ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCES
SCHOOL OF NURSING AND MIDWIFERY
DEPARTMENT OF NURSING

ASSESMENT OF NURSES KNOWLEDGE AND PRACTICE REGARDING PATIENT CARE AFTER CARDIAC CATHETERIZATION AT SELECTED HOSPITALS IN ADDIS ABABA, ETHIOPIA.

BY: ALEM WONDIMU (BSCN)

A REASEARCH THESIS SUBMITTED TO ADDIS ABABA UNIVERSITY, COLLEGE OF HEALTH SCIENCES, SCHOOL OF NURSING & MIDWIFERY FOR THE PARTIAL FULFILLMENT OF THE DEGREE OF MASTERS OF SCIENCE IN CARDIOVASCULAR NURSING

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ASSESMENT OF NURSES KNOWLEDGE AND PRACTICE REGARDING PATIENT CARE AFTER CARDIAC CATHETERIZATION AT SELECTED HOSPITALS IN ADDIS ABABA, ETHIOPIA:CCROSS SECTIONAL STUDY

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APPROVAL SHEET

ADDS ABABA UNIVERSITY

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I, the undersigned MSc student, declare that I have submitted my original work on a title Assessment of Nurses Knowledge and Practice regarding patients care after cardiac catheterization at Selected Hospitals, Addis Ababa, Ethiopia.

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ABBREVIATIONS/ACCRONYMS

CABG	coronary artery bypasses grafting
CAD	coronary artery disease
Cath-Lab	catheterization Laboratory
CCE	Cardiac center Ethiopia
CHD	coronary heart disease
CVD	cardiovascular diseases
ICU	intensive care unit
MI	myocardial infarction
MCM	Myung Sung Christian Medical Hospital
PAS	proportional allocation to size
PCI	percutaneous coronary intervention
PTCA	percutaneous transluminal coronary angioplasty
SPSS	Software Package of Social Science
TASH	TikurAnbessa Specialized Hospital

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ABSTRACT

Background: Cardiac catheterization is an invasive procedure which is used in the diagnosis and treatment of several cardiac diseases. As cardiac catheterization involves the insertion of cardiac catheters into the circulatory system, there will be a risk of developing variety of complications which may contribute to morbidity and mortality. Early recognition of complications requires standardized care policies, as well as it needs qualified and skilled health care providers to ensure good patient care and improve patient outcome.

Objective: assess knowledge and practice on patient's care after cardiac catheterization among nurses working in cardiac wards and cardiac ICUs of the selected hospitals in Addis Ababa, Ethiopia, 2021.

Method: An institution based cross-sectional study was conducted among 151 nurses working in cardiac wards and cardiac ICU of the seven purposely selected hospitals. The total sample sizes were allocated proportionally based on the number of nurses from each hospital. A simple random sampling technique was employed for the selection of study participants. Data were collected by using self-administered structured questionnaire and imported to SPSS version 26.0 software for analysis. Descriptive statistics and binary logistic regression was used to analyze the result. Bivariable and multivariable logistic regression was done to determine the association between the independent variables and dependent variables.

Result: Overall 42.4% and 32.5% of the participants have unsatisfactory knowledge and practice regarding patient care after cardiac catheterization respectively.BSC degree and training [AOR=3.7 ;(1.1, 12.4) and 3.1 ;(1.2, 7.9) respectively] were found to be statistically significant with nurses knowledge of patients care after cardiac catheterization. Experience in cardiac unit, knowledge and training [AOR=5.6 ;(1.6, 19.3), 2.2 ;(1.04, 4.7) and 3.0 ;(1.09, 8.4)] were also found to be significantly associated with practice.

Conclusion and recommendation: The study revealed that above one third of of the participants do not have satisfactory knowledge and more than one third of the participants practice is not satisfactory. Therefore, there is a need to design and implement knowledge increasing training on patients care after cardiac catheterization

Key words: Cardiac catheterization, nurses, knowledge, practice.

1. INTRODUCTION

1.1 Background

Cardiac patient is critically ill patient because of a reduced cardiac output, decreased myocardial perfusion, abnormal cardiac rhythm, and sever valvular lesions. This patient requires continuous assessment and intervention to diagnose and manage their complicated medical conditions (1). Cardiac catheterization is a process that is supposed as the golden standard for diagnosing, evaluating, and treating cardiac diseases. One or more catheters are inserted through a peripheral blood vessel in either the antecubital artery or vein or femoral artery or vein with x-ray guidance (2).As diagnostic procedure it does a comprehensive examination of how the heart and its blood vessels function. The procedure gathers information such as adequacy of blood supply through the coronary arteries, blood pressures, blood flow through the different chambers of the heart, collection of blood samples, and x rays of the heart's ventricles or arteries. Based on the results of diagnostic catheterization either percutaneous coronary intervention (PCI) or coronary bypass surgery (CABG) will be decided as treatment procedure. These procedures are preferred as an alternative to open heart surgery and are considered as a revascularization treatment which have similar effects (3).

As cardiac catheterizations involve the insertion of cardiac catheters into the circulatory system, there will be a risk of developing variety of complications. The overall prevalence of complications of post cardiac catheterization is 1.5-9%. These complications range from minor problems which are usually temporary(e.g., bleeding, allergic skin reaction to latex or tape, bruising, abnormal heartbeats, temporary pain, minor infections, nausea and vomiting. transient bradycardia during coronary contrast injection)to major problem that are severe but rare(e.g., serious bleeding, hematoma, lung or heart failure, stroke, heart attack, blood vessel or nerve damage, failure of medical equipment, renal failure, with possible dialysis needed, or even death cardiac perforation, abrupt closure of a coronary artery during percutaneous transluminal coronary angioplasty (PTCA)) that may require immediate surgical attention or cause irreversible damage (4,5) .

Nurses play a pivotal role in preventing post cardiac catheterization complications by recognizing potential sign and symptoms for potential intervention. They are also responsible

for assessing patient condition, safe transportation, medication administration, basic personal care needs, bleeding control and homeostasis maintenance. Nurses who are competent in post cardiac catheterization care are able to minimize mortality and morbidity rates in the post catheterization period. Using standard protocol of care for post cardiac catheterization patients by cardiac nurses Using standard protocol of care that is based upon various educational needs of nurses and considers other relevant factors will help patients to cope successfully with their condition and minimizing their vascular complications (6).

Hence, the competence of the cardiac nurses is crucial; and caring of patients after cardiac catheterization requires knowledge about its complications, management and the related factors. To prevent post cardiac catheterization complication uninterrupted follow-up is required which includes close observation, continuous monitoring, and maintenance of hemodynamic stability. Well trained nurses are assets for a well functioning unit with safety culture which can be demonstrated by clinical quality results and high internal/external client satisfaction scores to evade the dangers associated with a less reliable unit (1,7) .

Optimizing nursing knowledge and skills assures this safe and accurate procedure, and improve physical and mental health of patients. The purpose of this study is to evaluate the knowledge level and practices among nurse's regarding patient's care after cardiac catheterization at the selected hospitals.

1.2 Statement of the problem

Cardiac catheterization is an invasive procedure that is being used both for diagnosis and treatment of coronary heart disease. As the procedure involve insertion of cardiac catheters into circulatory system, it is common to see different levels of complication after the procedure (8).

Even if complication rate and its level are known to decrease in recent years, because of advanced catheter technology, statistics show that post cardiac catheter complications to remain a significant source of mortality and morbidity. Major complications including bleeding, hematoma formation, thrombus, pseudoaneurysm, arteriovenous fistula and infection which requires excellent nursing care (5). Complications related to cardiac catheterization accounts nearly half of the medical errors, according to the Pennsylvania Patient Safety Authority's reporting system (9). A study made at 28 military facilities in US also shows that 3.5% of patients who undergo cardiac catheterization developed minor to major complications (10).A prospective study made on 164 patients undergoing trans radial coronary catheterization in Egypt also founds a radial artery occlusion in 54 (32.9%) patients (11).

Early clinical identification of complications and vascular surgery consultations are found to improve patient outcomes (12).Nurses that are competent can prevent or identify these complications at early stage and also take critical actions to improve patient outcomes. In post cardiac catheterization care, nurses are responsible for ensuring that the access site is not bleeding and the distal extremity pulses are intact. In addition the nurse should monitor the urine output to ensure that there has been no adverse reaction of the dye to the kidney (8).

Studies have showed that early clinical identification of post cardiac catheterization complications to significantly reduce mortality and morbidity. Close clinical observation and conservative management is also found to result in a low incidence of the necessity for surgical repair (13).For recognizing symptoms early and take proper intervention, nurses require adequate knowledge and skilled practice.

Nurses also need to advance their knowledge and evidence based practice when providing care for patients after cardiac catheterization (7).The knowledge and practice of nurses regarding patient care after cardiac catheterization was studied in different countries. Studies made in

Iraq and Egypt indicated that the knowledge of nurse's regarding patient care after cardiac catheterization was poor (14–16).Similarly study made in Pakistan revealed that, the practice of staff nurses regarding patient care after cardiac catheterization was at poor level (16,17).

However, a study conducted in India indicated that the proportion of nurses who have good practice regarding patient care after cardiac catheterization was better (72%) when compare with Pakistan and Egypt (18).

The studies made in specified countries had also tried to identify the factors affecting the nurses knowledge and practice regarding patient's care after cardiac catheterization. Age, sex of participants, service experience, availability of guideline and taking training on post cardiac catheterization care were identified as major factors affecting the nurse's knowledge and practice (2,19,20). Insufficient knowledge, excessive workload, lack of cooperation between teams and insufficient performance monitoring systems are also identified factors affecting the level of nurse's practice regarding patient care after cardiac catheterization (16).

Studies recommend conducting periodic competency based orientations and simulation based trainings for nurses in addition to developing and implementing patient care protocols (21).Well designed teaching protocols were found to be effective in improving nurses knowledge and practice; followed by reduced vascular complications among patients (22)

In Ethiopian, there is no published data concerning Knowledge and practice of nurses regarding patient's care after cardiac catheterization. Therefore, the purpose of this study to assess knowledge and practice on patient's care after cardiac catheterization and identify associated factors among nurses working in cardiac wards and cardiac ICUs at the selected hospitals of Addis Ababa.

1.3 Significance of the study

The findings of this study are expected to provide useful information to policymakers by identifying the knowledge and practice gap among cardiac nurses on post cardiac catheterization care. Based on the study result, recommendations will be given to the respective clinical units to give emphasis on their management and trainings to the specific factors affecting knowledge and practice of nurses. The findings from this study will also

add to the existing literature and will be used as input in developing intervention protocols and in preparation of post cardiac catheterization complication management guidelines.

Therefore this study will provide important information for health professionals, administrators, program managers, policy makers, and other researchers

1.4 Justification of the study

Studies show that post cardiac catheterization complications can result in poor health and mortality in patients. In-hospital complications were found to be significant contributors for the high morbidity and mortality of cardiac patients in the country (23). Previous study made in Ethiopia has confirmed significant post cardiac catheterization complications, and demonstrated gaps in follow up that could be due to not adequately educating patients and care takers (24). To our knowledge there is no study made in the country which had tried to evaluate the knowledge and practice gap of health care takers on post cardiac catheterization care. So this study helps to assess the level of knowledge and practice about post cardiac catheterization care among nurses in selected hospitals in Addis Ababa.

2 OBJECTIVES

2.1 General Objective

- To assess knowledge and practice on patient's care after cardiac catheterization among nurses working in cardiac wards and cardiac ICUs of the selected hospitals in Addis Ababa, Ethiopia, 2021.

2.2 Specific Objectives

- To assess knowledge of nurses on patient care after cardiac catheterization among nurses working in cardiac wards and cardiac ICUs of the selected hospitals in Addis Ababa, Ethiopia, 2021.
- To assess practice of nurses on patient care after cardiac catheterization among nurses working in cardiac wards and cardiac ICUs of the selected hospitals in Addis Ababa, Ethiopia, 2021.
- To identify factors associated with knowledge and practice on patient care after cardiac catheterization among nurses working in cardiac wards and cardiac ICUs of the selected hospitals in Addis Ababa, Ethiopia, 2021.

3 LITERATURE REVIEW

3.1 Introduction

Literature reporting studies made in connection with care after cardiac catheterization were reviewed and important information grouped to the following subtopics.

- Complications after cardiac catheterization
- Contributing factors for post cardiac catheterization complications
- Roles of nurses for patients undergoing cardiac catheterization care
- Nurses knowledge and practice in post cardiac catheterization care
- Factors related to nurse's knowledge and practice on post cardiac catheterization

3.2 Complications after cardiac catheterization

Cardiac catheterization is one of the best approaches to limit atherosclerotic disease progression, prevent or reduce complications including death, and to near-completely eliminate ischemic symptoms with the aim of improving quality of life, and restoring functional capacity (25). It is generally a safe procedure if certain precautions are taken. Although complications are infrequent, they do occur and may be life threatening. Even if there is no data on the frequency and level of complications in Ethiopia, published studies made in other developing countries show considerable number of complications after cardiac catheterization. A study made by Dubey and Sharma in Nepal showed a 0.84% death and 1.4% vascular complications occurred following cardiac catheterization (5). A similar study made on 2071 cardiac catheterization procedure in Seoul, Korea also found a significant 16.2 % overall complication with 0.19% mortality (26).

Based on severity, post cardiac catheterization complications can be classified as major (which includes bleeding that requires transfusion, retroperitoneal hemorrhage, pseudoaneurysm, arteriovenous fistula, arterial dissection, thrombosis and limb ischemia) and minor complications (such as temporary pain, nausea/vomiting, bleeding and hematoma). In order to prevent and manage these complications cardiac nurses should incorporate risk reduction

strategies and implement standardized communication tools. The standard of post cardiac catheterization care should include ensuring compression time of 20 to 30 minutes after sheath removal, frequent vital sign assessment, proper positioning and patient education for common complications (5).

3.3 Contributing factors for post cardiac catheterization complications

Different factors are indicated to contribute the most to vascular complications including old age, repeated intervention, frequently using the same vascular access site, and anticoagulation medications. A study made in Egypt found that old age, female sex, increased BMI and femoral sheath to be significant risk factors which should be determined to facilitate the identification of patients at risk for vascular complications before cardiac catheterization (27). similarly another study conducted on predictors of vascular complications post cardiac catheterization found that patients who were older than 70 years, were female, had renal failure, underwent percutaneous intervention, and had a venous sheath to increase risks for vascular complications (14). In addition to the factors listed above the study found insufficient length of the compression of the punctured place and use of a combined anticoagulant therapy to be important risk factors to look for in order to prevent post cardiac catheterization complications (28). It is remarkable to notice that the factors that increase individual risk for complications from the procedure are also those that increase the risk for coronary artery disease. Thus, patients at highest risk from the procedure are also the patients most likely to benefit from the procedure (10).

Optimized patient care requires identifying individual risk factors during cardiac catheterization. Different studies have tried to list specific patient characteristics and comorbidities that may increase the risk for development of complications after cardiac catheterization. Presence of peripheral vascular disease, hypertension, diabetes mellitus, renal failure and coagulopathies are the major disease types mentioned as risk factors for development of vascular complications (29). Mortality rate is also found to be high in patients with co-existing illness and higher rates of complications that require a prolonged hospital stay (30).So, studies recommend cardiologists and expert nurses to consider these diseases and also perform comprehensive review of current medications and assessment of risk factors (31).

Cardiac centers may also need to develop risk factor identification tool and make them accessible for effective personalized medicine.

3.4 Roles of nurses for patients undergoing cardiac catheterization care

Expert nurses who care for patients after cardiac catheterization have important roles in preventing and recognizing complications. Nursing care protocols prepared by different health centers may incorporate different responsibilities to their expert nurses. Some may even train them to perform cardiac angiography in low risk patients with consultant supervision (32). However, in order to ensure a safe outcome following catheterization, the major duties of nurses to be considered in post cardiac catheterization care should include

- Post procedure assessment
    - Vital sign, condition of puncture site, intactness of dressing, pulse quality…
    - Assess the patient for nausea or pain
- Early detection, prevention and management of complications
- Ensure the placement and tidiness any vascular clamp
- Removing sheath
- Attach arterial sheath to pressure tubing (or apply manual pressure for 20-30 minutes)
- immobilizing the affected limb after sheath removal
- Maintain bed rest for 4-6 hrs
- Keep puncture site dressing (33)

3.5 Nurses knowledge and practice in post cardiac catheterization care

In order to minimize complications optimizing, monitoring and caring of post catheterization patients by expert nurses will be helpful. Well trained nurses will understand the type of complications that can occur and can have the skill of spotting them. Studies made in Egypt and Pakistan showed that nurses have inadequacy of knowledge and practice regarding care of patients undergoing cardiac catheterization. The finding in Assiut University Hospital, Egypt

also indicates that 87.5%of nurses had unsatisfactory level of knowledge about nursing care for patients undergoing cardiac catheterization and low score of practice. A similar study made in tertiary hospital in Karachi, Pakistan also found that 40% of nurses had inadequate, and only 5.7% nurses had excellent knowledge scores. Moreover, 87.1% nurses were observed as carrying out unsatisfactory practices (20,21). A study made in Punjab, India indicates that even if the nurses do have adequate knowledge about post cardiac catheterization care, the level of excellence in practice was poor (25.74%) (17). Even if the knowledge and practice of nurses about nursing care before and after cardiac catheterization were evaluated as good in Teheran, Iran; lack of some principles of care in their performance was observed (35).

3.6 Factors related to nurses knowledge and practice on post cardiac catheterization

A Study done on nurses knowledge regarding cardiac catheterization at General Hospital in Rania City, Iraq showed that age in years, gender, working experience and no of training courses has significantly associated with nurses knowledge except level of Education (14). In contrary another study in Baghdad revealed that statistically no significant association regarding gender, age, level of education, years of experience in hospital, training and nurses' knowledge. Having many years of experience is found to contribute much for better knowledge and practice score in post cardiac catheterization care (2,24). A cross sectional study conducted in Pakistan also showed that qualification has great effect on the nurse's knowledge and nurses can develop their knowledge through experience (21).

Implementing nursing care guidelines have also been found to significantly improve level of knowledge and total score regarding patient care on cardiac catheterization (19). Strong positive correlation between the performance of nurses and their qualification regarding the post learning guideline implementation is also reported (19). The analysis showed that the demographic variable "Any workshop and training attended related to cardiac catheterization?" had shown statistically significant association with pretest level of knowledge regarding patient care after cardiac catheterization among cardiac nurses at $p<0.05$ level (20).insufficient knowledge, workload, insufficient performance monitoring systems, and lack of surveillance systems were also identified as factors affecting the level of nurse's practice regarding patient care after cardiac catheterization (16).

While there is no clear guideline set to be implemented in post cardiac catheterization care in our country, the present study evaluated the level of knowledge and practice scores of nurses working in cardiac unit indicated specific limitations on the area to provide optimized care for patients after cardiac catheterization.

3.7 Conceptual framework of the study

This conceptual frame work is developed from reviewing of different literature. As indicated by different studies socio demographic such as age, sex, marital status, educational level, work experience ,training and availability of guideline for post cardiac catheterization care has significant relation with knowledge and practice of nurses (2,14,19,21).And others, like; insufficient knowledge, work load, insufficient performance monitoring systems, and lack of cooperation between team are also identified as factors affecting the level of nurse's practice regarding patient's care after cardiac catheterization (16).

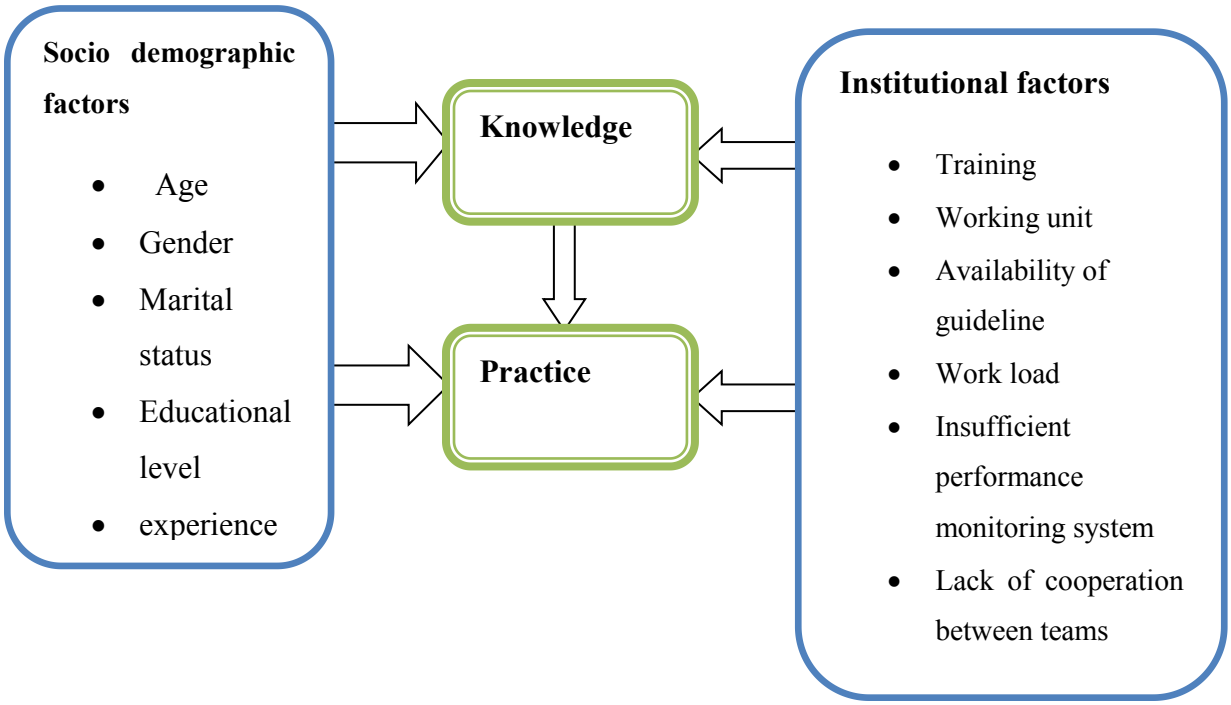

Figure 1 Conceptual framework on Assessment of knowledge and practice of nurses working in cardiac wards and cardiac ICUs on patient's care after cardiac catheterization at selected Hospitals, Addis Ababa, Ethiopia, 2021.

4 METHODS AND MATERIALS

4.1 Study Area and Study Period

The study was conducted in seven selected hospitals in Addis Ababa. Addis Ababa is the capital city of Ethiopia which is situated at the heartland of Ethiopia, with a population of 4,793,699 in an area of 540 square kilometers. The city consists of 10 Sub Cities which contain an aggregate of 116 Woredas under their structure (36). The population pyramid is broad based, typical of a developing world. People from different regions of Ethiopia populate the city. The city consists of a total of 45 Hospitals, 13 public and 32 are private hospitals. Among these 2 public Hospitals; Tikur Anbessa Specialized Hospitals(TASH), St Peter Hospital and 5 private Hospitals ; Myung Sung Christian Medical General Hospital(MCM), Gesund General Hospital, Cardiac Center Ethiopia(CCE), Addis Cardiac Hospital are **s**elected because they have cardiac catheterization laboratory(CCL), cardiac ICU and wards**.**

The study was conducted from February to May, 2021**.**

4.2 Study Design

Institutional based cross-sectional study was conducted.

4.3 Population

4.3.1 Source Population

All nurses who were working in cardiac ward, and cardiac ICU of hospitals in Addis Ababa.

4.3.2 Study Population

The staff nurses who were working in cardiac ward and cardiac ICU of the seven selected hospitals during the data collection period.

4.3.3 Sample Population

The sample populations were all randomly selected nurses working in the cardiac wards and cardiac ICU of the selected hospitals in Addis Ababa city, Ethiopia.

4.4 Eligibility criteria

4.4.1 Inclusion Criteria

Full time staff nurses who were working in cardiac wards and cardiac ICU for at least 6 month or more were included.

4.4.2 Exclusion Criteria

Nurses on annual leave and maternity leave was excluded.

4.4.3 Sample size determination

The actual sample size for the study was fixed by the formula of single population proportion formula for single proportion population.

$$n = \frac{(Z\ \alpha/2)^2\ p\ (1-p)}{d^2}$$

Where, z – confidence interval corresponding to 95% (1.96)

P – Prevalence rate 50%, since the prevalence is not known to get the maximum sample size.

n – Minimum sample size, d = (Marginal error) = 0.05

Our sample size is then,

$$n = \frac{Z^2\ P(1-P)}{d^2} = \frac{(1.96)^2\ x0.50(1-0.50)}{(0.05)^2} = 384$$

Since the total number of nurse working in cardiac ICU and wards of selected hospitals is N= 230 which is less than 10, 000, a finite population correction formula was applied.

Therefore, $n_f = \frac{n}{1+n_i/N} = \frac{384}{1+384/230} = 142$

To adjust for non response rate 10% of the calculated sample size added to the n therefore n=

156 nurses hence the minimum sample size required for this study was 156 nurses.

4.4.4 Sampling technique and procedures

A total of 45 hospitals are identified in Addis Ababa city. Of those 45, thirteen are Governmental and thirty-two are private hospitals. Among these 2 governmental Hospitals; Tikur Anbessa Specialized Hospitals (TASH), St.peter Hospital and 5 private Hospitals; Myung Sung Christian Medical General Hospital (MCM), Gesund General Hospital, Cardiac Center Ethiopia (CCE), Addis Cardiac Hospital and Tazma Hospital are **s**elected purposely because they have cardiac cath lab, cardiac ICU and cardiac wards**.** Then the sample was determined by using proportional allocation to size (PAS).

The total sample size 156 study subjects were distributed at selected hospitals, the list of individual nurses with their department were obtained from human resource management in each selected hospitals and the simple random sampling method was used to recruit the individual sample.

The total numbers of nurses who were working in cardiac wards and cardiac ICU of the selected hospitals are 230. Based on proportional allocation to size 156 using the following formula:

Proportional to size allocation formula $= \frac{n_i \ x n_f}{N}$

Where n_i - number of nurse in hospital

n_f - final sample of the study

N-total number of nurse in the selected hospitals

- TASH $= \frac{25 \times 156}{230} = 17$
- St.Peter Hospital $= \frac{25 \ x \ 156}{230} = 17$
- MCM Hospital $= \frac{47 \ x \ 56}{230} = 32$
- Gesund hospital $= \frac{21 \ x \ 156}{230} = 14$

- Cardiac Center Ethiopia = $\frac{42 \times 156}{230} = 29$
- Addis cardiac Hospital=$\frac{35 \times 156}{230} = 24$
- Tazma Hospital=$\frac{35 \times 156}{230} = 24$

Participants were selected by using simple random sampling.

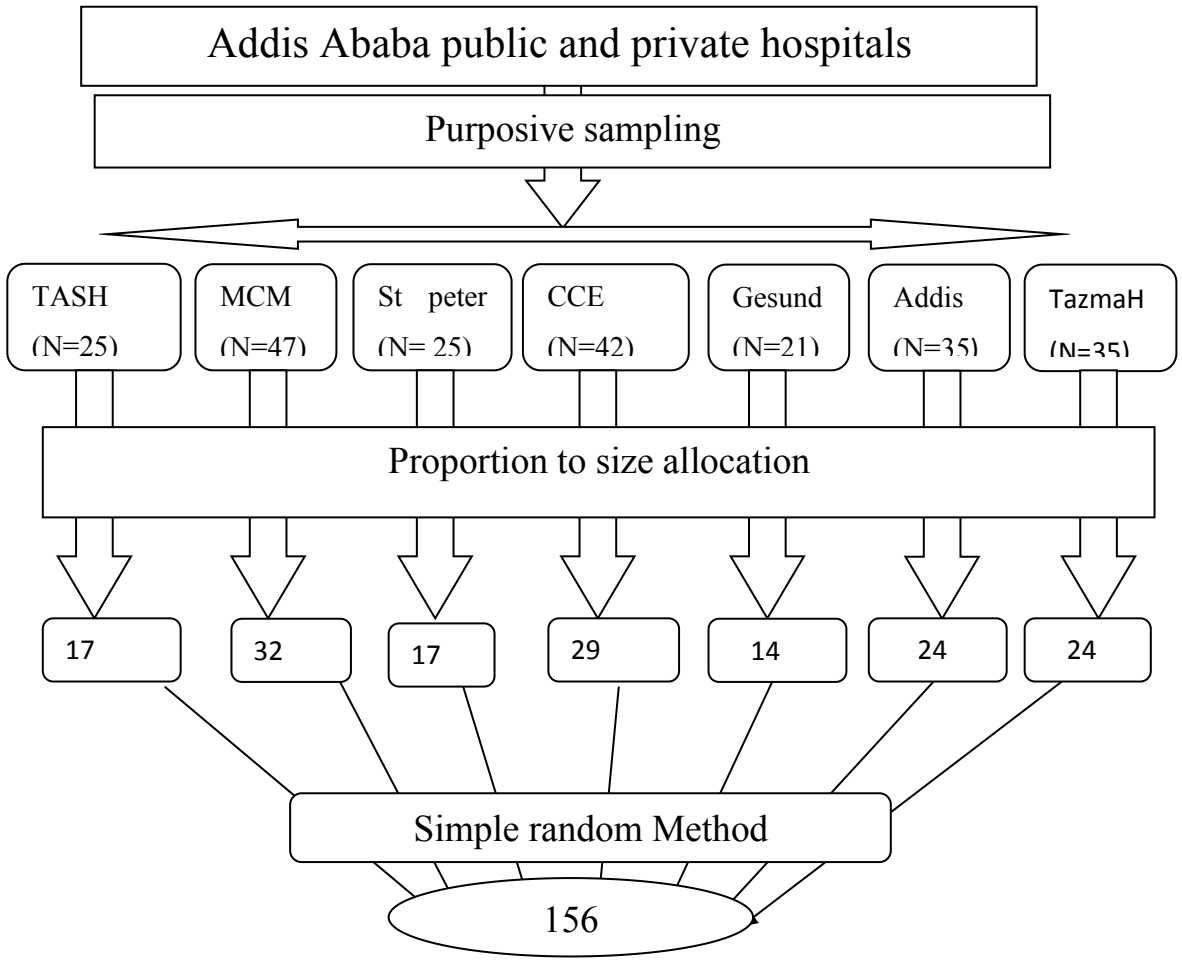

Figure: 2 A schematic representation of sampling procedure on Assessment of knowledge and practice of nurses working in cardiac wards and cardiac ICU on patient's care after cardiac catheterization at selected Hospitals, Addis Ababa, Ethiopia, 2021.

4.5 Operational Definitions

Knowledge:

In this study it refers to a state of awareness or understanding with conscious mind regarding patient's care after cardiac catheterization as measured by structured questionnaire.

Nurses' knowledge on patient care after cardiac catheterization was measured using a 20 items multiple choice questions.

Scoring System for knowledge:

- Nurses' answers scored on Part II questionnaire: Multiple choice questions (correct = 1, incorrect =0). Total score categorized and interpreted as (37).

Range	Interpretation
≤75%	unsatisfactory knowledge
>75%	satisfactory knowledge

Practice

In this study it refers to the task carried out by the nurses on the subject regarding patient care after cardiac catheterization such as compression given to puncture site after sheath removal, immobilizing the affected limb after sheath removal, checking of untoward symptoms, maintenance of intake and output chart, intervention done if urine not passed, administered fluid and soft diet, administering medication, ambulation done in correct duration etc.

Nurses' practice on patient care after cardiac catheterization was measured using a 20-items Likert type scale. Each item has 3 response options with values of (0 = never at all, 1 = sometimes, and 2 = always)

Scoring system of practice:-

- Scoring system of practice on part III of questionnaire: scoring system scored on points (Always =2, sometimes =1, never =0) Total score categorized as satisfactory and interpreted as(37)

Range	Interpretation
≤75%	unsatisfactory practice
>75%	satisfactory practice

4.6 Data collection tool and procedure

4.6.1 Data collection tool

A structured and pretested self-administered English version questionnaire (Since English is an academic language in Ethiopia) was utilized to collect the necessary data from the study participants. The questionnaire adapted from previous comparable studies (2,20,21) and had three sections:

Part 1: Assessment of Demographic variables

It consists of demographical variables such as age, sex, educational qualification, year of experience in cardiac unit, training attended on cardiac catheterization, working unit and availability of protocol. No score was given to this section. Data of this section was used for the descriptive purpose.

Part 2: Structured Knowledge Questionnaire

It is about the knowledge of nurses regarding patient's care after cardiac catheterization and it consists 20 multiple choice items. Each correct response receives 1 point and incorrect response receives 0 and the scores ranged from 0-20.

Part 3: Questionnaire for practice

The section consists; a Likert scale designed, to measure the nurse's practice regarding patient's care after cardiac catheterization. The scale consists 20 items in which responses were answered in 3-point Likert scale (never practice, sometimes practice, and always practice) and the scores ranged from 0-40.

4.6.2 Data collection procedure

Formal permission was obtained from the authorities for the collection of data then the data was collected from the cardiac intensive care units and cardiac wards of selected Hospitals in Addis Ababa, Ethiopia. For data collection two Bsc nurses and one Msc nurse was recruited to assist in data collection process. Three days before the actual data collection period a two days training was given for supervisor and data collectors on the objectives of the study, the questions and extent of explanations. The data collectors, supervisors and Investigator were

responsible for the distribution and collection of the self-administered structured questionnaire to all nurses meeting the selection criteria and willing to participate in the study after briefly presenting the study purpose and consenting the nurses in the study area. The supervisors coordinated the overall data collection processes.

4.7 Study Variables

4.7.1 Dependent Variables

- Knowledge level of nurses regarding patient's care after cardiac catheterization.
- Practice level of nurses regarding patient's care after cardiac catheterization.

4.7.2 Independent Variables

Socio-demographic characteristics

- Age
- gender
- marital status
- Educational status
- Experience

Institutional factors

- Training
- Working unit
- Guideline /Protocol availability
- Workload
- Insufficient performance monitoring system
- Lack of cooperation between teams

4.8 Data quality assurance

Data quality was assured by designing appropriate data extraction tool. The adapted data extraction tool was evaluated by the supervisor. Pretest was done on 10% of the sample nurses in TASH two weeks prior to the actual data collection time to check consistency and feasibility of the questionnaire. This helped to screen out vague questions and modify some of

the question item as soon as possible. Two days training was given for data collectors and supervisors regarding the study, the questionnaire and data collection procedure by the main investigator. During data collection, the data was checked for its completeness and missing information at each point. Furthermore data was checked during entry into the computer before analysis.

4.9 Data analysis procedure

First, the data was checked for completeness then cleaned, coded and entered to SPSS version 26.0 for analysis. Descriptive statistics was used to describe frequency and percentages and it was displayed in tables, graphs and charts. Measure of central tendency (mean) was calculated. Binary logistic regression was used to analyze the result. Bivariable and multivariable logistic regression was done to determine the association between the independent variables and dependent variables. The independent variables which become fitted on the bivariable regression less than or equal to p-value of 0.25 was included in the multivariable analysis. The odds ratio with 95% CI and p values < 0.05 was considered as statistically significant.

4.10 Ethical consideration

Ethical clearance was obtained from institutional review board of Addis Ababa University, college of health sciences, department of nursing and midwifery research committee. Official letter was submitted to the Hospital and then, permission was obtained from those bodies. Prior to data collection; all participants recruited to the study was received written information sheet about the study. Respondents were insured about the confidentiality of information obtained and the respondents name was not asked. Then verbal consents was obtained from each study subjects after explaining the objectives of study and procedures

4.11 Dissemination and utilization of the result

The result of this study will be disseminated to Addis Ababa University, College of Health Sciences Department of Nursing. A copy of the results will be submitted to the hospitals. The result will be presented in local and International conferences and will be sent for publication in scientific journals.

5 RESULTS

5.1 Socio demographic and Institutional characteristics of nurses

From the total of 156 planned study participants, complete response rate was obtained for 151 (96.7%).

Among 151 respondents, 124 (82.1%) were female. The mean age of score was 30.72years ± 4.74SD. The age category of the respondents show that 47(31.1%) were between 31-35 years. Majority of the respondents 112 (74.2%) were bachelor degree holders in Nursing. From the total respondents; 73(48.3%) had 1 to 5 years of experience in cardiac unit and 87(57.6%) were working in cardiac ICU. In this study 55 (36.4%) of the participants claimed that they attended training related to cardiac catheterization and heart diseases while 96(63.6%) of them do not attended (Table 1).

Table 1:-Socio demographic and institutional characteristics of Nurses in Selected hospitals in Addis Ababa, Ethiopia, 2021 (N=151)

Variable	Category	Frequency	Percentage (%)
Age	21-25	45	29.8
	26-30	45	29.8
	31-35	47	31.1
	>35	14	9.3
Sex	Male	27	17.9
	Female	124	82.1
Marital status	Single	64	42.4
	Married	80	53
	Divorced	7	4.6
Professional qualification	Diploma	19	12.6
	BSC	112	74.2
	MSC	20	13.2
Experience in nursing	1-5	73	48.3
	6-10	52	34.4
	11-15	20	13.2
	>15	6	4
Experience in cardiac unit	1 <5	105	69.5
	5<10	36	23.8
	≥10	10	6.6
Attended training of nurses related cardiac catheterization	Yes	55	36.4
	No	96	63.6
Number of training	1	25	16.6
	2	16	10.6
	3	3	2
	4	6	4
Working unit	Ward	64	42.4
	Cardiac ICU	87	57.6
Availability of guideline about cardiac catheterization in the unit	Yes	84	55.6
	No	67	44.4

5.2. Knowledge of the Nurses regarding patients care after cardiac catheterization

Among tested 20 items, five items were answered correctly by more than 75% of participants. The highest percentages of correct responses to a question (96 %) were regarding local complications that occur after cardiac catheterization. The lowest percentage of correct response (35.8%) was regarding number of days that the patient has to avoid sexual activity after cardiac catheterization (Table 2).

Table 2:- Response of Nurses on Each item of the Knowledge section on patient's care after cardiac catheterization in Selected Hospitals in Addis Ababa, Ethiopia, 2021

No	Item	Correct N(%)	Incorrect N(%)
1	What are the local complications that occur after cardiac catheterization?	145 (96)	6 (4)
2	How will you detect pseudoaneurysm after cardiac catheterization?	93 (61.6)	58 (38.4)
3	Time of the serum creatinine level of patients after cardiac catheterization checked	93 (61.6)	58 (38.4)
4	complication of delayed sheath removal	111(73.5)	40 (26.5)
5	Development of contrast-induced nephropathy occurs	69 (45.7)	82 (54.3)
6	At risk for developing renal failure after cardiac catheterization	131(86.8)	20 (13.2)
7	The sign of thrombus formation after cardiac catheterization	89 (58.9)	62 (41.1)
8	For how long the patient's affected extremity should be kept immobilized after cardiac catheterization	106 (70.2)	45 (29.8)
9	At risk for developing pulmonary edema after cardiac catheterization	68 (45)	83 (55)
10	When you detect a hematoma at the puncture site after cardiac catheterization, you should not.	86 (57)	65 (43)
11	How can we maintain hemostasis after sheath removal	114(75.5)	37(24.5)
12	What position will you provide for head end of the patient after procedure?	60 (39.7)	91 (60.3)
13	What will you assess in the extremity used for access	113 (74.8)	38 (25.2)
14	What are the important complications of cardiac catheterization?	140 (92.7)	11 97.30
15	What may be the cause for getting renal complication during coronary angiography	88 (58.3)	63 (41.7)
16	What is the cause of pseudoaneurysm	100(66.2)	51 (33.8)
17	How many days the patient has to avoid sexual activity	54 (35.8)	97 (64.2)
18	What will you educate the patient with radial approach at discharge	128(84.8)	23 (15.2)
19	What the patient has to do if the incision bleeds at home	105(69.5)	46 (30.5)
20	What is hematoma	132(87.4)	18 (11.9)

The knowledge was considered as satisfactory and unsatisfactory based on their response related to knowledge question. Those scored greater than 75% was considered as they have satisfactory knowledge and those scored equal to and less than 75% was considered as unsatisfactory knowledge. According to this study 87(57.6%) of them had satisfactory knowledge while 64 (42.4%) of them had unsatisfactory knowledge (Fig 3)

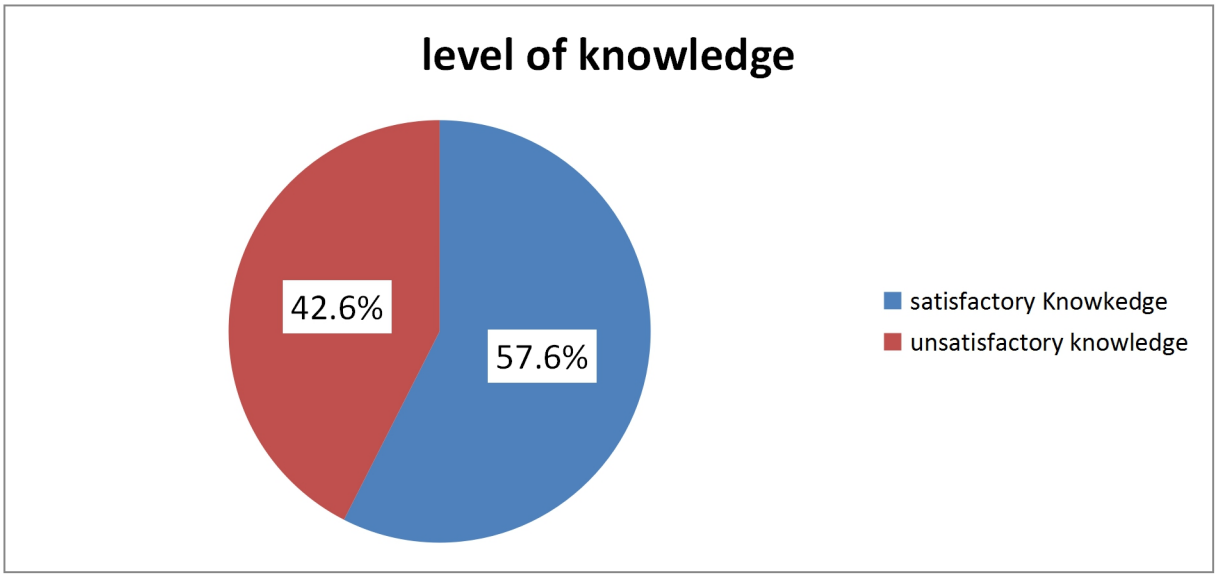

Fig 3:- Knowledge of Nurses on patient's care after cardiac catheterization in Selected Hospitals in Addis Ababa, Ethiopia, 2021

5.4 Practice of Nurses regarding patient care after cardiac catheterization

Among the total participants 132(87.4%), 125(82.8%) and 124(82.1%) of them always observe the catheter insertion site for bleeding or hematoma, apply firm pressure if any bleeding occurs and explain the post cardiac catheterization care to the patient respectively. While 68(45%) never educate patients about sexual activity after cardiac catheterization. (table 3)

Table 3:-Responses given by nurses on each item of the practice section, in the Selected Hospitals in Addis Ababa, Ethiopia, 2021

No	Item	Never n(%)	Sometimes n(%)	Always n(%)
1	Explain the post procedure care to the patient	2(1.3)	25(16.6)	124(82.1)
2	remove the sheath	15(9.9)	46(30.5)	90(59.6)
3	apply manual/mechanical compression after sheath removal	13(8.6)	21(13.9)	117(77.5)
4	apply manual pressure for 30-45 minute after sheath removal	21(13.9)	65(43)	65(43)
5	assess temperature, pulse and skin color of extremity used for access	5(3.3)	27(17.9)	119(78.8)
6	Do you assess the vital sign for (15-30) minutes for (2) hours initially and less frequently	2(1.3)	35(23.2)	114(75.5)
7	Do you monitor the patient by ECG?	3(2)	35(23.2)	113(74.8)
8	Do you places the patient in a supine position a padded table in the room	11(7.3)	42(27.3)	98(64.9)
9	Do you encourage patients to increased fluid intake?	18(11.9)	43(28.5)	90(59.6)
10	Do you observe for signs of hypersensitivity to the contrast and other sign	8(5.3)	44(29.1)	99(65.6)
11	Do you observe the catheter site insertion for bleeding or hematoma	6(4)	13(8.6)	132(87.4)
12	Do you check the patient urine output	3(2)	51(33.8)	97(64.2)
13	Do you observe the extremity in which catheter inserted straight for 4-6 hours after procedure	7(4.6)	27(17.9)	117(77.5)
14	Do you immobilize the patient's arm on arm board, if the anticubital vessels are used	33(21.9)	54(35.8)	64(42.4)
15	Do you apply pressure dressing over the insertion site when catheters withdraw	11(7.3)	17(11.3)	123(81.5)
16	Do you apply a firm pressure over the site, if any bleeding occurs	8(5.3)	18(11.9)	125(82.8)
17	Do you observe if there are complications after procedure	15(9.9)	26(17.2)	110(72.8)
18	Do you assess for a bruit in the access area	13(8.6)	41(27.2)	97(64.2)
19	Do you educate about sexual activity after procedure	68(45)	46(30.5)	37(24.5)
20	Do you give instruction to the patient for self management at home, before discharge	7(4.6)	30(19.9)	114(75.5)

The practice was considered as satisfactory and unsatisfactory based on their response related to practice questions. Those scored greater than 75% was considered as they have satisfactory practice and those scored equal to and less than 75% was considered as unsatisfactory knowledge. According to this 102 (67.5%) of them had satisfactory practice while 49 (32.5%) of them had unsatisfactory practice (Fig 4)

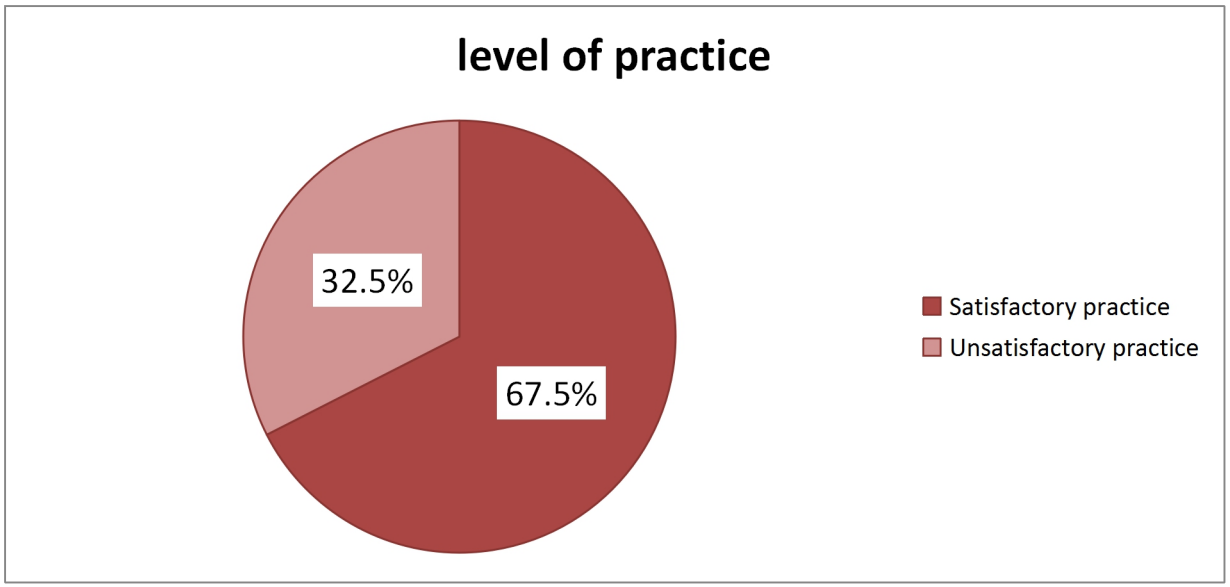

Fig 4 Nurses level of practice on patient care after cardiac catheterization in Selected Hospitals in Addis Ababa, Ethiopia, 2021

5.3 Factors associated with knowledge and practice of nurses regarding patient care after cardiac catheterization

Binary logistic regression was conducted to assess those variables which have influence over nurses knowledge and practice regarding patient care after cardiac catheterization.

Regarding knowledge; Nurses who have BSC degree were 3.7 times higher to have satisfactory knowledge on patients care after cardiac catheterization {(AOR=3.7 ;(1.1, 12.4)} than Nurses who have diploma. Nurses who attended training related to cardiac catheterization had 3.1 times higher to have a satisfactory knowledge on patients care after cardiac catheterization {(AOR=3.1 ;(1.2, 7.9)} than those who do not attended (Table 3).

Regarding practice; Nurses who had experience in cardiac unit between 5 and10 years were 5.6 times higher to have a satisfactory practice towards patient care after cardiac catheterization {(AOR=5.6; (1.6, 19.3)} than those who had between 1 and 5 years experiences. Nurses those have satisfactory knowledge towards patients care after cardiac catheterization were 2.2 times higher to have a satisfactory practice towards patients care after cardiac catheterization {(AOR=2.2;(1.04, 4.7)}than those have no satisfactory knowledge towards patients care after cardiac catheterization. Nurses those attended training which is related to cardiac catheterization were 3.0 times higher to have a satisfactory practice towards patient care after cardiac catheterization {(AOR=3.0;(1.09, 8.4)} than those who do not attended.(table 4)

Table 4:- Logistic regression analysis of factors associated with knowledge and practice of nurses regarding patient care after cardiac catheterization among Nurses in Selected Hospitals in Addis Ababa, Ethiopia, 2021

	Variable	Category	Satisfactory	unsatisfactory	COR(95%CI)	AOR(95%CI)
Knowledge	Age	21-25	19(21.8%)	26(40.6%)	1	1
		26-30	26(29.9%)	19(29.7%)	1.8(0.81,4.32)	1.5(0.58,4.12)
		31-35	22(36.8%)	15(23.4%)	**2.9(1.24,6.84)***	1.9(0.5,7.1)
		>35	10(11.5%)	4(6.2%)	3.4(1.24,12.57)	2.9(0.5, 16.7)
	Marital status	Single	28(32.2%)	36(56.2%)	1	1
		Married	54(62.1%)	26(40.6%)	**2.6(1.35,5.27)***	1.0(0.3,3.2)
		Divorced	5(5.7%)	2(3.1%)	3.2(0.58,17.81)	1.5(0.1,13.8)
	Professional qualification	Diploma	5(5.7%)	14(21.9%)	1	1
		BSC	71(81.6%)	41(64.1%)	**4.8(1.6,14.4)***	**3.7(1.1,12.4)****
		MSC	11(12.6%)	9(14.1%)	3.4(0.88,13.1)	0.8(0.17,4.48)
	Training related cardiac catheterization	Yes	41(47.1%)	14(21.9%)	**3.1(1.53,6.58)***	**3.1(1.2, 7.9)****
		No	46(52.9%)	50(78.1%)	1	1
Practice	Experience in cardiac unit	1 <5	64(62.7%)	41(83.6%)	1	1
		5<10	32(31.4%)	4(8.2%)	**5.1 (1.6,15.5)***	**5.6(1.6,19.3)****
		≥10	6(5.9%)	4(8.2%)	0.9 (0.2,3.61)	0.86(0.17,4.3)
	Satisfactory knowledge	No	36(35.3%)	28(57.1%)	1	1
		Yes	66(64.7%)	21(42.9%)	**2.4 (1.2,4.9)***	**2.2(1.04,4.7)****
	Training related to cardiac catheterization	Yes	44(43.1%)	11(22.4%)	**2.6(1.2,5.7)***	**3.0(1.09,8.4)****
		No	58(56.9%)	38(77.6%)	1	1

Key: *statistically significant if p- value <0.25 crude odds ratio (COR)
**statistically significant if p- value <0.05, Adjusted odds ratio (AOR)

Nurses were asked to rate their level of practice and 30 (19.8%) of them rated their level of practice as unsatisfactory And then, they were asked to mention the possible factors affecting their level of practice Among the reason mentioned by the nurses towards un satisfaction, insufficient knowledge, workload and insufficient performance monitoring were reported by 7(4.6%), 10(6.6%) and 7(4.6%) respectively (Table 5).

Table 5 Nurse's personal rating of their level of current practice and the respective reasons regarding patients care after cardiac catheterization, in the selected hospitals, in Addis Ababa city, Ethiopia, 2021

Questions	Responses	Frequency	Percentage(%)
How do you rate the overall level of your current practice Regarding care of patients after cardiac catheterization?	very unsatisfactory	2	1.3
	unsatisfactory	28	18.5
	satisfactory	87	57.6
	very satisfactory	34	22.5
If you are not very satisfied with Your current level of practice, what are the reasons/factors?	insufficient knowledge	7	4.6
	workload	10	6.6
	insufficient performance monitoring system	7	4.6
	lack of cooperation between teams	5	3.3

6 DISCUSSIONS

This Institutional based cross sectional study has attempted to assess the knowledge and practice of nurses on patient care after cardiac catheterization and their associated factor in selected hospitals in Addis Ababa, Ethiopia.

Even if our finding indicates that majority of the study participants 87 (57.6%) do have adequate knowledge about post cardiac catheterization care, a significant number 64 (42.4%) of them do not have satisfactory knowledge. Our finding is consistent with a study made in Portsaid, Egypt where only 52% of cardiac nurses were found to have acceptable level of knowledge on post cardiac catheterization care (36). However these results are found to be better when compared to results found by Thabet et al in Egypt, where 87% of the study participants don't have adequate knowledge (33). This difference of results may arise from different standardization of assessment tools, difference in training curriculum or educational level. Lack of continuous supervision and lack of training opportunities may contribute for the significant deficit in the knowledge of post cardiac catheterization care among cardiac nurses (33).

Most (n=102, 67.5%) of the study participants showed adequate practice in post cardiac catheterization care. Our result is consistent with the study made by Bakr A et al, where 62% of study participants demonstrated satisfactory practice (36).

Even if the overall performance of practice is found to be good in our study, the score in patient education and in implementation of some of the post cardiac care protocols were found to be low. This indicates the necessity of standard guidelines to be followed in post cardiac catheterization care in the cardiac units. Cardiac nurses should give proper discharge teaching to patients and significant others; which should include wound care, signs and symptoms of complications, medication and nutrition. They should also be sure that the patient demonstrates understanding of all aspects of home care (34).

Our study demonstrated that only one third of the study participants attended a formal training related to cardiac catheterization. This is found to be very low when compared to Egypt where three fourth of the cardiac nurses attended proper training on post cardiac catheterization care (36). In order to provide optimized care to patients who undergo cardiac catheterization,

nurses need to acquire good knowledge and skills. Regular practical trainings will ensure improved care and better patient outcomes(38).

According to this study, having BSC professional qualification {(AOR=3.7 ;(1.1, 12.4)} and attending training related to cardiac catheterization {(AOR=3.1 ;(1.2, 7.9)} has statistically significant association with satisfactory knowledge about patients care after cardiac catheterization. This finding was in line with a cross sectional study conducted in Pakistan showed that qualification has great effect on the nurse's knowledge (21).

Nurses who have satisfactory knowledge towards patients care after cardiac catheterization were 2.2 times higher to have a satisfactory practice towards patients care after cardiac catheterization {(AOR=2.2;(1.04, 4.7)} compared to those who have no satisfactory knowledge.

Work experience in cardiac unit was another factor which was significantly associated with nurse's practice. The odds of nurses with work experience of between 5 and 10 years was about 5.6 times higher to have satisfactory practice towards patients care after cardiac catheterization when {(AOR=5.6(1.6,19.3)} compared to those who have 5 years of experience or less. Similar studies made in other countries also demonstrate positive association between experience and practice (2). This could be due to the fact that as the number of years of practice increases, nurses are repeatedly exposed to various types of procedures and gain knowledge and practice through working with experienced medical staffs.

Nurses were asked to rate their level of practice and 30 (19.8%) of them rated their level of practice as unsatisfactory And then, they were asked to mention the possible factors affecting their level of practice And the result revealed that insufficient knowledge about cardiac catheterization, workload, lack of cooperation between teams and insufficient performance monitoring system were the identified factors affecting the nurses practice. These factors may result in feelings of frustration among nurses and may end up with professional non-achievement for nurses and low quality care to the health system. The finding is consistent with Egypt study in which ,insufficient knowledge, workload, insufficient performance monitoring systems, and lack of surveillance systems were also identified as a major factors

affecting the level of nurses practice regarding patient care after cardiac catheterization efforts (16).

Concerning to others association of factors, there was no statistically significant association of age, sex, year of experience and knowledge of patients care after cardiac catheterization in the current study. This result was consistent with the study conducted in Baghdad were the study revealed no significant association of knowledge with gender, age, years of experience in hospital and nurses knowledge on patients care after cardiac catheterization (2). We also didn't find significant association between guideline implementation and knowledge of patient care after cardiac catheterization. Our result is in discrepancy with similar study conducted in Egypt which shows improvement of level of knowledge based on strict follow-up of post cardiac catheterization care guideline (19). This discrepancy might be due to availability and utilization of standardized guideline, difference in the study setting and socio demographic factors of the participants.

Strengths and limitation of the study

Strengths

- To our knowledge, this is the first study conducted in the country to assess nurses knowledge and practice regarding patients care after cardiac catheterization.
- The study involved seven hospitals found in Addis Ababa city and tried to make the result representative.
- Standard and valid questionnaire used in other studies was adopted and adapted for this study.
- Pretest was done before actual administration of the prepared tool at actual subjects**.**

Limitation

- The Pandemic Covid 19 corona virus was a challenge for data collection.
- Since this study had used a self-administered Likert scale to measure, the study may be subjected to response set bias from the respondents. Therefore, the result may not reflect the actual nursing practice regarding patients care after cardiac catheterization.

- Shortage of time for data collection and analysis of results. Some hospitals have their own International Research Board, IRB. So, it took long time to get ethical clearance. Problem of transport service to reach different hospitals is also one of the limiting factors.

7 Conclusion and Recommendation

Conclusion

The study revealed that above one third of the participants do not have satisfactory knowledge. In addition more than one third of the participants practice is not satisfactory.

Our study also revealed professional qualification (BSC degree) and attended training were significantly associated with knowledge of nurses on patients care after cardiac catheterization. On the other hand experience in cardiac unit, satisfactory knowledge and attended training significantly associated with patient care after cardiac catheterization.

Insufficient knowledge about cardiac catheterization, workload, lack of cooperation between teams and insufficient performance monitoring system were also identified as factors affecting the nurses practice on patients care after cardiac catheterization.

Recommendation

The study forwards the following recommendations to responsible bodies:-

To FMOH and Policy Makers

(i) The FMOH should give further trainings for nurses to enhance their knowledge on care of patients after cardiac catheterization.

(ii) Policy makers should prepare policies and national guidelines based on evidence based global guidelines with the latest recommendations to prevent post cardiac catheterization complications.

To Professional Nurses

(i) Nurses recommended having self learning strategies (continuous professional development, training and reading) to enhance their knowledge on post cardiac catheterization care in order to further improve nursing practice in this area.

(ii) Nurses, who had better knowledge and practice, should also teach their respective colleagues who had deficits for the betterment of nursing care.

To Health Service Managers

(i) Health service managers should identify the perceived barriers of care and then minimize these barriers as much as possible to prevent post cardiac catheterization complications.

(ii) They also should recruit nurses to balance their numbers with the respective patient in order to reduce work load and improve patient outcome.

(iii) They should create a system to follow and monitor their staffs how they practice on post cardiac catheterization care and give feedback for those staffs that faced a problem.

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Appendix

Annex I: Participant information sheet

Title of the Research proposal: Assessment of nurse's knowledge and practice regarding patient's care after cardiac catheterization at selected hospitals in Addis Ababa, Addis Ababa, Ethiopia, 2021

Name of Investigator: AlemWondimu, B.Sc.

Name of the Organization: Addis Ababa University, College of Health Science, School of Nursing and Midwifery, Department of cardiovascular nursing

Name of the Sponsor: Addis Ababa University

Purpose of the Research Project: To assess nurses knowledge and practice level and associated factors regarding patient care after cardiac catheterization at selected hospitals in Addis Ababa, Ethiopia, 2021

Procedure: The procedure of data collection is easy and straightforward; data concerning your socio demographic characteristics Institutional factors knowledge towards patient care after cardiac catheterization will be collected using standardized self-administered questionnaire.

Risk and /or Discomfort: The name or any other identifying information will not be recorded on the questionnaire and all information taken will be kept strictly confidential and in a safe place. The information retrieved will only be used for the study purpose.

Benefits: The research has no direct benefit for those who will participate in this study. The information obtained from this study may be useful to the body of nursing to increase understanding in post cardiac catheterization nursing care.

Confidentiality: To reassure confidentiality the data on the chart will be collected without the name of the participant and the information collected will be kept confidential and will be stored in a file cabinet. In addition, it will not be revealed to anyone except the investigator and it will be kept in a key and locked system with computer password.

Person to contact: This research project will be reviewed and approved by the institutional review board of school of nursing and midwifery, college of health sciences, Addis Ababa University. If you have any question you can contact any of the following individuals (Investigator and Advisors) and you may ask at any the time you want.

ZuriashMengistu, M.Sc., Assistant. Professor,ph.D fellow: Addis Ababa University, College of Health Sciences, School of Nursing and Midwifery

TeferaMulugeta, M.Sc.,Assistant professor, Ph.D. Fellow: Addis Ababa University, College of Health Sciences, School of Nursing and Midwifery.

AlemWondimu, B.Sc.: Addis Ababa University, College of Health Sciences, School of Nursing and Midwifery

Cell phone: +251912928636, E-mail:alem.nolawi@gmail.com

Annex II consent Form

I hereby voluntarily agree to participate in the study as explained to me by_____my signature is a confirmation that I have understood the nature of the study and whatever information that I give will remain confidential and my identity will not be revealed in this study.

I also confirm that no monetary or material gains have been promised or given to me for participating in the study.

Sign: _____ Date_____

I have explained the nature and purpose of this study to the above study participant and have sought his/her understanding for informed consent.

Data collectors name _____sign _____ Date_____

Result of Data collected A) Completed B) Not completed C) Partially completed D) Refused

Annex III Questionnaire

PART-I: DEMOGRAPHIC VARIABLES

Structured questionnaire regarding demographic data from the cardiac nurses:

INSTRUCTION:

Kindly encirclethe appropriate answer and write your answer on the blank spaces for the questions asking you to write your answer.

S.no	Question	Response
1	Age in years	____
2	Sex	a)Male b)Female
3	Professional qualification	a) Diploma Nursing b) BSC Nursing c) MSC- Specialization
4	Years of experience in nursing service	____ years
5	Years of experience in cardiac unit.	____ years
6	Working Area in cardiac Unit	a)ward b) cardiac ICU
7	Any workshop and training attended related to Cardiac catheterization?	a)Yes b)No if Yes how many times _____
8	Is there a protocol? Guideline for cardiac catheterization in your unit?	A)Yes b)No

PART-II STRUCTURED KNOWLEDGE QUESTIONNAIRE

INSTRUCTION: Encircle the most appropriate answer.

1. What are the local complications occurring in patients after cardiac catheterization? Mark all that apply.

a) Stroke b) Hematoma c) AV fistula

d) Thrombus formation e) Renal failure f) Aortic dissection.

2. How will you detect pseudo aneurysm after cardiac catheterization?

a) Pain at the puncture site b) Severe bleeding from the puncture site

c) Pulsatile swelling and bruit d) Fever

3. When should you check the serum creatinine level of patients after cardiac catheterization?

a) Immediately after the procedure b) One day after the procedure

c) One week after the procedure d) No need to check

4. What is the complication of delayed sheath removal?

a) Bleeding b) Thrombus formation

c) Air embolism d) Tachypnea

5. Development of contrast-induced nephropathy occurs

a) One week after the procedure b) 5 days after the procedure

c) 2-3 days after the procedure d) One the day of procedure

6. Who is at risk for developing renal failure after cardiac catheterization?

a) Young adult b) Hypertensive patients

c) Elderly d) Dyslipidemia

7. What is the sign of thrombus formation after cardiac catheterization?

a) Absence of distal pulse b) Pain at the puncture site c) Swelling at the puncture site

8. For how long the patient's affected extremity should be kept immobilized after cardiac catheterization?

a) 1-3 hour b) 4-6 hours

c) 6-8 hour d) above 8 hours

9. Who is at risk for developing pulmonary edema after cardiac catheterization?

a) LV failure b) RV failure

c) AORTIC Regurgitation d) Pulmonary AV fistula

10. When you detect a hematoma at the puncture site after cardiac catheterization, you should not.

a) Elevate the bruised extremity b) Apply ice

c) Lower the bruised limb d) Apply pressure bandage.

11. How can we maintain hemostasis after sheath removal?

a) Topical application of medicine. b) Closing the area with suture.

c) Application of plaster. d) Manual / mechanical compression.

12. What position will you provide for head end of the patient after procedure?

a) Elevate 30 degree. b) Elevate 90 degree.

c) Elevate 60 degree. d) Flat lying position.

13. What will you assess in the extremity used for access?

a) Lesion and swelling. b) Temperature, color, pulses and discomfort.

c) Motor and sensory activity. d) Reflexes and nerve function.

14. What are the important complications of cardiac catheterization?

a) Cramping pain, numbness, tingling. b) scalds, purpura, eczema.

c) Hematoma, bleeding, infection at access site. d) Nausea, vomiting, headache.

15. What may be the cause for getting renal complication during coronary angiography?

a) Injection of dye. b) Vascular compromise and poor renal blood supply.

c) Use of premedication. d) Use of manual compression over the access site.

16. What is the cause of pseudoaneurysm?

a) Due to premedication. b) Due to prolonged manual compression.

c) Repeated pricks in access site. d) Damage to the blood vessel.

17. How many days the patient has to avoid sexual activity?

a) one month. b) 2 – 5 days

c) 10 days d) 2 months.

18) What will you educate the patient with radial approach at discharge?

a) Don't lift anything heavier than 10 pounds. b) Take bed rest for a month.

c) Limit fluid intake d) Take liquid diet for one week.

19. What the patient has to do if the incision bleeds at home?

a) Lie down and put pressure on it for 30 minutes& seek medical help b) Put bandage and do activity c) Give compression for 5 minutes d) Clean it and take bed rest

20) What is hematoma?

a) Localized swelling filled with fluid and pus b) Presence of tumor inside vascular region c) A localized swelling filled with blood d) Presence of tumor outside the vascular compartment

PART-III STRUCTURED PRACTICE QUESTIONNAIRE.

Instructions: The following questions seek information about practice of nurse's regarding patient's care after cardiac catheterization. Place a tick mark ✓ in corresponding column according to your response.

2 = Always (A) 1 = Sometimes (S) 0 = Never (N)

S.no	Item	Always	Sometimes	Never
1	Do you Explain the post procedure care to the patient?			
2	Do you remove the sheath?			
3	Do you apply manual/mechanical compression after sheath removal?			
4	Do you apply manual pressure for 30-45 minuteafter sheath removal?			
5	Do you observe the catheter site insertion for bleeding or hematoma?			
6	Do you assess temperature, pulse and skin color of extremity used for access?			
7	Do you assess the vital sign for (15-30) minutes for (2) hours initially and less frequently?			
8	Do you monitor the patient by ECG?			
9	Doo you places the patient in a supine position a padded table in the room?			
10	Do you encourage patients to increased fluid intake?			
11	Do you observe for signs of hypersensitivity to the contrast and other sign?			
12	Do you check the patient urine output?			

13	Do you observe the extremity in which catheter inserted straight for 4-6 hours after procedure?			
14	Do you immobilize the patient's arm on arm board, if the anticubital vessels are used?			
15	Do you apply pressure dressing over the insertion site when catheters withdraw?			
16	Do you apply a firm pressure over the site, if any bleeding occurs?			
17	Do you observe if there are complications after procedure?			
18	Do you assess for a bruit in the access area?			
19	Do you educate about sexual activity after procedure?			
20	Do you give instruction to the patient for self-management at home, before discharge?			
21	How do you rate the overall level of your current practice regarding patient's care after cardiac catheterization? Encircle your choice. 1.Very unsatisfactory 3.Satisfactory 2. Unsatisfactory 4. Very satisfactory			
22	If you are not very satisfied with your practice, what are the reasons? Note: More than one answer is possible. Encircle your choice. 1. I have no sufficient knowledge about patient care after cardiac cauterization 2.workload 3. Insufficient performance monitoring systems related to post cardiac catheterization care 4.lack of cooperation between teams Others:_____			