium.
- Active infection or unexplained fever.

### **Caution is required in higher-risk patients - for example, in:**

- Extremes of age (under 1 year and over the age of 60 years).<sup>(13)</sup>
- Severe coronary artery disease affecting the left main stem.
- New York Heart Association Classification class IV.
- Left ventricular ejection fraction <30%.
- Recent cerebrovascular disease.



- Chronic obstructive pulmonary disease.

### **Left heart catheterization:**

This is performed via the arterial route:

- The femoral artery has been the most commonly used access point.
- The brachial artery may be used. This is usually done percutaneously rather than with surgical exposure of the artery.
- The radial artery is gaining favour as an access site and many studies report fewer local complications for a range of different interventions.<sup>(14,15,16,17,18)</sup> It is useful particularly when:
  - There is significant femoral artery atherosclerosis.
  - Obesity obscures anatomical landmarks.

The disadvantages are that the technique is technically more difficult. For example, manipulation of the catheter can be difficult because of arterial spasm.

### **Diagnostic uses:**

Cardiac catheterization allows for diagnostic confirmation and more detailed information after non-invasive studies. It can be used to assess:

- Left ventricular function.
- Severity of mitral and aortic valve disease.
- Outflow tract obstruction.
- The extent and severity of coronary artery disease (coronary angiography is the most common diagnostic study).<sup>(19)</sup>
- Left ventricular biopsies may be taken (for example, in cardiomyopathies).

- Electrophysiological provocation studies can be performed (for example, for ventricular tachycardia).

The National Institute for Health and Clinical Excellence (NICE) recommends that angiography should be performed as soon as possible for patients who are clinically unstable or at high ischemic risk .<sup>(19,20)</sup>

### **Therapeutic interventions:**

Detailed analysis of the merits of such interventions is beyond the scope of this article. Such interventions include:

- Percutaneous transluminal coronary angioplasty (PTCA).
- PTCA and stenting.
- Treatment of acute coronary syndromes (ACS) by PTCA/stenting - a Cochrane review and others cautiously favour stents over PTCA, due to reduced risk of re-infarction and recurrent vessel occlusion.<sup>(21,22)</sup>
- Treatment of acute myocardial infarction. There appear to be advantages to PTCA in terms of short-term outcome but there are some drawbacks as well. This has been facilitated by the development of acute-PCI centers.<sup>(19)</sup>
- Balloon valvuloplasty.
- Septal infarction by alcohol injection for hypertrophic obstructive cardiomyopathy (HOCM).

### **Right heart catheterization:**

This is performed by the venous route, via the femoral, internal jugular, subclavian veins or forearm veins.<sup>(17)</sup>

### **Diagnostic uses:**

Right heart catheterization allows:

- Measurement of cardiac output, left ventricular filling pressure and pulmonary artery wedge pressure.
- Measurement of right heart oxygen saturations (for example, for Septal defects).
- Assessment of pulmonary hypertension (for example, prior to cardiac transplantation).
- Electrophysiological provocation studies.

### **Therapeutic interventions:**

These include:

- Right-sided valvuloplasties.
- Radiofrequency ablation of, for example, the accessory pathway in Wolff-Parkinson-White syndrome.
- Direct thrombolysis into the pulmonary artery for massive pulmonary embolism.
- Insertion of electrodes for cardiac pacemaker devices.

In the critically ill patient, right heart catheterization with a Swan-Ganz catheter may be used for acute monitoring of left and right ventricular function, to guide treatment and to monitor the effects of intervention. It has no direct therapeutic function. The catheter is usually inserted via the internal jugular or subclavian vein. Potential indications include:

- Shock (cardiogenic versus noncardiogenic).
- Respiratory distress (cardiogenic versus noncardiogenic).
- Complicated myocardial infarction.
- Monitoring effects of drugs (for example, cardiac inotropes).

- Assessing fluid requirements in patients with, for example, multi-organ failure.

### **Other uses:**

A cardiac catheter can be used for various other functions which include:

- Measuring the pressure within the heart chambers. The tip of the catheter can include a tiny pressure monitor. For example, the pressure either side of a heart valve can be measured by placing the catheter tip in different positions within the heart chambers. This can help to determine how well the valve is opening.
- To find how well the ventricles of the heart contract. Dye can be injected into the heart chambers and an X-ray video of the heart can see the dye as the heart chambers are pumping.
- To sample blood from within the heart chambers or coronary arteries. For example, to determine how much oxygen is in blood in certain parts of the heart.

To perform 'procedures' within the heart or coronary arteries. For example:

- The catheter tip can include a tiny balloon which can inflate to widen narrowed heart valves (valvuloplasty) or narrowed coronary arteries (angioplasty). Alternatively, a small cylindrical tube (stent) can be placed across a narrowing.
- Catheter ablation (destruction) treatment. This is where a device at the catheter tip can destroy a tiny section of heart tissue. This is sometimes used to treat arrhythmias (abnormal heart rhythms). The source or 'trigger' of the abnormal electrical impulses can sometimes be destroyed by this technique. This is only suitable if the exact site of the trigger can be found by special tests, and be located accurately by the catheter tip <sup>(10)</sup>.

## **Preparation for cardiac catheterization:**

### **This will include:**

**Investigations:** day-case angiography does not usually require any routine pre-procedure investigations other than:

- ECG.
- Blood tests: FBC, U&E, clotting studies and group and save.

**Full explanation of the procedure with *informed consent*:** it is not usually painful, although the injection of dye causes a warm flushing sensation.

**Premedication:** anxious patients may require premedication with oral or IV diazepam.

**Other considerations:** patients with renal impairment (Creatinine >200 µmol/L) require 1 litre of normal saline IV over one hour before and after angiography to prevent X-ray contrast nephropathy. This may be problematic where there is associated heart failure<sup>(11)</sup>.

- A 24-hour supply of your current medications and a
- Medication list complete with medication names, dosages and the usual time of day you take each medication.
- You are welcome to bring a toothbrush, toothpaste, shaving items, deodorant, lotions or hair care products, but it is not necessary as these items will be provided for you.
- Please do not bring any valuables or jewelry.
- Wear comfortable clothing and walking shoes.
- You may want to bring a book to help pass the time in case of delays.
- A history and physical examination by a cardiologist or vascular surgeon (or, in some cases, lung specialist or heart surgeon).<sup>(4)</sup>

### **Preparing at home (outpatient):**

If you are scheduled to be admitted on the day of your procedure, follow the specific instructions to prepare:

- Stop taking Coumadin (warfarin) at least 3 days before your procedure date, or according to your doctor's instructions.
- In some cases, your doctor may instruct you to receive blood thinner injections into your skin.
- Continue to take your prescribed medications unless your cardiologist has told you not to. Check to see if you should take your diuretic, insulin or oral diabetes medications on the day of the procedure.
- Let your cardiologist know if you have an allergy to X-ray dye. In that case, you may need to take allergy medications before the procedure.
- Do not eat any food after midnight the night before your procedure.
- You may drink clear liquids up until two hours before you arrive at the hospital the morning of your procedure. (Black coffee and tea are fine. Do not add cream or milk.)
- You may have sips of water with your medications the morning of your procedure.
- A 24-hour supply of your current medications and a medication list complete with medication names, dosages and the usual time of day you take each medication.
- You are welcome to bring a toothbrush, toothpaste, shaving items, deodorant, lotions or hair care products, but it is not necessary as these items will be provided for you.
- Please do not bring any valuables or jewelry.
- Wear comfortable clothing and walking shoes.

- You may want to bring a book to help pass the time in case of delays<sup>(4)</sup>.

### **Nursing Assessment and Patient Teaching:**

Nursing assessment and teaching are an important part of patient preparation. The nursing assessment includes the patient's heart rate and rhythm, blood pressure, evaluation of the peripheral pulses of the arms and legs, and assessment of heart and lung sounds. The sites for best palpation of the patient's dorsalis pedis and posterior tibial pulses are marked on the skin.

This information will be used for comparison in evaluating peripheral pulses after the catheterization procedure. A conscious sedation assessment is performed; including assessment of the patient's cardiovascular, respiratory, and renal systems. Care is taken to identify characteristics or conditions that may cause the patient to be at greater risk for complications associated with conscious sedation. Characteristics associated with greater conscious sedation risk include history of difficult intubation; history of difficulty with sedation; morbid obesity; sleep apnea; extremes of age; severe cardiac, respiratory, renal, hepatic, or central nervous system disease; and history of substance abuse. Patients with diabetes are questioned about the type of insulin they use. Those who take NPH insulin may be sensitized to protamine and are at increased risk for severe protamine reactions if it is used to reverse the effects of heparin. Teaching is aimed at preparing the patient for this experience. In some institutions, patients are given a tour of the laboratory before the procedure. A printed booklet to which the patient can refer is also helpful. The following points should be covered in patient teaching:

- The patient will be given nothing by mouth for 6 to 12 hours before the catheterization and will be asked to void before leaving the unit.
- Medication will be given before or during the procedure, if prescribed, but the patient will be awake during the procedure.

- The patient should be instructed in deep breathing or stopping the breath without bearing down and in coughing on request. With deep inspiration, the diaphragm descends, preventing it from obstructing the view of the coronary arteries in some radiographic projections. Bearing down (Valsalva maneuver) increases intra-abdominal pressure and may raise the diaphragm, obstructing the view. After the injection of contrast medium, coughing will be requested to help clear the material from the coronary arteries. The rapid movement of the diaphragm also acts as a mechanical stimulant to the heart and helps prevent the bradycardia that may accompany the injection of contrast medium.
- The appearance of the laboratory should be explained to the patient, including the general function of the equipment.
- The patient will wear a gown to the laboratory; both arms may be slipped out of the gown for ECG electrode placement in the laboratory.
- The patient will lie on a table that tends to be hard.
- The catheter insertion site will be washed, and hair will be removed with a razor or other depilatory.
- The expected length of the procedure should be explained to the patient.
- The patient will be given a local anesthetic at the catheter entry site, but the procedure is rarely totally pain free. The patient should let the staff know if the anesthetic begins to wear off so that more may be given.
- The patient may have hot flashes or experience nausea during injection of the coronary arteries with contrast medium.



- The patient should report angina or other chest pain to the staff.
- The patient should be told the expected length of bed rest after the catheterization<sup>(1)</sup>.

### **Preparing in the hospital (inpatient):**

For patients already staying in the hospital, a cath lab doctor or physician's assistant will visit you the day before your procedure. The doctor will explain the procedure in detail, including its potential benefits and risks. At this time, you will have an opportunity to ask any questions that you may have, and to sign a consent form. Adjustments may be made to the medications you are taking, and an IV will be inserted in your arm (if you do not already have one). The nurse caring for you will instruct you about any eating and drinking restrictions before the procedure. Typically, you will not be allowed to eat or drink (except for sips of water with your medications) after midnight. On your scheduled procedure day, the cath lab will place you on call, which means you are ready to go to the cath lab for your procedure. You may receive additional medications before the procedure if you have an allergy to X-ray dye or have kidney problems. You will be brought from your room directly to the pre-procedure holding area of the cath lab.<sup>(4)</sup>

### **The catheterization procedure:**

#### **The Cath Lab team:**

#### **Attending Physician:**

This is an experienced cardiologist, vascular medicine specialist or vascular surgeon who will be performing your procedure.

The attending physician coordinates the team and plan of care during your stay in the Cath lab. This may not be the doctor who ordered the procedure.

**Fellow:**

The fellow is a doctor who is pursuing further training in cardiology, vascular medicine or vascular surgery. He or she will ask you for a brief history and obtain consent prior to your procedure. The fellow is responsible for starting the procedure and assisting the attending physician during the procedure.

**Physician's Assistant (PA):**

The PA is a health care provider who has been specially trained to assist the attending physician during the catheterization procedure. The role of the PA is similar to that of a fellow.

**Nurse:**

When you arrive to the holding area, the cath lab nurses are responsible for completing an assessment prior to your procedure; they will start an IV if you do not already have one. During the procedure, they will administer medications to make you comfortable and will do frequent assessments to monitor the effectiveness of the medications given.

**Cath Lab Tech:**

The role of the technologists is to set up and operate the various types of equipment used by the physicians during your cath procedure. They also monitor and record vital signs and collect measurements to assist the doctor with the diagnosis of heart and vascular disease. The cath lab nurses and techs work together to prep you for the procedure and to care for you in the recovery area after the procedure.

**Pre-procedure holding area:**

The pre-procedure holding area is used as a staging place before moving you into the procedure room. You will be placed on a stretcher and the Cath lab doctor will review your medical history and physical exam. You

will be asked to sign a consent form for the procedure if you have not already been done so. An IV will be started and you may be given fluid or medication through this line. You will then be taken into the procedure room (4).

**The laboratory usually has the following equipment:**

- A fluoroscope with image intensifier. Fluoroscopy is the continuous presentation of an x-ray image on a fluorescent screen. This allows the viewing of structures in motion. Traditional fluoroscopy presents a dim image that cannot be filmed and must be viewed in a darkened room. The image intensifier receives the fluoroscopic image and increases its brightness, permitting filming (cinefluoroscopy) or digital acquisition of motion pictures and viewing of the image with a television camera, television screen, and videotape recorder.
- A video tape recorder for filming the fluoroscopic image for instant replay and for transmitting the image to a monitor, so that catheter progression, contrast medium test doses, and so forth, can be monitored.
- Single or biplane cameras linked to the image intensifier for filming of cine or digital angiograms.
- An x-ray table. The image intensifiers are mounted on a C-arm that rotates around the patient.
- Pressure transducers and a multichannel physiologic recorder.
- Equipment for CO determination.
- Advanced cardiac life support drugs and equipment.
- A cardioverter–defibrillator.
- An ECG with continuous monitor display.

- A standby pacemaker, either a temporary transvenous electrode and pulse generator system or an external transthoracic pacemaker.<sup>(23)</sup>

### **The nurse in cardiac catheterization laboratory:**

Nurses working in cardiac catheterization laboratories fill many roles. In some laboratories, the nurses scrub and assist in the procedure; in others, they are responsible for monitoring pressure and cardiac rhythm, assisting with hemodynamic studies such as CO determination, and administering IV conscious sedation. The nurse may visit the patient before the procedure to teach and help in preparing the patient. The nurse ideally has a background in intensive or coronary care and a thorough knowledge of cardiovascular drugs, arrhythmias, the principles of IV conscious sedation, sterile technique, cardiac anatomy and physiology, pacemakers, and the concepts of catheter flushing and clot and embolus formation and prevention. Changes in the patient's emotional status, alertness, vocal responses, and facial expressions are important indices of the patient's tolerance of the procedure. The nurse's alertness to these clues and early intervention with reassurance or appropriate medication may help to prevent more serious events, such as vasovagal reactions and coronary artery spasm.<sup>(1)</sup>

'Routine' cardiac catheterization for angiography usually takes about 20-30 minutes. In most cases it is done as a day-case procedure. However, some procedures using a cardiac catheter can take longer, and some people need to stay in hospital for a short time.<sup>(10)</sup>

### **After the procedure:**

If no other tests or treatment are required, the staff will prepare to bring you to the post-procedure area for recovery. You will need to keep your leg (or arm) straight, particularly as you are moving from the table to a stretcher. In the recovery area or, in some cases, back in your hospital room, your catheters will be taken out and pressure will be applied for

approximately 15 to 30 minutes to help stop bleeding and to allow the puncture sites to heal. Please tell the staff immediately if you experience any of the following after your catheterization :<sup>(4)</sup>

- Chest, neck, jaw, or arm discomfort, or any discomfort similar to your “heart pain”
- Shortness of breath.
- Weakness or dizziness.
- Pain at the puncture site.
- Numbness, tingling, or discomfort below the puncture site
- A warm or wet sensation around the puncture site
- Any other discomfort

If the catheterization was through the groin, bed rest (usually for 4 to 6 hours) is essential to ensure that the puncture site heals. We may raise the head of your bed slightly (up to 30 degrees), but you should not actively raise your head. You should not turn from side to side. You may bend your foot and wiggle your toes, but do not bend your knee. Please let us know if you have back discomfort; we will try to help you to get comfortable. If you have to cough or sneeze, apply firm, direct pressure over the adhesive strip on your groin. If your arm was used for the catheterization, you should be able to get out of bed within 1 to 4 hours following the procedure. You will be able to eat while you are in bed after the procedure. In most cases, you will be instructed to drink extra fluid to help your kidneys eliminate the X-ray dye. Since you will not be able to get out of bed, a nurse will assist you in the use of a urinal or bedpan. Following your resting period, a nurse will help you get out of bed. This should be done slowly and carefully. We recommend that your initial activity be limited to short trips, for example to a nearby bathroom. The following day, you may resume light activity. <sup>(4)</sup>.

If you are going home the evening of your procedure, additional written instructions before you are discharged. Please be prepared for the following:

- Plan to stay in the hospital for 2 to 8 hours after your procedure is finished
- Have an escort or family member pick you up and drive you home from the hospital
- Plan to have someone stay with you overnight after your catheterization procedure
- You should not spend the first night at home alone.
- Limit your activity to your trip home.
- Resume light activity (around home) the next day.

These are some important points your doctor should discuss with you before you leave:

- The findings of your catheterization.
- Your activity level.
- Your medications. <sup>(4)</sup>.
- Report to your doctor any of the following:
  - Painful swelling at the catheter insertion site that gets worse rather than better.
  - Bleeding from the insertion site.
  - Swelling in the calf or thigh that occurs days after the procedure.
  - Fever of 101 or higher.
  - Drainage of pus from the insertion site.

- Numbness or weakness of the extremity into which the catheter Was insertion. <sup>(3)</sup>.

## **Methodology:**

### **Study design:**

This study Was Descriptive, cross-sectional hospital-based study, done from the period from April to November 2014.

### **Study area:**

The study is carried out at Shendi town which is 176km north to Khartoum and 110 km south to Elddamer, the capital of River Nile State; Shendi town is lies on the eastern bank of the River Nile with a total area of about 14596 Km<sup>2</sup>. The total population of Shendi 'locality ' is estimated at about 197589 of whom 116713 live in rural areas and 80876 in urban centers, most of them are farmers. Shendi University was established in the early 1990s and stands as a landmark institution in Higher Education. There are three big hospital; Elmek Nimer university hospital, Shendi hospital teaching and military hospital.

### **Setting:**

The study was conducted at cardiac center at Elmek Nimer university hospital

Elmek Nimer hospital established in 2002, it including many department such as medicine, pediatric, surgery, obstetric, renal center and cardiac center

Cardiac center which congaing cardiac care unit which contain 8beds , intermittent cardiac care unit , stress test electrocardiogram room ,echocardiogram room ,cardiac catheterization lab with 2 room for follow up the patient after cardiac cateterization,with6-8 nurses over three shift.

### **Study population:**

Include all nurses' work in Elmek Nimer during the three shifts



With the following are Inclusion criteria:-

- Work in the cardiac unit.
- Both sexes.
- Exclusion criteria:
- Any nurses not work in cardiac unit.

**Sampling:**

Total coverage sample.

**Sample size:**

30 nurses work were participated during the study.

## **Materials:**

### **Data collection tools:**

Data was be collected by closed ended questionnaire to fulfill the purpose of the study. It compose from ( ) question. It included the fallowing parts:

### **Part 1 Concerned with Gathering Data in Relation to:**

#### **Characteristics: (Sociodemographic data):**

Including (Age, sex, qualification, years of experience, course attendance, area of course attendance)

The knowledge of nurses were assessed regarding meaning ,purpose , indication ,contraindication of cardiac catheterization ,high risk group for catheter and acceses point of cardiac catheter.

#### **Part two (pre cardiac catheter preparation:**

Including consent form, hours of patient fasting, physical preparation, nursing assessment, nursing teaching diagnostic study and pre medication.

#### **Part three (complication):**

The knowledge of nurses was assessed regarding complication which may occur.

#### **Part four :-( home –self care):**

Including activity, hygiene, follow up and monitor catheter site for (Painful, swelling, Bleeding, swelling in the calf or thigh and Drainage of pus.)

### **Data collection technique:**

The data was collected during interview between researcher and participator.

**Data analysis:**

Data were coded and transferred into special designed formats for data entry then data were analyzed and computed using the statistical package for social sciences (SPSS version 16.0). And presented in forms of table and figure.

**Ethical consideration:-**

An explanation of the aim of the study was given to every nurse before their enrolment in the study. An oral consent was obtained; each study subject was individually interviewed using the previously mentioned study tools. They were assured that all the gathered data will be used for research purpose only. Participants', confidentiality, privacy, safety and protection were secured.

## Results:

Table (1) the distribution of study population according to Sociodemographic Characteristics (age, sex, qualification and years of experience.

Items	Frequency	Percentage
<b>Age</b>		
25-30years	24	80.0%
30-35years	6	20.0%
More than 40years	0	00.0%
Total	30	100.0%
<b>Sex</b>		
Male	10	33.3%
Female	20	66.7%
Total	30	100.0%
<b>Qualification</b>		
Diploma	3	10.0%
Bacolloria	19	63.3%
Master degree	8	26.7%
Total	30	100.0%

<b>Years of experience</b>		
Less than 2 years	7	23.3%
3-4 years	10	33.3%
More than 4 years	13	43.3%
Total	30	100%

**Table (2) the distribution of the study population according to course attendance:**

<b>Items</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Course attendance</b>		
Yes	12	40.0%
No	18	60.0%
Total	30	100.0%
<b>Area of course attendance</b>		
Local	4	13.3%
National	8	26.7%
Total	12	40.0%

**Table (3) the distribution of study population according to knowledge about cardiac catheterization meaning, indication, contraindication, purpose , high risk group of catheter, access point):**

<b>Items</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Meaning of cardiac catheterization</b>		
Good knowledge	10	33.3%
Fair knowledge	5	16.7%
Poor knowledge	15	50.0%
Total	30	100.0%
<b>Indication of cardiac catheterization</b>		
Good knowledge	10	33.3%
Fair knowledge	13	43.3%
Poor knowledge	7	23.3%
Total	30	100.0%
<b>Contraindication of catheter</b>		
Good knowledge	11	36.7%
Fair knowledge	12	40.0%
Poor knowledge	7	23.3%
Total	30	100.0%

<b>Purpose of cardiac catheterization</b>		
Diagnostic	1	3.3%
Therapeutic	2	6.7%
Diagnostic\therapeutic	26	86.7%
I don't no	1	3.3%
Total	30	100.0%
<b>Higher-risk patients for catheter</b>		
Good knowledge	9	30.0%
Fair knowledge	8	26.7%
Poor knowledge	13	43.3%
Total	30	100.0%
<b>Accesses point</b>		
Femoral artery	14	46.7%
Brachial artery	4	13.3%
Femoral-brachial	5	16.7%
Femoral-radial	7	23.3%
Total	30	100.0%



**Table (4) the distribution of study population according to knowledge about preparation of patient before procedure (consent form, fasting, and physical preparation):**

<b>Items</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Consent form</b>		
Written consent	29	96.7%
Verbally	-	00.0%
Without consent	1	3.3%
Total	30	100.0%
<b>Fasting</b>		
4 hours	5	16.7%
6-8 hours	18	60.0%
12hours	2	6.7%
Without fasting	5	16.7%
Total	30	100.0%
<b>Physical preparation</b>		
Good knowledge	10	33.3%
Fair knowledge	14	46.7%
Poor knowledge	6	20.0%
Total	30	100.0%

**Table (5) the distribution of study population according to knowledge about, nursing assessment:**

Items	Always	Usually	Sometime	Never	Total
heart rate and rhythm, blood pressure	28 (93.3%)	2 (6.7%)	-	-	30 100 %
evaluation of the peripheral pulses of the arms and legs	27 (90%)	3 (10%)	-	-	
Assessment of the heart and lung sound	18 (60%)	5 (16.7%)	6 (20%)	1 (3.3%)	
Evaluation of the patient's emotional status and attitude toward catheterization	21 (70%)	6 (20%)	2 (6.7%)	1 (3.3%)	

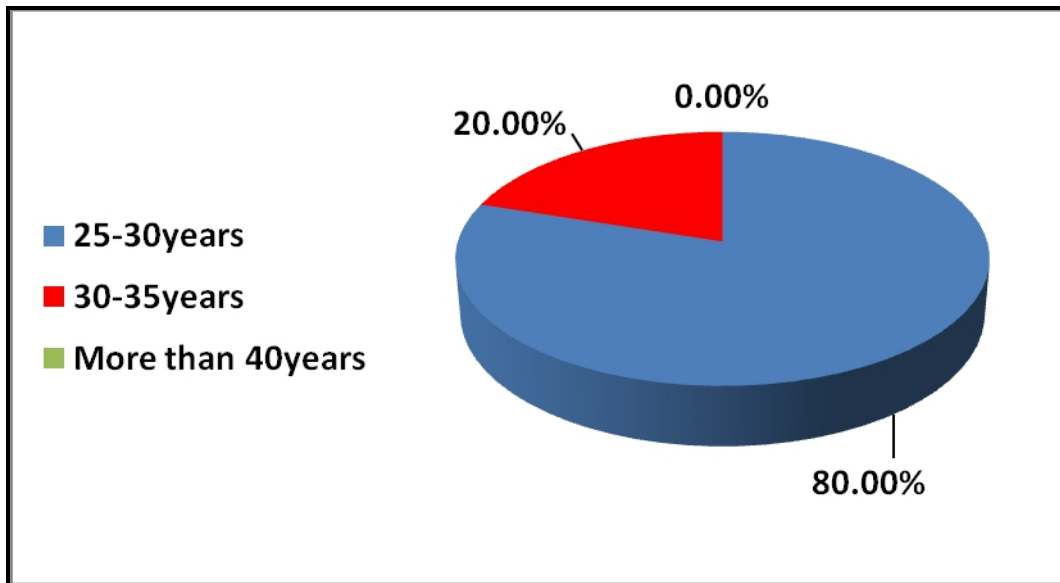
**Table (6) the distribution of study population according to knowledge about, nursing teaching, diagnostic study and premedication:**

Items	Knowledge			
	Good	Fair	Poor	Total
<b>Nursing teaching</b>	<b>17</b> <b>(56.7%)</b>	<b>7</b> <b>(23.3%)</b>	<b>6</b> <b>(20%)</b>	<b>30</b>
<b>Diagnostic study</b>	<b>11</b> <b>(36.7%)</b>	<b>7</b> <b>(23.3%)</b>	<b>12</b> <b>(40%)</b>	<b>(100%)</b>
<b>Pre medication</b>	<b>15</b> <b>(50%)</b>	<b>8</b> <b>(26.7%)</b>	<b>7</b> <b>(23.3%)</b>	

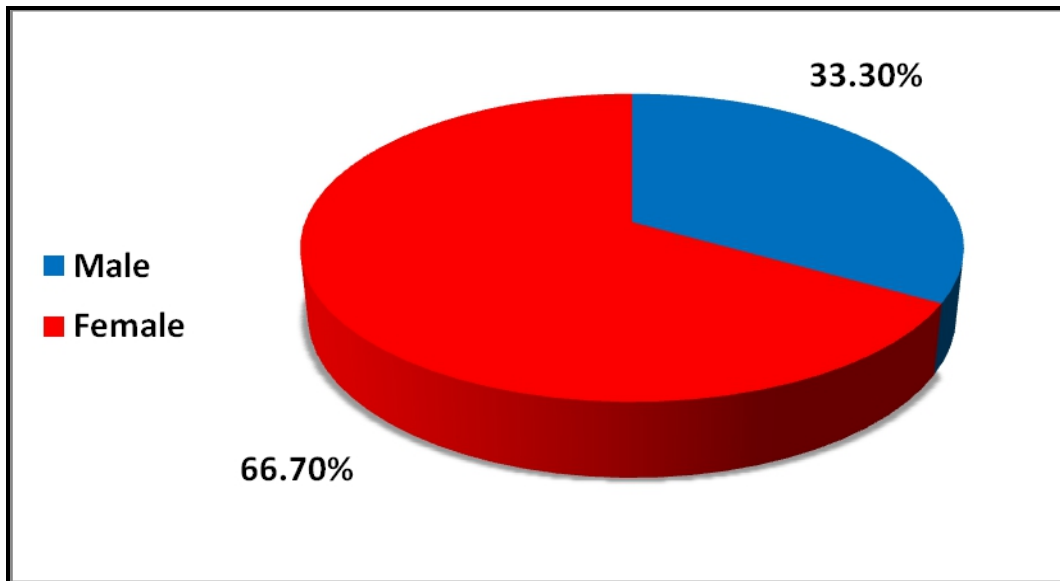
**Table (7) the distribution of study population according to knowledge about complication and home self care (activity, hygiene follow up, monitor site of**

<b>Percentage</b>	<b>Frequency</b>	<b>Items</b>
<b>Common complication occurs</b>		
Good knowledge	16	53.3%
Fair knowledge	6	20.0%
Poor knowledge	8	26.7%
Total	30	100.0%
<b>Hygiene</b>		
Catheter site care	25	83.3%
Partial bath	2	6.7%
Complete bath	3	10.0%
Tub bath	-	00.0%
100.0%	30	Total

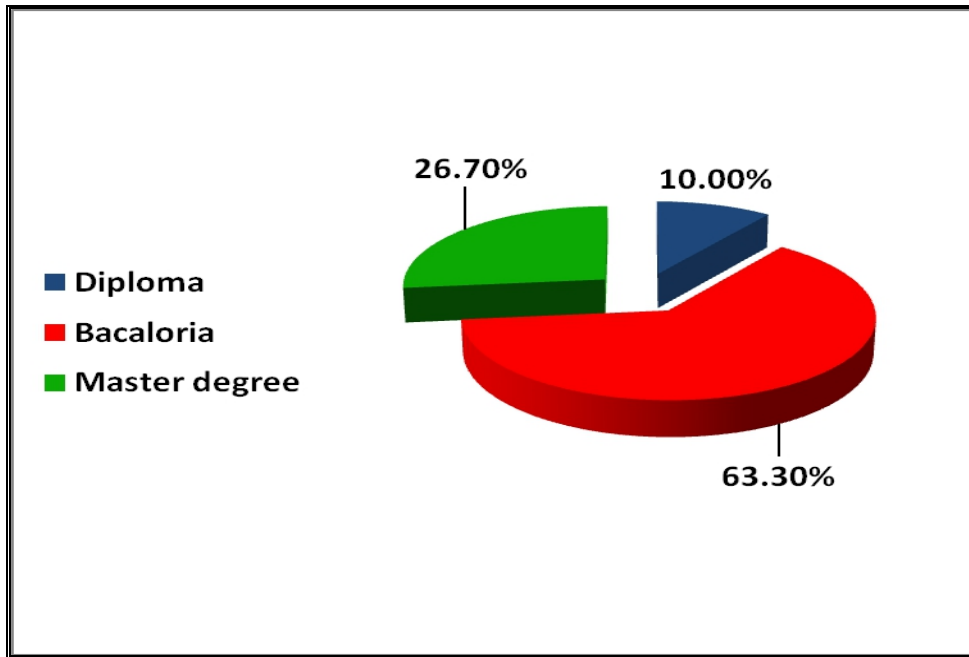
<b>Follow up</b>		
Good knowledge	13	43.3%
Fair knowledge	8	26.7%
Poor knowledge	9	30.0%
Total	30	100.0%
<b>Monitor catheter site for</b>		
Good knowledge	16	53.3%
Fair knowledge	6	20.0%
Poor knowledge	8	26.7%
Total	30	100.0%
<b>Other complication</b>		
Good knowledge	14	46.7%
Fair knowledge	11	36.7%
Poor knowledge	5	16.7%
Total	30	100.0%



**Figure (1) show the age of study group**

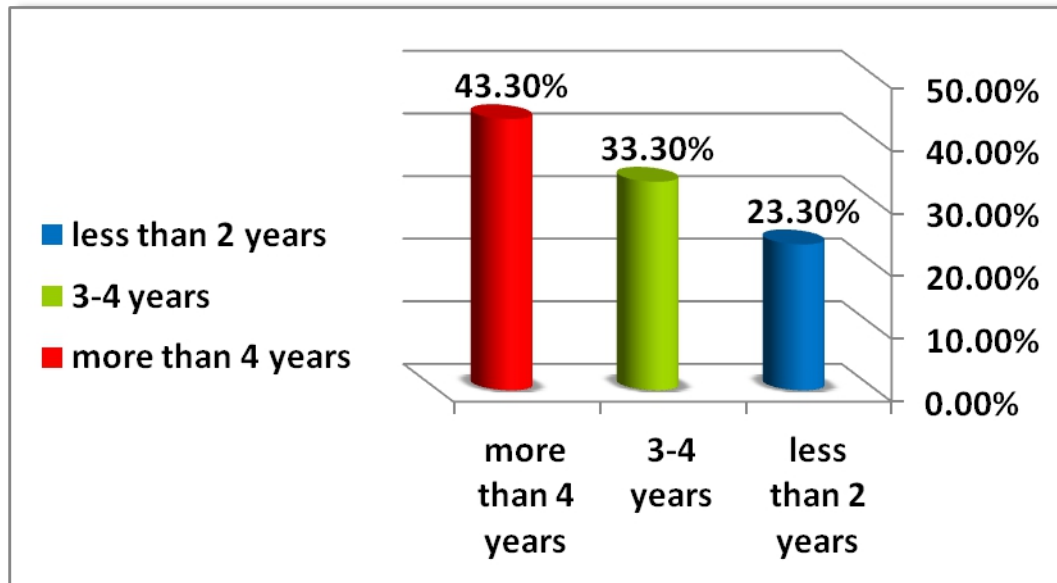


**Figure (2) Show the sex of study population**

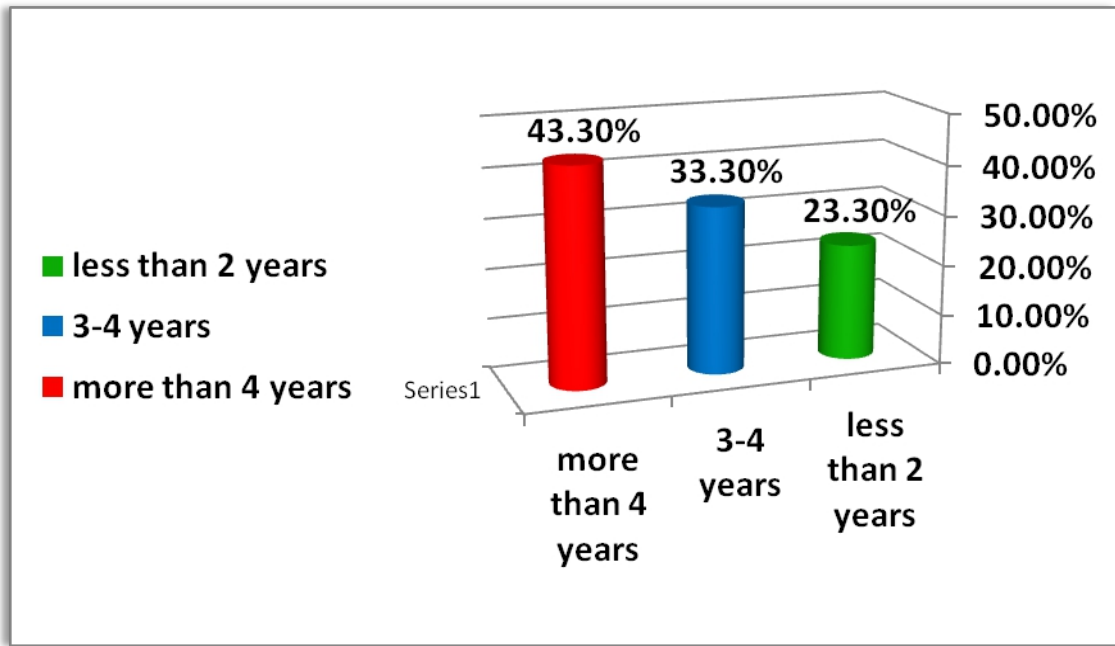


**Figure (3) Show the study population according to qualification.**

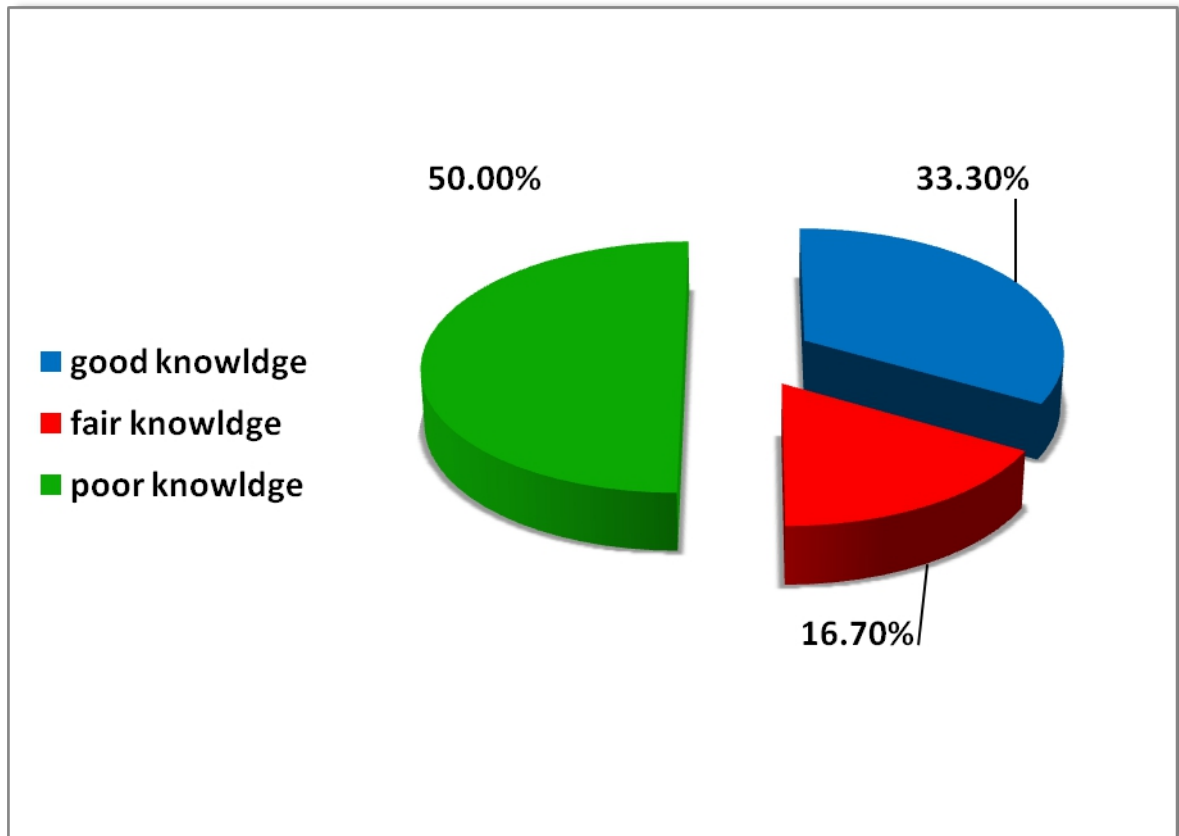




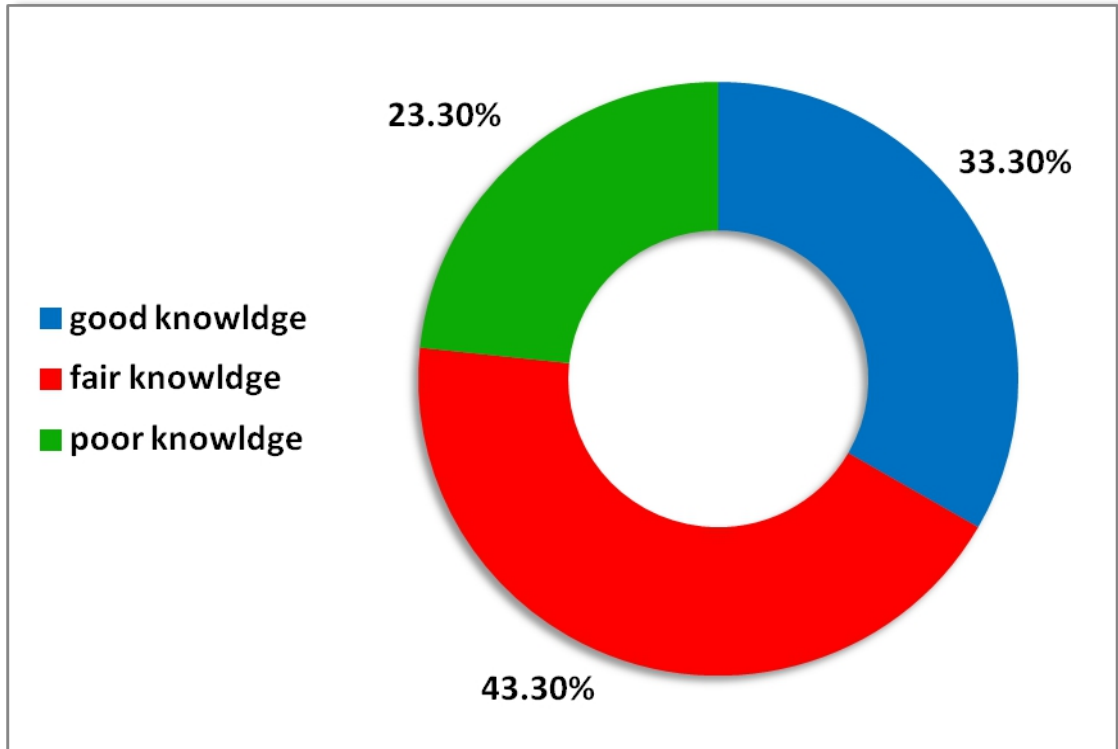
**Figure (4) Show the study population according to years of experience.**



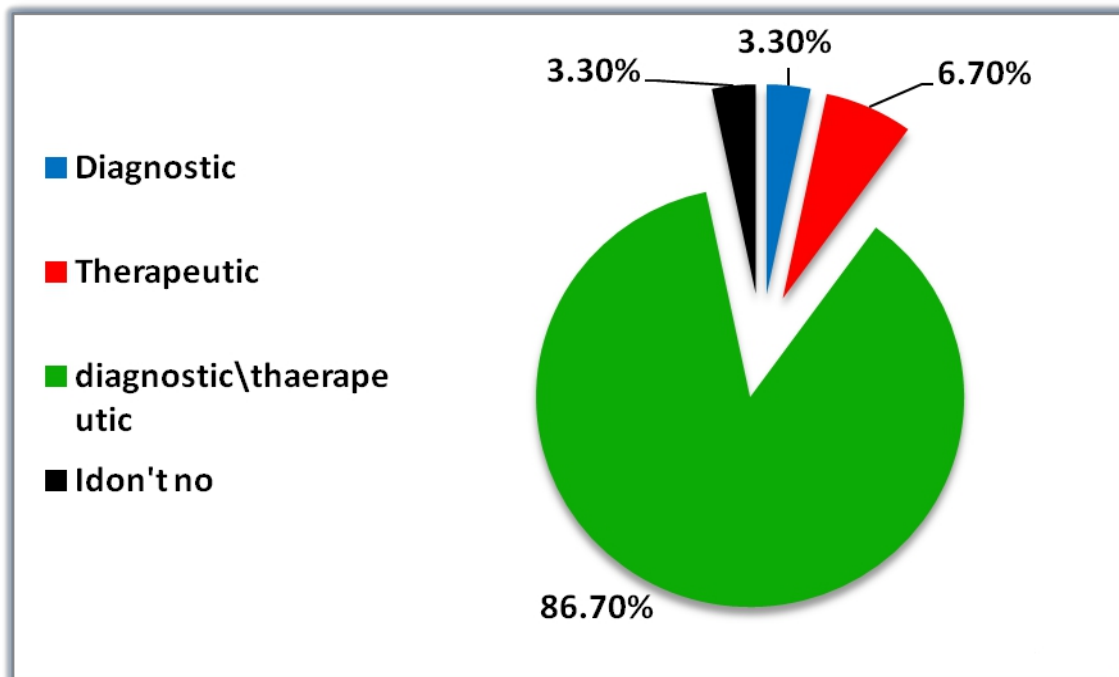
**Figure (5) Show the study population according to years of experience.**



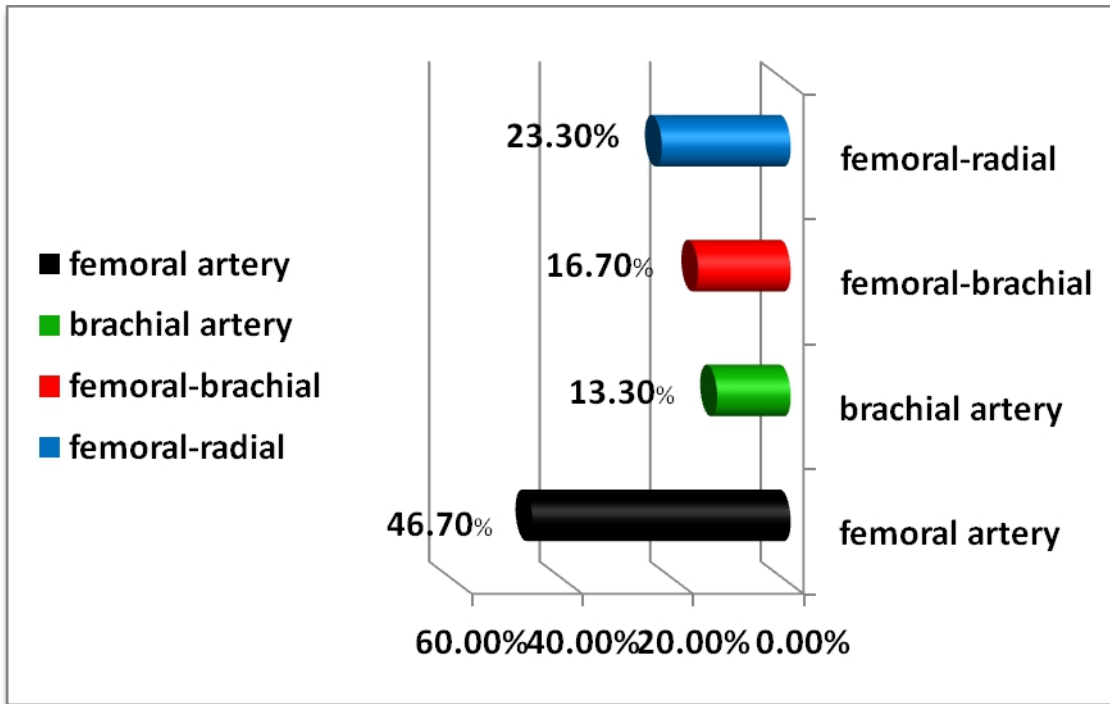
**Figure (6) Show the study population according to knowledge about meaning of cardiac catheterization.**



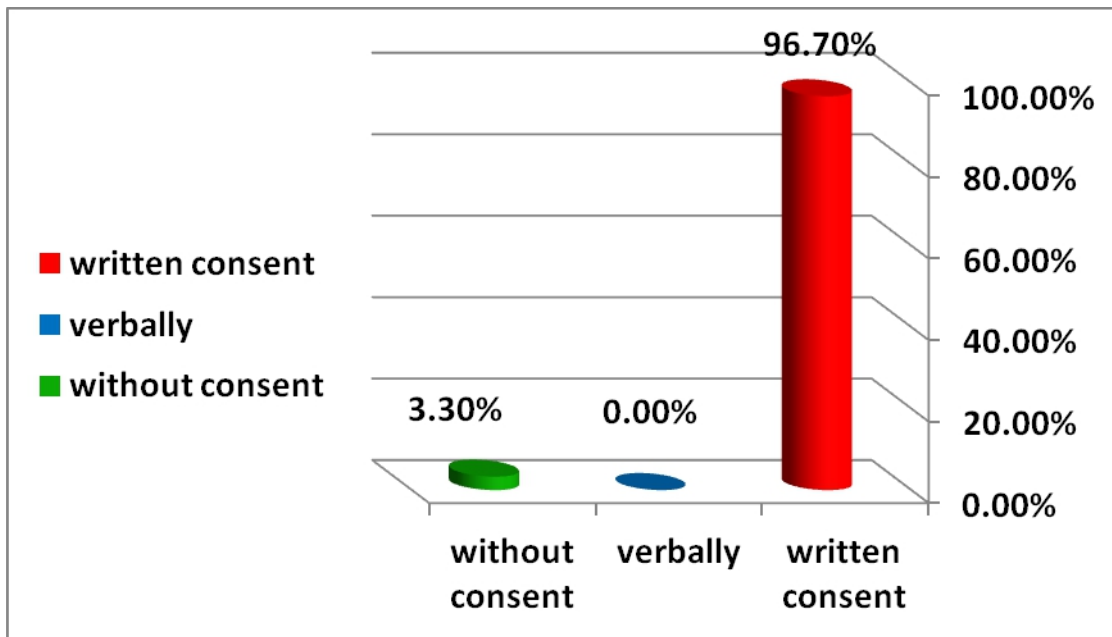
**Figure (7) Show the study population according to knowledge about indication of cardiac catheterization.**



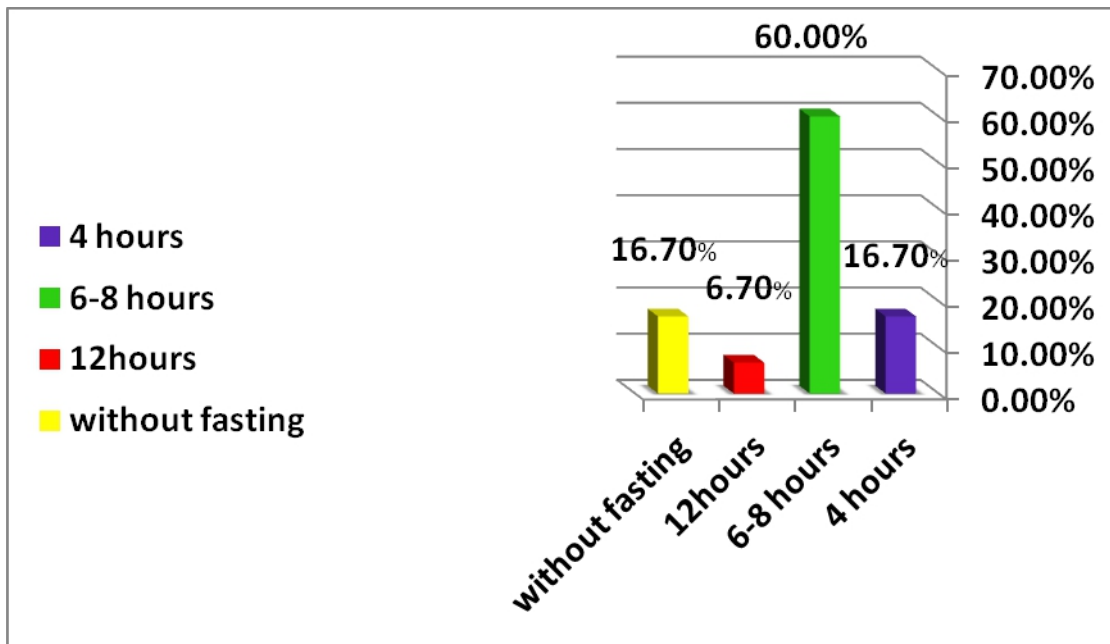
**Figure (8) Show the study population according to knowledge about purpose of cardiac catheterization.**



**Figure (9) Show the study population according knowledge about accesses point.**

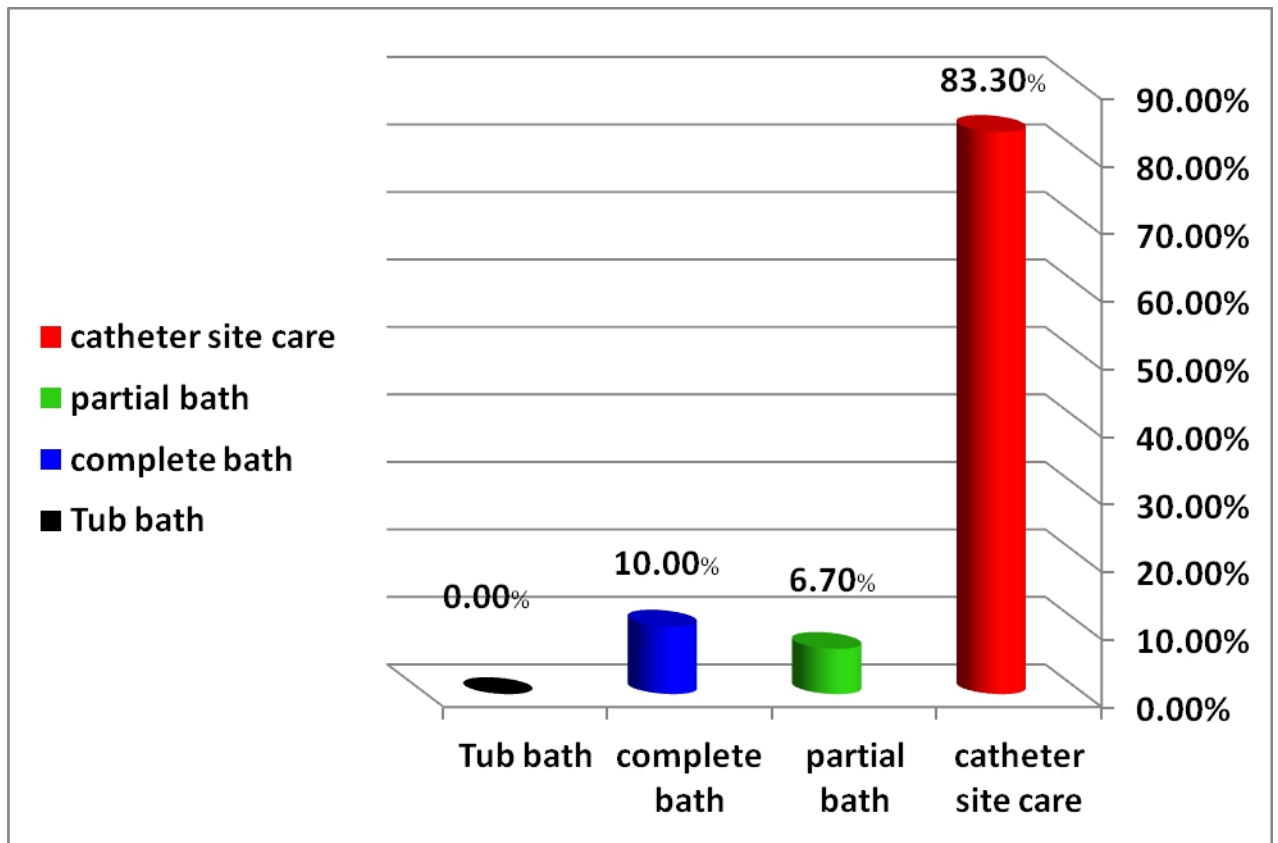


**Figure (10) Show the study population knowledge about consent form.**



**Figure (11) Show the study population knowledge about pre procedure fasting.**





**Figure (12) Show the study population knowledge about hygienic care of catheter.**

## Results:

The study showed that the 24nurs of candidate (80.0%) of study population their age between (25-30 years) and 6 of candidate (20.0%) between (30-35 years), Figure (1) .20candidate (66.7%) of them their female. Figure (2) . 19 candidate (63.3%) of the study population their qualification is bacaloria .figure (3) and 13candidate (43.3%) of them experience more than 4years. Table (1), figure (4).

The study reflect that 18candidate (60.0%) of study population haven't course attendance .8candidate have (26.7%) national course. Table (2).

The study reveals that 15candidate (50.0%) of study population have poor background about meaning of cardiac catheterization, figure (6). And 26candidate (86.7%) know purpose of catheterization. Figure (8) . 13candidate (43.3%) have fair knowledge about indication of catheterization figure (7) while 12candidate (40%) of them have fair knowledge about contraindication .13candidate (40.3) of them have poor knowledge about high risk group.14candidate (46.7%) of population show the femoral artery most accesses point. Figure (9), Table (3).

The study showed that 29candidate (96.7%) of patients have written consent form. figure (10) and 18candidate (60.0%) fasting between (6-8 hours) before procedure. Figure (11). And 14candidate (46.7%) of study group have fair knowledge about physical preparation of patients. Table (4)

The study showed that the 28candidate (93.3%) of study population always assess heart rate, blood pressure and evaluation of the peripheral pulses of arm and leg. 18candidate (60%) of study population assessed heart and lung sound and 21candidate (70%) of them evaluated the patient' emotional status and attitude toward catheterization. Table (5)

The study showed that the 17candidate (56.7%) of them have good knowledge about nursing teaching .12candidate (40.0%) of them have poor knowledge about diagnostic study and 15candidate (50.0%) of them have good knowledge about pre medication before procedure. Table (6).

The study Showed that the 16candidate (53.3%) of study group have good knowledge about complication. and 16candidate (40.0%) of them have good knowledge about activity .while 25candidate (83.3%) of the show hygienic care about catheter site .13candidate (43.3%) of them have good knowledge about follow up. And 16candidate (53.3%) of them has good knowledge about monitoring catheter site while 14candidate (46.7) of them has good knowledge about other complication. Table (7)

## **Discussion**

Nurses Knowledge about cardiac catheterization is the major role that aiding in preparation of patients before catheterization and complication occurrence.

The present study showed that the 24 candidate (80.0%) of study group age between (25-30) years this indicate that most of them are young, and 20 candidate (66.7%) of them are female.

The study revealed that the 19 candidate (63.3%) of the study group had bacaloria certificate and 13 candidate (43.3%) of them their experience more than 4 years, this will enable them to improve their care about cardiac catheterization and preparation of patients undergoing catch lab.

This study revealed that the 18 candidate (60.0%) of study group have not attend any course during years of experience but only 12 candidate (40.0%) had attended course this result is may be related to low hospital apportouinity for course attend, work shop and conferences committee and absence of nursing round. 8 candidate (26.7%) of them had attended national course. This result also shows that low percentage of courses and training for nurses.

Regarding knowledge the present study finding showed that the 15 candidate (50.0%) of study population had poor knowledge about meaning of cardiac catheterization, and the 26 candidate (86.7%) of study group know the purpose of catheterization. 13 candidate (43.3%) of them have fair knowledge about indication of catheterization, 12 candidate (40%) of them have fair knowledge about contraindication, and the 13 candidate (40.3%) of them have poor knowledge about high risk group. This result show that low percentage of knowledge in spite of the 13 candidate (43.3%) years of experience more than 4 years this indicate that the study group highly skill without knowledge and may be related to no resident cardiologist available

and catheter can be done 2-3 time per month and needed more training and courses about cardiac catheterization and present of resident cardiologist play important role in teaching and learning.

Furthermore The present study results showed that the 14candidate (46.7%) of study group knew the femoral artery as the most access point. .this result is inconsistent with Thorsten M, Matthew L, Michael P. Catheterization and Cardiovascular Interventions.jornal of cardiac catheterization. (2) "Transcatheter aortic valve replacement (TAVR) via the transfemoral (TF), transapical (TA), or even the transaortic (TAO) approach in high-risk or inoperable patients is quickly becoming a safe and effective modality for the treatment of symptomatic severe aortic stenosis (AS). However, in this selected group of patients, those with anatomical or physiologic constraints preventing TF, TA, and conventional TAO TAVR, alternative sites of access must be explored. Here, we report a successful TAVR in an inoperable patient with severe AS using a distal abdominal TAO approach via a synthetic graft-conduit."

As regard to preparation of patients The present study showed that the 29candidate (96.7% ) of patients have assent consent form and 18candidate (60.0%)knew fasting about (6-8 hours) before procedure. 14candidate (46.7%) of study group have fair knowledge about physical preparation of patients , and 28candidate(93.3%) of them always assess the heart rate , rhythm, and blood pressure, 27candidate (90%) evaluated the peripheral pulses of the arms and leg ,18candidate(60%) of them assess of the heart and lung always done ,21candidate(70%) of them always evaluation of the patient's emotional status and attitude toward catheterization. corresponding to 17candidate (56.7%) of them have good knowledge about nursing patient teaching . 12candidate (40.0%) of them have poor knowledge

about diagnostic study and 15candidate (50.0%) of them have good knowledge about pre procedure medication , results indicate that the study group have good knowledge about consent form , diagnostic study ,pre medication and nursing teaching and assessment and This information will be used for comparison in evaluating peripheral pulses after the catheterization procedure. but needed more education and rehabilitation about physical preparation.

The study revealed that the 16candidate (53.3%) of study group have good knowledge about complication, 12candidate (40.0%)of them have good knowledge about activity. 25candidate( 83.3%) of them did hygienic care to catheter site, 13candidate (43.3% ) of them have good knowledge about follow up .16candidate (53.3%) of them have good knowledge about monitoring catheter site.14candidate (46.7%) of them have good knowledge about other complication .this results indicate that study population have good knowledge.

## **Conclusion:**

**Based on the finding of present study it was concluded that:**

Half of study population had poor knowledge about meaning of cardiac catheterization, and needed more training and courses about cardiac catheterization.

The study result about home self care and complication clarify that most of study population have good knowledge about complication and home self care.

## **Recommendations**

**Based on the study finding and conclusion the following recommendation:**

(A) By Head nurses must develop plan as :

1. Nurses should train to deal with patient undergoing cardiac catheterization.
2. Increase nurse awareness about preparation of patients undergoing cardiac catheterization to reduce risk of complication and improve quality of care through in-services educational programs, workshops, and continuous training.

(B) By the Hospital director have to develop plan as:

1. Collaborate between clinician and researcher in an effective way to develop standers can help nurses to improve quality of care.
2. Send nurses to learn advanced courses in specialized centers.
3. Resident cardiologist available in Shendi in cardiac center.

(C) Further studies in multiple local and international centers are needed to further expiree the real important of preparation to patient undergoing cardiac catheterization. These with provide clean quid lines for diagnosis and treatment.



## References:

- 1- Margaret Wooding Baker, et al. Cardiac nursing 2000. 4<sup>th</sup> edition. publisher Lippincott Williams & Wilkins.
- 2- Thorsten M, Matthew L, Michael P. Catheterization and Cardiovascular Interventions. Journal of cardiac catheterization. 1 March 2014. Volume 83, Issue 4, pages 670–675.
- 3- David Brill, MD, Director, Cardiac Catheterization Laboratory. Washington Adventist Hospital. Copyright© 2004.
- 4- Massachusetts General Hospital Vascular Center, Understanding and Preparing for a Catheterization Procedure, 2014, page 3, 4, 5.
- 5- Marieb EN, Hoehn K. Human Anatomy and physiology, cardiovascular system, Benjamin Cummings 8<sup>th</sup> Edition 2010.
- 6- Noble A, Johnson R, Thomas A, Bass P. The cardiovascular system, systems of Body series, Churchill Livingstone 2<sup>nd</sup> Ed 2010.
- 7- Aaronson P, Ward P. The cardiovascular system at a glance, Blackwell publishing 3<sup>rd</sup> Ed 2007.
- 8- Mohrman D, Heller L. Cardiovascular physiology, Lange physiology .7<sup>th</sup> Ed 2010.
- 9- Lilly L. Pathophysiology of heart disease. In A collaborative project of medical student and faculty 5th Ed. Lippincott Williams and Wilkin: 2010.
- 10- from <http://www.patient.co.uk/health/cardiac-catheterization-leaflet>. (Last Accessed Wednesday, July 09, 2014 12:57:58pm.)
- 11- from <http://www.patient.co.uk/doctor/cardiac-catheterization>. (Last Accessed Wednesday, July 09, 2014 12:57:58pm.)
- 12- Fox KA, Anderson FA Jr, Dabbous OH, et al; Intervention in acute coronary syndromes: do patients undergo intervention on the basis of their

risk characteristics? The Global Registry of Acute Coronary Events (GRACE). *Heart*. 2007 Feb; 93(2):177-82. Epub 2006 Jun 6.

13- Alexander KP, Newby LK, Cannon CP, et al; Acute coronary care in the elderly, part I: Non-ST-segment-elevation acute coronary syndromes: a scientific statement for healthcare professionals from the American Heart Association Council on Clinical Cardiology: in collaboration with the Society of Geriatric Cardiology. *Circulation*. 2007 May 15; 115(19):2549-69.

14- Kassam S, Cantor WJ, Patel D, et al; Radial versus femoral access for rescue percutaneous coronary intervention with adjuvant glycoprotein IIb/IIIa inhibitor use. *Can J Cardiol*. 2004 Dec; 20(14):1439-42.

15- Choussat R, Black A, Bossi I, et al; Vascular complications and clinical outcome after coronary angioplasty with platelet IIb/IIIa receptor blockade. Comparison of transradial vs. transfemoral arterial access. *Eur Heart J*. 2000 Apr; 21(8):662-7.

16- Bertrand OF, De Larochelliere R, Rodes-Cabau J, et al; A randomized study comparing same-day home discharge and abciximab bolus only to overnight hospitalization and abciximab bolus and infusion after transradial coronary stent implantation. *Circulation*. 2006 Dec 12; 114(24):2636-43. Epub 2006 Dec 4.

17- Gilchrist IC, Moyer CD, Gascho JA; Transradial right and left heart catheterizations: a comparison to traditional femoral approach. *Catheter Cardiovascular Interv*. 2006 Apr; 67(4):585-8.

18- Ziakas A, Gomma A, McDonald J, et al; A comparison of the radial and the femoral approaches in primary or rescue percutaneous coronary intervention for acute myocardial infarction in the elderly. *Acute Cardiac Care*. 2007; 9(2):93-6.

19- Management of Acute Myocardial Infarction in patients presenting with ST-segment elevation, European Society of Cardiology (2012).

20-Unstable angina and NSTEMI, NICE Clinical Guideline (March 2010).

21- West R, Ellis G, Brooks N; Complications of diagnostic cardiac catheterization: results from a confidential inquiry into cardiac catheter complications. *Heart*. 2006 Jun; 92(6):810-4. Epub 2005 Nov 24.

22-Nordmann AJ, Hengstler P, Harr T, et al; Clinical outcomes of primary stenting versus balloon angioplasty in patients with myocardial infarction: a meta-analysis of randomized controlled trials. *Am J Med*. 2004 Feb 15; 116(4):253-62.

23- Banka VS, Bodenheimer MM, Helfant RH: Determinants of reversible asynergy, the native coronary circulation. *Circulation* 52: 810–816, 1975



*Shendi University*

*Faculty of Graduate Studies and Scientific Research*

**Questionnaire to evaluate knowledge of nurses about preparation of patient undergoing cardiac catheterization:-**

**Part one :-( definition)**

1-age:-

- 25-30years ( )
- 30-35years ( )
- More than40 year ( )

2-Sex:-

- Male ( )
- Female ( )

3- Qualification:-

- Diploma ( )
- Bicolor ( )
- Master degree ( )

4-Years of experience:-

- Less than 2 years ( )
- 3-4years ( )
- More than4years ( )

5-Course attendance:-

– Yes ( )

– No ( )

6-If yes the Area of course attendance:-

– Local ( )

– National ( )

– International ( )

7-Meaning of cardiac catheterization:-

-Procedure used to diagnose and treat various forms of heart and vascular disease. ( )

-The procedure is performed in an area of the hospital called the catheterization laboratory, or “cath lab.” ( )

-Procedure which insert long, thin tubes catheters into blood vessels in your arm, leg or neck. ( )

-Procedure of catheter insertion through large vessel to the coronary arteries ( )

8-Purpose of cardiac catheterization:-

– Diagnostic ( )

– Therapeutic ( )

– Idont'no ( )

9-Indication of catheterization:-

- Unstable angina pectoris. ( )

- Before major vascular surgery. ( )

- Successful resuscitation from cardiac arrest. ( )

- Myocardial infarction. ( )

- High-risk occupations including airline pilots, bus drivers, truck drivers, and air traffic controllers ( )

10-Contraindication of catheter:-

- Severe hypertension ( )
- In shocked patients ( )
- Severe anemia ( )
- Acute renal failure ( )
- Allergy to the contrast medium ( )
- Active infection or unexplained fever ( )

11- higher-risk patients for catheter:-

- Extremes of age ( )
- Severe coronary artery disease affecting the left main stem. ( )
- Left ventricular ejection fraction <30 %. ( )
- Recent cerebrovascular disease. ( )
- Chronic obstructive pulmonary disease ( )

12-Access point:-

- The femoral artery ( )
- The brachial artery ( )
- The radial artery ( )

**Part two :-( pre cardiac catheter preparation)**

13-Consent form:-

- Written consent ( )
- Verbally ( )

- Without consent ( )

14-Fasting:-

- 4hours ( )
- 6-8hours ( )
- 12hour ( )
- Without fasting ( )

15-Physical preparation:-

- Shaving ( )
- Jewelry free ( )
- Comfortable clothing ( )
- Comfortable shoes ( )

**Nursing Assessment:-**

16-heart rate and rhythm, blood pressure.-

- Always ( )
- Usually ( )
- Sometime ( )
- Never ( )

17- Evaluation of the peripheral pulses of the arms and legs:-

- Always ( )
- Usually ( )
- Sometime ( )
- Never ( )

18-assessment of heart and lung sounds:-

- Always ( )
- Usually ( )
- Sometime ( )
- Never ( )

19-evaluation of the patient's emotional status and attitude toward catheterization:-

- Always ( )
- Usually ( )
- Sometime ( )
- Never ( )

20-Nursing teaching:-

- Voiding before procedure ( )
- Deep breathing and coughing exercise ( )
- Explanation about procedure and length ( )
- Report any chest pain to the staff. ( )
- Length of bed rest after the catheterization ( )

21-diagnostic study:-

- Hematological studies ( )
- radiological investigation ( )
- Standard 12-lead ECG ( )

22- Pre medication:-



- Stop anticoagulation at least 3 days. ( )
- Control antidiabetic medication. ( )
- Continuous prescribed medication ( )
- Test to allergic to x-ray dye ( )

**Part three :- ( complication )**

23- common complication occurs:-

- Chest, neck, jaw, or arm discomfort ( )
- Shortness of breath ( )
- Weakness or dizziness ( )
- Pain at the puncture site ( )
- Numbness, tingling, or discomfort below the puncture site ( )
- A warm or wet sensation around the puncture site ( )

**Part four :- ( home –self care):**

24- Activity:-

- Limit your activity to your trip home ( )
- Light activity (around home) the next. ( )
- Avoid heavy lifting. ( )
- Start daily activity slowly. ( )

25-Hygiene:-

- Catheter site care ( )
- Partial bath ( )
- Complete bath ( )
- Tub bath ( )

26-follwo up:-

- Doctor visits. ( )
- Medication compliance. ( )
- Hematological study. ( )
- ECG. ( )

27-monitor sign of complication:-

1-Monitor catheter site for

- Painful swelling. ( )
- Bleeding ( )
- Swelling in the calf or thigh ( )
- Drainage of pus ( )

28-Other complication:-

- Fever. ( )
- Pain ( )
- Numbnes ( )
- Weakness of the extremity at insertion site ( )

Department of cardiac center

*Shendi University*

*Faculty of Graduate Studies and Scientific Research*

**Subject:**

**Evaluation of nurse's knowledge about preparation of patient under- going cardiac catheterization.**

Investigator: *Faiza Ahmed Saeed Mousa*

Supervisor: *Motwakil Imam Awadelkareim.*

Consultant Physician

إقرار شفوي بالموافقة

أوافق بمحض ارادتي بالمشاركة في البحث العلمى المتعلق بهدف تقييم معرفه الممرضين بتحضير المريض قبل عملية القسطرة القلبية .

تقني تمرىض / فائزه احمد سعيد موسى.

بعد أن شرحت لى بأنه لا يترتب عليه أى أذى جسدى او نفسى واعلم كما أنه يحق لى بدون ابداء أسباب الإنسحاب من هذا البحث في أى مرحلة من مراحلہ.

البحث باشراف

دكتور/ متوكل امام عوض الكريم