

**KNOWLEDGE, ATTITUDE, PRACTICE, AND ITS ASSOCIATED  
FACTORS IN PREVENTION OF CATHETER-ASSOCIATED  
URINARY TRACT INFECTION AMONG NURSES IN PUBLIC  
HOSPITALS ADDIS ABABA ETHIOPIA.**

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**A THESIS TO ADDIS ABABA UNIVERSITY, COLLEGE OF  
HEALTH SCIENCE, SCHOOL OF NURSING, AND MIDWIFERY  
DEPARTMENT OF NURSING IN PARTIAL FULFILLMENT OF  
THE REQUIREMENTS FOR THE DEGREE OF MASTER OF  
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THE DEGREE OF MASTER IN ADULT HEALTH NURSING**

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## **APPROVAL BY THE BOARD OF EXAMINATION**

This thesis by Zemene Dessie is accepted in its present form by the board of examiners.  
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## ABBREVIATIONS/ACRONYMS

AA	Addis Ababa
AAU	Addis Ababa university
ALERT	All Africa Leprosy Rehabilitation and Training Center
BOO	Bladder outlet obstruction
BSC	Bachelor of Science
CAI	Catheter-associated infection
CAUTI	Catheter-associated urinary tract infection
CHS	College of health science
CI	Confidence interval
ETB	Ethiopian birr
G.C	Gregorian calendar
HAI	Hospital-acquired infection
ICU	Intensive care unit
IRB	Institutional review board
IUC	Indwelling urinary catheter
KAP	Knowledge, attitude, and practice
MR	Mister
MSC	masters of Science
NHSN	National healthcare safety network
<u>NQ</u>	Number
SPSS	Statistical processing for social science
SR	Sister
TASH	Tikur Anbasa specialized hospital
UTI	Urinary tract infection
WHO	World health organization

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## ABSTRACT

**Background:** CAUTI is an infection caused by catheter-related during catheterization procedures. Nurses are responsible for performing catheterization procedures strictly with sterile techniques. Nurse's knowledge, attitude, and practice are the primary input for preventing the patient from CAUTI. Therefore, this study aimed to assess the KAP and its associated factors in CAUTI prevention among nurses.

**Objective.** To assess knowledge, attitude, practice, and its associated factors related to catheter-associated urinary tract infection prevention among nurses in public hospitals Addis Ababa, Ethiopia, 2021. **Method:** Institutional-based cross-sectional study used. After selecting five hospitals from 14 public hospitals by lottery method the number of nurses in each hospital with respective total number of nurse was calculated by proportion and total sample size was 352. After getting ethical clearance, One day training about the objectives of the study, data collection tool, methods, and process of data collection was provided to data collectors and collected by three BSc and one MSc supervisor nurses. The study was conducted on a total of 344 nurses. SPSS version 24 software used for data analysis. Descriptive statistics, binary and multivariate logistic regression performed. Statistical significance for possible associated factors tested using a p-value  $< 0.05$  and CI 95%. **Results.** 57.3% of participants had poor knowledge, 55.7% of participants had a negative attitude, and 44.8% of the participants had an incompetent level of practice. Factors associated with knowledge included guideline availability in their institution. (AOR= 0.317, 95% CI, (0.121-0.832) P=0.002). Factors associated with attitude included the marital status of the participants (AOR=2.200(1.370-3.533) P=0.001), the knowledge of the participants (AOR=0.462(0.283-0.754) P =0.002) and the practice of the participant (AOR=2.200(1.370-3.533) P=0.001). Factors associated with the practice were the attitude of the participant (AOR=2.725, 95% CI (1.732 -4.287), P= 0.000) and the availability of guidelines in participants' institution (AOR=2.360, 95% CI, (1.320- 4.219) P= 0.004). **Conclusion and recommendation:** The overall results showed an unsatisfactory level of knowledge, a negative attitude towards CAUTI prevention, and a somewhat good level of practice of nurses in CAUTI prevention. It is recommended that there should be a guideline in each hospital, and nurses should get training to increase attitudes of nurses and knowledge of nurses towards CAUTI.

**Keywords:** knowledge, attitude, practice, nurse, CAUTI. Addis Ababa, and Ethiopia.

# CHAPTER 1: INTRODUCTION

## 1.1 Background

The urinary tract is one of the major routes for excretion which is composed of the upper and lower urinary tract used for excreting liquid waste products in the human being excretory system. If there is a problem in this urinary tract due to prostatic cancer, prostate enlargement, urethral stricture, urinary retention, nerve damage, urinary tract muscle atrophied, incontinency, or for a short period of procedures like surgery, collect urine sample urinary catheter will be advanced (1).

Urinary Catheter is a long, flexible silicone or latex plastic tube that is placed in the bladder to drain urine for a temporary or long-term solution until the patient can urinate independently (2).

This catheter is inserted by health professionals most regularly at the hospitals and is known as a catheterization procedure (1).

Urinary catheterization is indicated if the client has acute and chronic retention of urine, bladder outlet obstruction (BOO), end-stage diseases like advanced prostatic cancer, advanced cervical cancer patients, and patients for operation procedures (3).

Nosocomial infection is also known as hospital-acquired infection (HAI) is an infection by which a patient is infected after 48 hours of admission, within three days of discharge, or thirty days after surgical procedure, among the most common nosocomial infections catheter-associated infection (CAI) accounts 80 % (4).

Catheter-associated urinary tract infection (CAUTI) is one of the major device-associated nosocomial infections of the urinary tract in hospitals (5). Health professionals should have both adequate knowledge and technical skill to perform appropriate urinary catheterization, aseptic insertion, and proper maintenance to reduce the risk of catheter-associated infection (CAUTI) (6). But nurses had not enough knowledge and had poor practices about infection control in the use of a urethral catheter (5).

To reduce CAUTI nurses should practice proper hand hygiene, close drainage system, and follow aseptic technique for insertion and catheter care along with daily need assessment with evidence-based practice (7).

Health professionals especially nurses are accountable to have adequate knowledge and practical skill to catheterize because they are responsible and considered to be the primary health care service provider. One of the responsibilities is inserting and maintaining a catheter (8).

Since catheterization is performed by qualified nurses, the knowledge of the nurses is essential. A nurse's knowledge means the theoretical aspect of knowledge about the indication and contraindications, the mechanisms of how the procedure is performed, how to prevent the patient from the infection.

The nurse's attitude in the prevention of CAUTI is the perception of the nurse about catheterization, indication and when the catheter will be removed, and prevention of catheter-associated infection. In regarding nurses practice means the art of and the skill of nurses to perform the procedure. If nurses had good knowledge and practice effectively by following aseptic methods in the prevention of CAUTI 69% of catheter-associated infection can be avoided (9).

Since nurses are the primary managers of all the routine care and problem-solving associated with patients who have indwelling urinary catheters, therefore, nurses are expected to have sufficient knowledge, a positive attitude towards catheterization, and perform the practice appropriately to prevent the patient with catheterization related complications and manage of patients with catheterization throughout the procedure.

## 1.2. Statement of the problem

To reduce the risk of CAUTI, colonization of pathogens, the trauma of the urinary tract, health care professionals should follow aseptic technique, which means use a sterile catheter, a sterile set for catheterization, sterile gloves, sterile equipment, sterile draping, and sterile fluids for per urethral cleaning before catheterization, use adequate lubricant and the smallest French size of the catheter tube and the drainage tube should be placed below the level of the bladder.

As much as possible urinary catheterization should be inserted for the shortest period to measure urine output, in case of urinary obstruction, acute and chronic retention of urine removal, long-period operation, and patients who need palliative care if there is no indication to stay for a long period (10).

Nurses should prevent the patient from CAUTI because most of the time catheterization procedure is performed by a nurse (11). But mostly catheterization is not performed following strictly aseptic technique due to unavailability of materials, related to nurse's knowledge and training, the attitude of nurse are factors that may lead to catheter associated infection.

Catheter-associated Urinary tract infection is not only the Burden of the low and middle-income country but it is also a global Burden. Globally 150 million people are affected related to catheter-associated urinary tract infections (12). Annual WHO reports that about 50% of women had UTI, 8.3 million and one million OPD, and hospitalization visits respectively It is the leading cause of morbidity and economic crisis for health care expenditures (13). National Healthcare Safety Network (NHSN) research study conducted in 2016 shows that the events of CAUTI estimated to be 449,334 each year with an economic burden of \$340 million spent on health care services a similar study conducted in NHSN report the prevalence rate of CAUTI shows that 35.2 per 1000 catheter days(14). Similar studies conducted by NHSN in 2018 show that 160,833 CAUTI events occurred with a cost of a burden of \$13,793 for health care service (15).

A study conducted in America 2014 urinary tract infection is the major Burden of the country of which catheter-associated urinary tract infection accounts 70% to 80% and the risk of daily acquiring of ureteral infection related to the catheter in situ is 3% to 7% (16). Another study in the US 2017 shows that about 100,000 people die annually related to HAI this CAUTI is the second most common cause of death it accounts for about 15% of it (17).

Studies conducted in China in 2020 show that the prevalence rate of CAUTI was 2.25 per 1000 catheter days (18). Studies in Brazil 2019 show that the incidence rate of urinary tract infection related to catheterization was 4.8 per 1000 catheters per day (9). In another cross-sectional study conducted in Australia in 2014, the prevalence rate of CAUTI was 0.9 % (19).

A retrospective descriptive study conducted in Iran, 2020 shows that 18.7% of patients who are critically ill were related to catheter-associated infection (20). Another study in India by taking a urine sample after catheterization reveals that 69 patients were urinary tract infected (21).

A prospective observational study was conducted in IDI ARABA, 2018, on catheterized patient participants by taking a sample of urine at the time of catheterization, third, seventh, tenth, fourteenth, and twenty-eighth day after catheterization shows that 43% of frequency was related to CAUTI (22).

A prospective cross-sectional study conducted in Zinvie, Benin (West Africa) in 2016 to determine the prevalence of UTI related to catheter-associated shows that 23.33% (23). a descriptive prospective observational study conducted in south Uganda to assess the incidence of catheter-associated urinary tract infection by taking a urine sample from catheterized patients reveals that 15.3% of them were urinary tract infected (24). In a descriptive quantitative study conducted in Rwanda, 2020 from adult patient-participants the prevalence rate of CAUTI shows 17.6 % (25).

Another study conducted in South Africa in 2016 shows that the burden of HAI accounts for 34.1%, urinary tract infection (UTI) accounts for 11% of that UTI, CAUTI prevalence accounts for 16% (26).

A study conducted in Rwanda shows that among nurses participating 35.48% of the participants had no adequate knowledge about catheter-associated urinary tract infection even though 79.9% of participants perform activities related to the different practice of nursing (27). The study in Egypt shows that 62.77% and 83.94% which is more than half indicates low levels of knowledge and practice respectively of nurses regarding catheter-associated infection; only 16.1% had a good level of practice (28). Another study also shows that 80.85% of nurse participants had knowledge about CAUTI and 11.2% of nurses did not have enough knowledge regarding urinary tract infection (8).

Even with the above problems, in my knowledge in Ethiopia, there are no published studies regarding KAP and its associated factors of nurses related to the prevention of CAUTI. Therefore, the purpose of this study was to assess knowledge, attitude, practice and its associated factors towards the prevention of catheter-associated urinary tract infection among nurses working in Addis Ababa selected public hospitals 2021.

### 1. 3. Significance of the study

Catheterization is mostly practiced in health care settings and nurses are responsible to perform this procedure, the procedure also should be performed following a strictly sterile approach to prevent CAUTI. To follow this approach, nurse knowledge, attitude, and practice even determining the associated factor is essential and crucial because poor KAP will lead to unavoidable complications and even death. This study result may have an important contribution for the ministry of health, the hospitals, and health professional's especially nurses by determining the gaps to prevent the patient from catheter-associated infection. This study may help the ministry of health for policymaking by identifying the gaps of nurses on KAP to produce a guideline/protocol for catheterization. Health care institutions may use it for planning to train nurses. After determining the gap of a nurse on KAP in the prevention of CAUTI they will improve themselves in KAP. The patient will be managed properly if nurses' KAP and associated factors are corrected.

Finally, this study finding will be used as a baseline source for researchers who are interested in this area because to my knowledge there is no published study in Ethiopia related to KAP and its associated factors towards the prevention of catheter-associated infection among nurses.

## **CHAPTER 2: REVIEW OF LITERATURE**

### **2.1. Knowledge of nurses regarding catheter-associated urinary tract infection**

In a cross-sectional descriptive study conducted in America, Mesh hospital, 2017 nurse participants' knowledge on infection control in the use of urethral catheters were limited which is 66% with a standard deviation of 25.3% (5). A prospective cohort study conducted in 2018, in Georgia on the knowledge of staff nurses towards Foley catheter insertion and maintenance shows that 86.9% of staff nurses who work in ICU and trauma center answer the survey question correctly (29). In another prospective study conducted in 2015 in India, the knowledge of nurses was only 57% towards the indication of catheterization and catheter-associated infection (30). Another cross-sectional study conducted in India, 2018 about the knowledge on the practice of urinary catheter care among staff nurses was 82.4% and 16.7% average and good knowledge respectively (31).

Studies conducted in Nellore in 2016 on the knowledge of staff nurses regarding catheterization shows that only 20% of participants had adequate knowledge, 33.3% and 46.7% inadequate and moderate level of knowledge respectively (32). Similarly, in cross-sectional studies conducted in Nellore in 2018, the knowledge of nurse participants about catheter-associated infection reveals that 48.75% moderate, 48.13% poor, and 3.13% good knowledge (33).

A cross-sectional study conducted in Mangalore 2020 among nurse participants shows that most of the participants had average knowledge of 80.85% and 11.2% low knowledge even 7.231% high knowledge about CAUTI prevention (8).

Another cross-sectional study conducted in Pakistan, 2019 among nurse and physician participants to assess the knowledge of CAUTI shows that 80.3% of nurses answer the effectiveness of avoiding catheter blockage to prevent CAUTI (28).

A descriptive cross-sectional study conducted in Africa Ruanda 2017 among ICU staff nurse participants' knowledge about the prevention of CAUTI shows that 64.52% (27). A descriptive prospective study conducted in Uganda, 2019 shows that among catheterized admitted patients 15.3% of them were urine culture positive. This indicates that the catheterization procedure was not an aseptic technique (24).

## 2.2. Attitude of nurses towards prevention of catheter-associated urinary tract infection

An internet survey study conducted in America; Minnesota Rn nurses perceived that early removal of the catheter could reduce the risk of CAUTI (34). Another cross-sectional study was done in seven selected Swiss hospitals in 2020 from nurses and physicians to assess the attitude towards indwelling urinary catheter (IUC) practice shows, even though nurses and physicians work cooperatively, nurses had a better attitude than physicians with the 5.4 to 5.1 ratio (35). Another cross-sectional study conducted in Switzerland, 2020 about nurse's attitude towards avoiding Unnecessary indwelling urinary catheters shows that nurses had a positive attitude to avoid unnecessary IUC insertion (35).

A prospective cohort study done on trauma and ICU nurses' attitudes towards CAUTI prevention shows not changed their perception pre- and post-educational training survey (29). A cross-sectional descriptive study conducted in Pakistan in 2018 to assess the knowledge and attitude of nurse participants towards the prevention of CAUTI reveals that 60% had a good attitude and 40% had no attitude (33). Another descriptive cross-sectional study conducted in south Ruanda, 2017 in nurse participants' shows that 52.83% had a good attitude towards the prevention of CAUTI (27).

## 2.3. Practice of nurses towards prevention of catheter-associated infection

A descriptive cross-sectional study conducted in the America Peshawar hospital in 2017 on the practice of nurses towards the prevention of CAUTI was 56.43% from nurse participants inappropriately performing their activity (5). Another study done in New York City at the emergency department on the practice of placement and management of indwelling urinary catheter was only 40% of nurse participants performed an appropriate approach for IUC placement (36). Another electronic survey study conducted in Colorado teaching hospital to assess the practice of nurses in prevention of CAUTI during IUC insertion shows that 97% wear glove, hand hygiene practice 89%, keeping sterility 81%, non-contact insertion 73%, not using catheter attaching device 4% genital area care providing 43% were performed and providing training about prevention of CAUTI at the time of hiring nurses were given 64% health care settings (37).

An observational study conducted in Brazil, 2019, shows that out of 451 observed activities 97.7% of the urine bag and the catheter tube were not connected adequately and 3.5% where the urine bag

was filled by more than  $\frac{3}{4}$  of its space urine bag (38). In the same study from 556 observed activity of the nurse 22.9% of the genital area was not cleaned, 94.2% and 66.5% before and after contact with the catheter tube handwashing was not done respectively (38).

A descriptive cross-sectional study also conducted in Rwanda, 2017 the practice of nurse's shows that 79.9% of nurse participants performed their activities to prevent CAUTI (27).

## 2.4. Factors associated with knowledge, attitude, and practice of nurses in prevention catheter-associated infection prevention

### 2.4.1. Sociodemographic factors

Studies conducted in India 2015 on nurse's knowledge and attitude of nurses' show that nurses' gender had an association with the knowledge of nurses which shows females are more aware than males on prevention of CAUTI (30). Another descriptive study conducted in Mangalore, 2020 also shows that the knowledge level of nurses is significantly associated with age (8).

A cross-sectional study conducted in Pakistan, Lahore hospital on the assessment of the perception and practice of nurses on infection prevention associated with indwelling urinary catheter shows that there is no significant association between practice as well as attitude of a nurse with age (39). Another study also conducted in Nellore district hospital in 2016 to assess the knowledge of staff nurses regarding catheterization shows that age and gender had an association with the knowledge of staff nurses (32)

A study conducted in Rwanda 2019 on nurse's knowledge and practice towards the prevention of catheter-associated urinary tract infection shows that there was a significant association between the nurse's knowledge and age but has no association between the participant's age and practice and also there was no association between nurse gender with that of knowledge and practice of nurses on prevention of CAUTI (40). Another cross-sectional study conducted in Rwanda, 2017, also shows that there is no significant association between genders, age, and religion with the knowledge of nurses (27). According to studies, there is a significant association between nurses' years of experience and knowledge of nurses as well as practice (40).

### **2.4.2 Personal factors**

A cross-sectional study design conducted in Pakistan, Lahore hospital conducted on the assessment of nurse's attitude and practice on prevention of IUC associated urinary tract infection shows that there was a significant association between nurses' level of knowledge with practice to prevent CAUTI (39). Another study conducted in Nellore district hospital in 2016 to assess the knowledge of staff nurses and students shows that there is no association between years of experience with the knowledge of staff nurses (32).

Another study conducted in Turkey, 2016 on the effects of education of nurses on prevention of CAUTI in patients who undergo hip fracture surgery shows that the level of nurse's knowledge is significantly associated with practice on prevention of CAUTI (41). A study conducted in 2018 on trauma and ICU nurses' knowledge and attitude on Foley catheter insertion and maintenance, shows that there is no significant association between nurses' knowledge and year of experience (29).

In another cross-sectional study conducted in Rwanda, 2017, the work experience of nurses had no association with the attitude of nurses to the prevention of CAUTI but practice quality in the prevention of CAUTI was significantly associated with the level of education (27).

### **2.4.3. Institutional factors**

A study conducted in Swiss hospitals in 2017 on staff perceptions on indwelling urinary catheter use and infection prevention shows that no changes are occurring after training and before training of staff knowledge on practice which means no association between training and knowledge as well as practice (42). Another descriptive study conducted in Mangalore, 2020 shows that the quality of training is significantly associated with the knowledge of nurses to prevent CAUTI (8).

Another study conducted in 2018 on trauma and ICU nurses' knowledge and attitude on Foley catheter insertion and maintenance, shows that there is a significant association between nurse's knowledge and training in the prevention of CAUTI but has no significant association between nurse's attitude and training (29). Studies conducted in Rwanda on knowledge, attitude, practice, and its associated factors for the prevention of CAUTI among nurses indicates that training and knowledge of nurses have no significant association to prevent, but the quality of training has an association to the attitude of nurses towards prevention of CAUTI which shown by 43% good attitude to the prevention of CAUTI (27).

## 2.5 Conceptual Framework

This conceptual framework was developed after reviewing and assessing different works of literature that affect the dependent variables. Those are grouped in sociodemographic factors, personal factors, and institutional factors (6, 25, 27, 28, 31, 38, 39, 40, and 41).

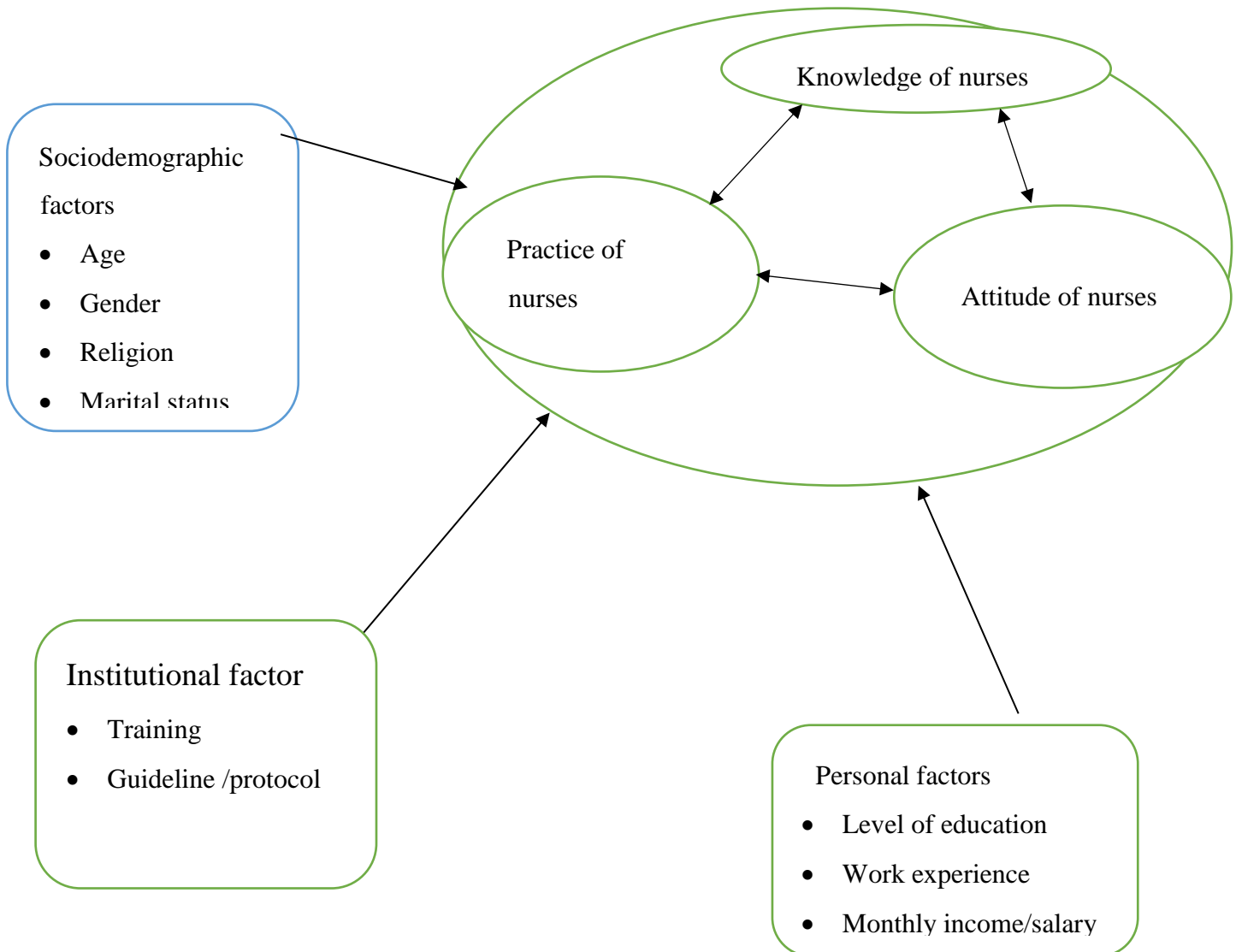


Figure 1: Conceptual framework on KAP and associated factors on prevention of CAUTI among nurses in public hospitals, Addis Ababa, Ethiopia, 2021.

## **CHAPTER 3: OBJECTIVES**

### **3.1. General objective**

❖ To assess the knowledge, attitude, practice, and its associated factors among nurses in a public hospital, Addis Ababa, Ethiopia 2021 GC.

### **3.2 Specific objectives**

➤ To determine the knowledge of nurses on prevention of catheter-associated urinary tract infection in a public hospital, Addis Ababa, Ethiopia 2021 GC.

➤ To determine the attitude of nurses towards prevention of catheter-associated urinary tract infection in a public hospital, Addis Ababa, Ethiopia 2021 GC.

➤ To identify the practice of nurses on prevention of catheter-associated urinary tract infection in a public hospital, Addis Ababa, Ethiopia 2021 GC.

➤ To identify factors associated with knowledge of nurses in the prevention of catheter associated urinary tract infection in a public hospital, Addis Ababa, Ethiopia 2021 GC

➤ To identify factors associated with an attitude of nurses in the prevention of catheter associated urinary tract infection in a public hospital, Addis Ababa, Ethiopia 2021 GC

➤ To identify factors associated with the practice of nurses in the prevention of catheter associated urinary tract infection in a public hospital, Addis Ababa, Ethiopia 2021 GC.

## CHAPTER 4: METHODS AND MATERIALS

### 4.1 Study area and study period

The study was conducted in Addis Ababa, which is the capital city of Ethiopia with a geographical landmark of an elevation of 2,355 meters (7,726 ft.) and is a grassland biome, located at 9°1'48"N 38°44'24"E and lies at the foot of Entoto Mount. According to the 2007 census, the city has a population of 2,739,551 of peoples who live in a harmonized manner with nations and nationalities. The city is divided into 11 sub-city and 99 woredas. Not only AA is the capital city of Ethiopia but also the headquarter of the Africa Union. In AA there are 14 public hospitals namely Tikur Anbessa Specialized Hospital, ALERT Hospital, Yekatit 12 Hospital, Saint Paulo's hospital, Ras Desta Damtew Memorial Hospital, Saint Peter's Hospital, Menelik II Hospital, Zewditu Memorial Hospital, Tirunesh Beijing Hospital, Federal Police hospital, Amanuel Hospital, Gandhi Hospital, and Eka Cotebe hospital. The study was conducted at five public hospitals. Those hospitals were selected randomly by using the lottery method. Those hospitals were namely Tikur Anbessa Specialized Hospital, ALERT Hospital, Menelik II Hospital, Eka Cotebe hospital, and Zewditu memorial hospital. The study was conducted from March to April 2021.

### 4.2 Study design

- ❖ An institution-based cross-sectional study design was conducted.

### 4.3 Population

#### 4.3.1 Source population

- ❖ All nurses working in public hospitals Addis Ababa, Ethiopia

#### 4.3.2. Study population

- ❖ Nurses, who were working in selected public hospitals in Addis Ababa Ethiopia

##### 4.3.2.1 Study unit

- ❖ Each nurse who participated in this study was the study unit

## 4.4. Eligibility criteria

### 4.4.1 Inclusion criteria

- ❖ All nurses on duty on the day of data collection and who were willing to participate at specified wards or units were included.

### 4.4.2 Exclusion criteria

- ❖ Nurses who were on maternity leave, annual leave, and sick leave, and nurse managers were excluded.

## 4.5. Sample size determination:

To determine the sample size of study population single population proportion formula was used.

$$\text{That is, } n = \frac{(Z \alpha/2)^2 * p (1-p)}{d^2}$$

Where n = estimated sample size

Z = Confidence level (alpha,  $\alpha$ )

P = prevalence

d = margin of error

Since the actual proportion of knowledge, attitude, and practice of nurses towards the prevention of CAUTI was unknown, therefore 50% was used. With a confidence level of 95% and a margin of error of 0.05 was used this assumption was considered.

$$n = \frac{(1.96)^2 * 0.5 (1-0.5)}{(0.05)^2} = \mathbf{384}$$

Since the target population are less than 10,000 the sample size was adjusted by using the

$$\text{population correction formula of } \mathbf{nf} = n \frac{ni}{1 + \frac{ni}{N}} = \frac{384}{1 + \frac{384}{2261}} = \mathbf{320}$$

Where: nf =the desired sample size (when population was less than 10,000)

$n_i$  = initial sample size from single population formula, N= the estimate of the population size of Health care hospitals was provided by 2261 nurses by collecting from each hospital human resource management. By considering a nonresponse rate of 10%, the final sample size was **352**

#### 4.6. Sampling technique and sampling procedures.

Five public hospitals were selected from 14 hospitals by using lottery methods. Then the number of nurses in each selected public hospital was collected from the human resource management of each hospital then calculated by the number of representative samples by using proportion with the total sample size. For recruiting the study participants, a systematic random sampling method was used, a list of nurses working in the study area was obtained from administrative records from each hospital. Then participant nurses were selected by using the formula  $K = N/n$  (dividing the population size "N" by required sample size "n").  $K = \frac{2261}{352} = 6$ . Then the first sample size was selected randomly from 1- 6 by lottery method then every six intervals was selected until the number of proportional sample size completed for each hospital.

Proportional allocation of sample size for each selected hospital.

- ALERT hospital =  $\frac{400 * 352}{2261} = 62.2 \sim 62$
- Zewditu Memorial hospital:  $\frac{500 * 352}{2261} = 77.8 \sim 78$
- TASH:  $\frac{825 * 352}{2261} = 128.4 \sim 128$
- Menelik II hospital:  $\frac{376 * 352}{2261} = 58.5 \sim 59$
- Eka kotebe Hospital:  $\frac{160 * 352}{2261} = 24.9 \sim 25$

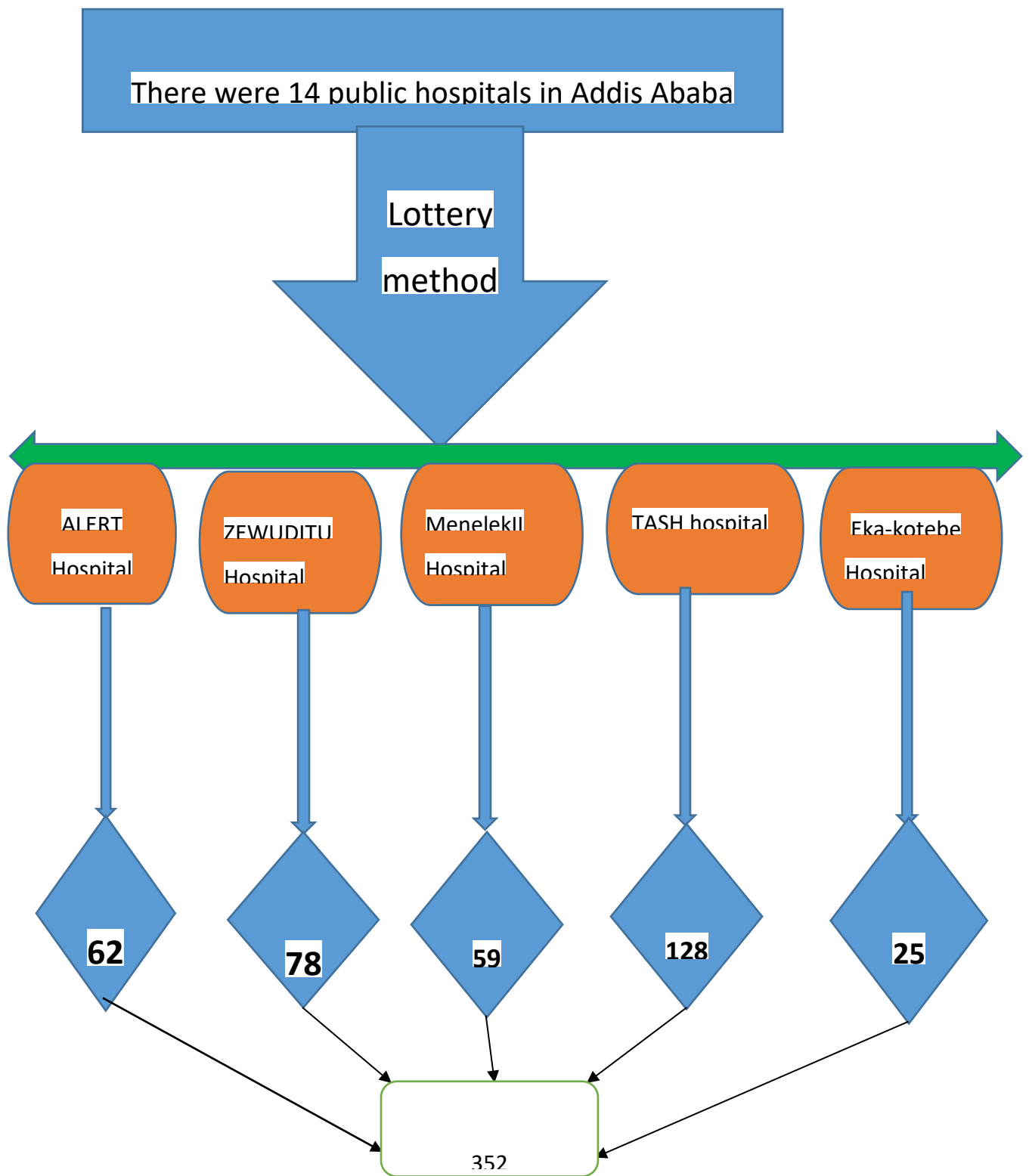


Figure2: Diagrammatic representation of sampling methods for KAP and its associated factors among nurses in public hospitals, Addis Ababa, Ethiopia, 2021.

## 4.7 Study variables

### 4.7.1 Dependent variables

Knowledge of nurses towards prevention of CAUTI.

The attitude of nurses towards prevention of CAUTI.

The practice of nurses towards prevention of CAUTI.

### 4.7.2 Independent variables

#### ❖ Sociodemographic factors:

- Age
- Gender
- Religion
- Marital status

#### ❖ Personal factors:

- Level of education
- Year of experience
- Monthly  
incomes/salary

#### ❖ Organizational factors:

- Protocol or guideline
- Training

## 4.8 Operational definitions

**Knowledge:** Nurse's theoretical understanding of catheterization, indications of catheterization, the removal of the catheter, and the major complications related to catheterization and determining factors that cause urinary tract infection. Good knowledge refers to the nurse who answers more than the mean value of the given 10 multiple choice questions on knowledge of nurses related to catheterization and poor knowledge refers to nurses' answers from the given 10 multiple choice questions below the mean value (27). **Attitude:** refers to the perception, beliefs, opinions, and general views of the participant about the indication of catheterization, the removal of catheterization, and the complications of UTI related to catheter-associated in their perspective.

After calculating, participants' answers more than the mean value were considered as a positive attitude, and below means value was considered as a negative attitude (27).

**Practice:** Practice is the actual skill and performance of the nurse regarding the procedure, ways, and methods to prevent CAUTI during catheterization, catheter removal, and maintenance. A self-reported practice questionnaire was used and participants scoring more than the mean value was considered as having good practice (27).

**Nurse.** In this study nurses were health professionals who had taken nursing education with a certificate of Diploma, degree, or masters.

#### 4.9 Data collection tool

English version self-administered structured questionnaire which was adapted from a similar study from Rwanda was used. The data collection tool consists of four parts. Section A the sociodemographic information part of the participant, section B Information regards the knowledge part of the participant, Section C Information regards the attitude part of the participant, Section D Practice part of the study participant was used.

#### 4.10 Data collection procedures

After getting ethical clearance from the Institutional Review Board (IRB)/AAU, CHS, department of nursing, and permission from the study area, the data was collected by three BSc nurses and one MSc supervisor. One day of training about the objectives of the study, data collection tool, methods, and process of data collection was provided.

#### 4.11 Data processing and analysis

After raw data was collected it was verified, coded, and entered into statistical processing for social science (SPSS) version 24 statistical software for analysis, and after data cleaning; Descriptive statistics, binary and multivariate logistic regression were performed. Statistical significance for possible associated factors was tested using p-value < 0.05 and 95% CI and the results were presented in the form of text and tables.

#### 4.12. Data quality assurance

Before the actual data started the quality of the data was assured through pre-testing the questionnaires on populations which was not part of the main study at Yekatit 12 hospital using 5% of the study population sample size. Based on the findings of the pre-test modification and developments of the tool were done. Data collectors were instructed to check the completeness of each questionnaire whether every question was completely answered and also the supervisor was rechecking the completeness of the questionnaire after submission. Confidentiality of participants was assured by the name or physical address of participants was not used.

#### 4.13. Ethical clearance

Institutional ethical clearance was obtained from the Institutional Review Board of AAU, the college of health science department of nursing and midwifery with a supportive letter to be submitted to Tikur Anbessa hospital, ALERT hospital, Menelik II hospital, Zewditu memorial hospital, and Eka Kotebe hospital were obtained. After getting permission from those hospitals, an information sheet on the objective of the study, the voluntariness of the participant, benefits, and risks of the study, and confidentiality of the study participant's information were provided to the participant nurses, and collection of data was started.

#### 4.14. Dissemination of the results

The result of the study will be disseminated to AAU, the College of health science, and the school of nursing. Because the main purpose of the study is to the fulfillment of a degree of masters in adult health. Ethiopian Federal Ministry of health, Tikur Anbasa hospital, Menelik II hospital, ALERT hospital, Zewditu memorial hospital, Eka Cotebe hospital, and concerned bodies like policymakers and other stakeholders. Finally published in international scientific journals publication will be attempted.

## CHAPTER 5: RESULTS

### 5.1 Socio-demographic characteristics of participants.

Out of 352 participants 344 willingly participated in the study with a response rate of 97.7%. Among the study participants, 194(54.4%) were females, 239 (69.5%) of the participants belonged to orthodox Christianity and the average age of nurses was 28.68 years with SD 4.175. The majority of the study participants 188 (54.7%) were single and 281(81.7%) of the study participants were holding a bachelor degree in nursing with experience year ranging between 1 to 35 years and the majority of the study participants level of income were ranging between 6193 – 8125 ETB. 145(42.2%) of the participants said that there was the availability of training programs related to infection prevention. Of them, 91(62.8%) have taken the training related to infection prevention. among those who had taken the training majority of them, 75(21.8%) took once. Regarding guideline availability in participants' institutions, 76 (22.1%) of the respondents said that there was the availability of guidelines in their institutions. From those respondents who had catheter insertion and removal, guideline 26 (7.6%) of the participants said that they were not following the guideline (Table 1).

Table 1: Sociodemographic characteristics of respondents in public hospitals, Addis Ababa, Ethiopia, 2021(n=344).

Variables	Category	Frequency	Percent %
Age	<25	64	18.6
	26-30	200	58.1
	31-35	59	17.2
	>35	21	6.1
	Mean $\pm$ SD	28.68 $\pm$ 4.175	
Gender	Male	150	43.6
	Female	194	56.4
Marital status	Single	188	54.7
	Married	153	44.5
	Divorced	1	0.3
	Widowed	1	0.3
	Separated	1	0.3
Religion	Orthodox	239	69.5
	Muslim	36	10.5
	Protestant	61	17.7
	Others	8	2.3
Level of education	Diploma	20	5.8
	BSc	281	81.7
	MSc	43	12.4
Year of experience	1-3 years	80	23.3
	4-6 years	153	44.5
	7-10 years	70	20.3
	>10 years	39	11.3
Availability of training program	Yes	145	42.2
	No	192	55.8
Training taken	Yes	91	62.8
	No	54	37.2
No of times had taken the training	Once	75	82.4
	Two times	15	16.5
	>Three times	1	1.1
Year of training had taken	< one year ago	6	6.6
	1-2 years ago	23	25.3
	>two years ago	62	68.1

## 5.2 KAP status of the nurse participants on prevention of catheter associated urinary tract infection.

More than half of that is 197(57.3%) of the nurse respondents working in the study area had a poor level of knowledge, 178(51.7 %) of participants had a negative attitude and more than half of 190(55.2%) of the participant had a good practice on prevention of catheter-associated urinary tract infection.

Table 2: The knowledge, attitude, and practice statutes of nurses towards prevention of CAUTI in public hospitals Addis Ababa, Ethiopia, 2021(n=344).

<b>Variables</b>		<b>Frequency (%)</b>	<b>Mean (SD)</b>
<b>Knowledge</b>	Good	147(42.7%)	5.137 ± 2.00
	Poor	197(57.3%)	
<b>Attitude</b>	Positive	166(48.3%)	18.9 ± 4.8
	Negative	178(51.7 %)	
<b>Practice</b>	Good	190(55.2%)	15.26 ± 4
	Poor	154(44.8%)	

### 5.3. Factors associated with KAP of participants towards prevention of CAUTI

#### 5.3.1 Factors associate with knowledge of nurses towards prevention of CAUTI.

In bivariate analysis found that variables: age, gender, marital status, religion, year of training the participant had taken, attitude, and availability of guideline/protocol were factors related to knowledge of nurses towards prevention of catheter associated urinary tract infection however, multivariate analysis revealed that those who had not guideline/protocol in their institution were 68.3% less likely knowledgeable than participants those had guideline/protocol in their institution to prevent catheter-associated urinary tract infection. (AOR= 0.317, 95% CI, (0.121-0.832), P=0. 002).

Table 3: Factors associated with knowledge of participants towards prevention of catheter-associated urinary tract infection in public hospitals, Addis Ababa, Ethiopia, 2021(n=344).

Variables	Group	Knowledge		COR95%CI	AOR 95% CI
		Good	Poor		
<b>Age</b>	<25	18(12.2%)	46(23.4%)	1	
	26-30	94(63.9%)	106(53.8%)	2.266(1.229-4.177)	2.198(0.58-8.312)
	31-35	17(11.6%)	42(21.3%)	1.034(0.472-2.265)	0.99(0.217-4.510)
	>35	18(12.2)	3(1.5%)	15.333(4.022-58.458)	0.688(0.274-1.732)
<b>Gender</b>	Male	79(52.7%)	71(47.3%)	1	
	Female	68(35.2%)	126(64.9%)	2.062(1.334-3.187)	0.588(0.276-1.250)
<b>Religion</b>	Orthodox	112(46.9%)	127(53.1%)	2.877(0.569-14.542)	0.886(0.116-6.763)
	Muslim	17(47.2%)	19(52.8%)	2.143(0.379-12.112)	1.332(0.139-12.806)
	Protestant	16(26.2%)	45(73.8%)	0.536(0.661-18.972)	0.236(0.026-2.177)
	Other	2(25%)	6(75%)	1	
<b>Marital status</b>	Single			1	
	Married	122(64.9%)	66(35.1%)	1.972(1.276-3.052)	1.275(0.585-2.793)
	Missed (3(0.9%))	79(51.6%)	74(48.4%)		
<b>Year of training</b>	<one years ago	2(33.3%)	4(66.7%)	1	
	1-2 years ago	40(34.5%)	76(65.5%)	1.053(0.185-5.997)	0.954(0.127-7.151)
	>Two years ago	(41(66.1%))	21(33.9%)	3.905(0.660-23.085)	2.135(0.276-16.611)
<b>Attitude</b>	Good	59(35.5%)	107(64.5%)	0.564(0.366-0.869)	0.561(0.261-1.205)
	Poor	88(49.4%)	90(50.6)	1	
<b>Guideline</b>	Yes	20(26.3%)	56(73.7%)	0.394(0.224-0.693)	0.317(0.121-0.832)
	No	126(47.5%)	139(52.5%)	1	*

\*\* Statistically significant at 95% CI, P- value  $\leq 0.05$ ; 1.00-reference; COR- Crude odds ratio, AOR-adjusted odds ratio.

### 5.3.2. Factors associated with an attitude of nurses in the prevention of CAUTI.

The variables that showed a statistically significant association (at p-value  $\leq 0.25$ ) in the bivariate analysis were marital status, availability of guidelines, practice, and knowledge were factors related to the attitude of nurses towards the prevention of CAUTI. However, the multivariate analysis showed that married participants had 2 times good attitudes towards CAUTI prevention than those who are single (AOR=2.210(1.311-3.723) P=0.003). Nurses who had good practice towards prevention of CAUTI had 3 times good attitude than those who had not good practice towards CAUTI prevention (AOR= 2.886(1.785-4.665) P=0.000) and the other were nurses who had poor level of knowledge towards the prevention of CAUTI had 53.3% times had a negative attitude towards prevention of CAUTI (AOR=0.467(0.283-0.780) p-value =0.004).

Table 4: Factors associated with an attitude of nurses in prevention of CAUTI in public hospitals, Addis Ababa, Ethiopia, 2021(n=344).

Variables with group		Attitude		COR(95%CI)	AOR(95%CI)
		Good	Poor		
Age	<25	23(13.9%)	41(23%)	1	
	26-30	110(66.3%)	90(50.6%)	2.179(1.218-3.898)	1.858(0.941-3.667)
	31-35	27(16.3%)	32(18%)	1.504(0.730-3.100)	1.073(0.463-2.486)
	>35	6(3.5%)	15(8.4%)	0.713(0.243-2.09)	0.479(0.131-1.749)
Marital status	Single	76(45.8%)	112(62.9%)	1	
	Married	88(53%)	65(36.5%)	1.995(1.294-3.077)	2.210(1.311-3.723)***
	Divorced	-	1(0.6%)	0.452(1.524-4.21)	2.451(1.231-3.421)
	Separated	1(0.6%)	-	0.452(1.524-4.21)	2.451(1.231-3.421)
	widowed	1(0.6)	-	0.452(1.524-4.21)	2.451(1.231-3.421)
Knowledge	Poor	107(54.3%)	90(45.7%)	1	
	Good	59(40.1%)	88(59.9%)	0.564(0.366-0.869)	0.467(0.283-0.780)*
Practice	Poor	53(34.4%)	101(65.6%)	1	
	Good	113(59.5%)	77(40.5%)	2.797(1.799-4.346)	2.886(1.785-4.665)
Guideline	Yes	48(59.5%)	28(36.8%)	2.236(1.322-3.782)	1.694(0.961-2.986) ***
	No	115(43.4%)	150(56.6%)	1	

Significant at 95% CI, P- value  $\leq 0.05$ ; 1.00-reference; COR- Crude odds ratio, AOR-adjusted odds ratio.

### 5.3.3 Factors associated with the practice of participants towards prevention of catheter-associated urinary tract infection.

The variables that showed statistically significant association (at P=value  $\leq 0.25$ ) and (at P=value  $\leq 0.05$ ) were attitude and the availability of protocol/ guideline associated with the practice of nurses towards the prevention of catheter-associated urinary tract infection.

Participants who had a good attitude towards prevention of CAUTI had 3 times more practice than those who had poor attitude (AOR=2.725, 95% CI, 1.732 -4.287, P=value 0.000) and the availability of guideline/protocol in the participant's institution was 2 times better practice than those who had not guideline/protocol in the participant's institution to prevent CAUTI. (AOR=2.360, 95% CI (1.320- 4.219) P=value 0.004).

Table 5: Factors associated with the practice of participants towards prevention of CAUTI in public hospitals, Addis Ababa, Ethiopia, 2021(n=344).

Variables		Practice		COR(95%CI	AOR(95%CI
		Good	Poor		
<b>Attitude</b>	Positive	113(68.1%)	53(31.9%)	2.797(1.799)	2.725(1.732-4.287)***
	Negative	77(43.3%)	101(56.7%)	1	
<b>guideline</b>	Yes	56(73.7%)	20(26.3%)	2.737(1.557-4.814	2.360 (1.320- 4.219)*
	No	134(50.6%)	131(49.4%)	1	

\*\* Statistically significant at 95% CI, P=  $\leq 0.05$ ; 1.00-reference; COR- Crude odds ratio, AOR-adjusted odds ratio.

## CHAPTER 6: DISCUSSION

### 6.1. Knowledge of nurses on prevention of CAUTI.

The main purpose of the study was to determine the knowledge, attitude, practice, and associated factors among nurses on CAUTI.

As the current study shows, 54.4% of the participant's gender were females, and 69.5% of the participants belong to orthodox Christianity and the average age of nurses was 28.68 years with SD 4.175. About 81.7% of the study participants were holding a bachelor's degree in nursing with experience years ranging between 1 to 35 years. The majority of the study participants 54.7% were single with a level of income ranging between 6193 – 8125 ETB.

The current study showed that more than half of 197(57.3%) of nurse participant's current knowledge status was inadequately related to the prevention of CAUTI. The study finding is lower than studies conducted in America, which was 66% (5), and in Georgia, whose knowledge was 86.9% (31). This knowledge difference may be due to: In America, since it is a developed country, there may be continuing training provided which initiates nurses to update themselves, availability of department specialty which concerning infection prevention on procedures, monthly income difference, sociodemographic difference and the accessibility of the internet. But in this study area may be due to the unavailability of specific training for CAUTI prevention, no applicable job description, and work overload. Therefore, it is better to update nurses' knowledge by reducing work overload, providing continuous training with trained personnel, and providing a clear job description in each level of education.

The study finding is better than studies conducted by Nellore, whose knowledge was 20%, and studies in India, whose knowledge was 16.7% in the prevention of CAUTI (31). This result difference may be due to the study methodology difference.

The finding was lower when compared to a similar study conducted in Africa Ruanda, which shows that 64.52% (27). The difference may be the study participants in these areas might take courses/training related to catheterization and CAUTI prevention, the level of educational status of participants, academic background of the study respondents sampling technique.

In this study, there was no association between the participant's age, gender, religion, and marital status with the participant's knowledge compared with studies conducted in India, which shows females are more aware than males on prevention of CAUTI (30).

It may be that females are more concerned about the profession, there may be females who have a more positive attitude than males. A study in Nellore, district hospital nurse's gender had an association to the knowledge of nurses (32) and in Mangalore, shows that knowledge of nurses is significantly associated with age (8). This difference might be the year of experience difference, the age of the participant's difference, setting of the study, and sample size between studies. The findings of the study were similar to the studies in Rwanda, which showed that there was no significant association between genders, age, and religion with the knowledge of nurses (27). This similarity might be methodology similarity and similar characteristics of respondents. Nurses' knowledge was not associated with training in agreement with studies conducted in Rwanda indicates that training and knowledge of nurses had no significant association to prevent CAUTI. This might be because the training may not be continuous, the trainee may not be committed to getting knowledge during the training, and the participant's educational level may be affected.

## 6.2 The attitude of nurses on prevention catheter-associated urinary tract infection

According to this study finding among the total respondents, 178(51.7 %) had a negative attitude towards the prevention of CAUTI. This study finding was higher compared with a cross-sectional study conducted in Pakistan which was 40% had a negative attitude (33).

For this explanation it might be, in Pakistan. This difference might be level of income difference, curriculum difference, methodology difference, work load difference. Therefore, the ministry of health collaborated with the ministry of education the attitudinal initiative course should be included in the curriculum, also increase the number of nurses to reduce the work overload and increase the income of nurses will provide a better attitude of a nurse towards CAUTI.

The result was comparable with another cross-sectional study conducted in south Ruanda which shows that 52.83% had a good attitude towards the prevention of CAUTI (27). This similarity might be due to similar socio-demographic characteristics of participants, similar perceptions of nurses to the prevention of CAUTI.

The current study showed that there was no association between the attitudes of nurses with socio-demographic factors like gender, age, religion this was similar to a cross-sectional study conducted in Pakistan, which shows that there was no significant association between attitudes of a nurse with age (39). But this study was associated with the knowledge and practice of the respondents and the marital status of nurses.

### 6.3 Practice of nurses towards catheter-associated urinary tract infection prevention

Above half of 190(55.2%) of the participants had good practice. This result was lower than a cross-sectional study conducted in the American Peshawar hospital which was 56.43%. (5) And a study conducted in Africa Ruanda, the practice of nurses showed that 79.9% of nurse participants in prevention of CAUTI (27). This result difference might be due to the availability of materials, the availability of well-trained nurses, continuous on-site and on-the-job training, and availability of CAUTI prevention guidelines but in this study area no adequate equipment, no training program.

A study conducted in Colorado teaching hospital to assess the practice of nurses in prevention of CAUTI during IUC insertion shows that 97% wear glove, hand hygiene practice before and after catheter insertion 89%, keep sterility during the procedure 81%, non-contact insertion 73%, not using catheter attaching device 4%, genital area care providing 43% (37) and in this study, finding shows that hand hygiene practice before and after catheter insertion 78.5%, wear glove during the procedure 89%, 77.3% follow aseptic technique, not apply catheter attaching device was 21%. This practice difference may be due to the availability of materials, pipe water, and low workload in another study area. If adequate materials are available, continuous follow-up and the procedure is practiced under the supervision of one another will reduce the risk of CAUTI.

This study found there is no significant association between socio-demographic factors with the practice of nurses in agreement with studies conducted in Rwanda (40) and Pakistan, Lahore hospital (39).

This study finds show that there was no significant association between respondents' knowledge with the practice compared with studies conducted in Pakistan, Lahore hospital (39,) and Turkey (41) which has a significant association between nurses' knowledge with practice to prevent

CAUTI). For this explanation in this study area, it may be performed through experience, participant's level of education difference.

The attitude of nurses was significantly associated with the practice of the nurses. Concerning the association between practice and institutional factors in this study training and practice had no association but the availability of guideline/protocol had an association with practice which means the availability of guideline/protocol in the participant's institution were 2 times better practice than those who had not guideline/protocol in the participant's institution to prevent catheter-associated urinary tract infection (AOR=2.360, 95% CI, P=value 0.004).

## **CHAPTER 7: STRENGTH AND LIMITATION**

### **7.1 Strength**

The strength of the study was that a standardized (CDC developed in 2009) questionnaire was utilized

A pre-test was done before the actual administration of the prepared tool at actual subjects.

Representative samples size was used

This is the first study in Ethiopia.

### **7.2 Limitation**

The study design was cross-sectional which could not establish a causal association as to how and when the associations were established.

To determine the practice of the respondents if it was an observational study, it was better than cross-sectional.

The study has been conducted at only selected public hospitals in Addis Ababa it not included private hospital nurses

Data obtained from the study participants through self-report were not crosschecked with the real practice on the ground.

## **CHAPTER 8: CONCLUSION AND RECOMMENDATIONS**

### **8.1. Conclusion**

The overall result showed there was an inadequate level of knowledge, negative attitude, and a somewhat good level of practice towards catheter-associated urinary tract infection prevention. Factors associated with knowledge towards catheter-associated urinary tract infection prevention were: the availability of guidelines in participant's institutions. Factors associated with attitude were marital status, knowledge, practice, and factors associated with the practice where the attitude of the respondent and availability of guidelines in the respondent's institution.

### **8.2. Recommendations**

For the ministry of health

The Ministry of health should collaborate with Ethiopian Health Service to establish a written updated protocol for catheter insertion, maintenance and removal procedures for prevention of CAUTI and adequate knowledge and safe nursing practice and nurses should be allowed to further higher education and should get on-site and off-site training related with CAUTI prevention.

For hospitals

There should be the availability of catheterization and catheter removal guidelines in each ward. Nursing quality assurance units must be established and empowered to periodically reward and reprimand bad nursing practices in catheter insertion, maintenance, and removal procedures to increase good patient health care outcomes.

For researchers

The findings of this study provided a baseline direction to the studies aimed to assess nurses' knowledge, attitude, practices, and associated factors toward the prevention of CAUTI. Further studies may be required to investigate the barrier affecting nurses' knowledge, attitude, and practice by using other study methods.

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## ANNEX

### **Annex A: Information document and informed consent Information document.**

I am Zemene Dessie and I am studying for Masters of Nursing in Adult health nursing at Addis Ababa University College of Health Sciences department of nursing. As per the course requirements, I am going to research Nurses' knowledge, attitude, and practice, and associated factors towards the prevention of catheter-associated urinary tract infection and so I would like to ask you some questions about CAUTI prevention.

The purpose of this study is to assess the knowledge, attitude, and practice of nurses towards the prevention of CAUTI. The results to be retrieved from this study will be used for nursing practice, education, and further research that shall contribute to the quality of care and improvement of the patient outcome via appropriate handling of the indwelling urinary catheter (IUC).

You have been chosen for this study because as a nurse, you are responsible for providing the usual assessment and management of patients with a catheter; you are also responsible for the sterile insertion of the catheter, its maintenance, and its timely removal to prevent catheter-related urinary tract infection. Your participation in this study is voluntary and if you decide not to take part you are still free to stop here. Some possible risks that you may encounter are taking your time to fill in the questionnaire and potential disruption of routine activities. All the information that you are going to provide will remain confidential and you don't need to mention your name.

All data collected will be coded and stored securely and cannot be accessed by any third parties. For this reason, you are kindly requested to give your sincere and truthful answer about demographic data, knowledge, attitude, and practice about CAUTI prevention. All this is completely voluntary and your refusal to participate or to answer questions will not affect your working environment and will have no effect on your life. Note that there is no reward or payment for participating in this study.

If you have further questions or would like to know the results of this study, please feel free to contact the principal investigator on

**Investigator:** Zemene Dessie, TEL +25193187611, email [zemenedessie9@gmail.com](mailto:zemenedessie9@gmail.com).

## **Informed consent**

I ....., have been informed about the purpose, objectives, and process of this study. I also understood that the research imposes no risk and no complication to me and my family. I have been told that if I feel discomfort responding to any of the questions, I feel free to drop in any time I wish to do so. I have understood the information given and that the participation is completely voluntary based and that no rewards or payment is to be provided. I have been told that my answers to the questions will not be given to anyone and not expect to write my name. Now I am giving my consent to participate in the study voluntarily.

..... Yes, I want to participate in the study (Please go to the next page)

..... No, I don't want to participate in the study (Thank you very much!).

Witness: Signature..... Date.....

Investigator: Signature..... Date.....

A copy of this consent form should be given to you.

Witness: Signature..... Date.....

Investigator: Signature..... Date.....

**Annex B: Questionnaire.**

This questionnaire was prepared based on 2009 CDC guidelines for the prevention of catheter-associated urinary tract infections published by the Healthcare Infection Control Practices Advisory Committee (HICPAC). General instruction: This instrument is divided into 4 sections. Section A is related to your data. Section B is your knowledge about Catheter-Associated Urinary Tract Infections (CAUTI) prevention. Section C is your attitude related to CAUTI prevention. Section D is your practices regarding CAUTI prevention. Section E is institutional factors.

**SECTION A: SOCIODEMOGRAPHIC CHARACTERISTIC OF RESPONDENTS**

Serial no.	Socio-demographic data	Group	Response
101	Age (years)	.....years	
102	Gender	Male	
		Female	
103	Marital status	Single	
		Married	
		Divorced	
		Widowed	
		Separated	
104	Religion	Orthodox	
		Muslim	
		Protestant	
		Other	
105	Monthly income/salary		
106	Highest level of education that you have achieved	Diploma	
		Bachelor (BSc)	
		Masters (MSc)	
107	Year of experience		

108	Have taken training related to infection prevention	Yes	
		No	
109	If yes in the above question no. 8 when?		
110	For how many times you have taken the training		

**Instruction:** Please fill in the provided space or put an “X” in the area provided

### SECTION B:

Knowledge of nurses on urinary catheter indications and catheter-associated urinary tract infection prevention. Instruction: Please read carefully the statement and circle the most correct answer.

201. Among the following what is an inappropriate indication for indwelling urinary catheterization?

- A. Acute urinary retention and bladder obstruction.
- B. Getting urine for culture when the patient can void voluntarily
- C. Need for accurate measurements of urinary output in patients who are severely ill.
- D. To ensure comfort for end-of-life care.

202. Which is an appropriate indication of urinary catheterization among the following? A. Measurement of the urine output that can be obtained by means other than the urinary catheter.

- B. As a replacement for nursing care for the patient or resident with incontinence
  - C. For prolonged postoperative duration without appropriate indications
  - D. Patients expected to receive a great number of infusions or diuretics during surgery
203. Read the following carefully and select the proper technique used for indwelling urinary catheter Insertion?

- A. Using clean technique with clean equipment.
- B. Using clean technique with sterile equipment
- C. Using aseptic technique with sterile equipment
- D. Using aseptic technique with clean materials

204. Based on CDC 2009 Guidelines for prevention of Catheter-associated urinary tract infection, operative patients who have been catheterized, it is advised to remove the catheter as soon as possible postoperatively, preferably within .....

- A. 24 hours
- B. 6 hours
- C. 36 hours
- D. 12 hours

205. As a nurse you find that the indwelling urinary catheter is obstructed during your patient assessment, what are you going to do?

- A. Change the catheter immediately
  - B. Notify the physician
  - C. Clamping indwelling catheters and wait for the physician order
  - D. Perform instillation of antiseptic or antimicrobial solutions into a urinary drainage bag.
206. One of the following is not a nursing action to prevent infections from urinary catheters?

- A. Maintain continuous urine flow.
- B. Changing the urinary catheters or drainage bags only at routine and fixed intervals
- C. Keep the collecting bag under the level of the bladder at all times.
- D. Empty the collecting bag regularly using a separate, clean collecting container for each patient

207. Which one of the following is a risk factor for catheter-associated urinary tract infection?

- A. Prolonged immobility
- B. Using aseptic techniques during catheter insertion
- C. Prolonged time of catheterization
- D. None one of the above

208. Among the following categories, which patient is at high risk of mortality or developing catheter-associated urinary tract infection?

- A. Children less than 12 years old
- B. Young adult between 18-25 years old
- C. Adult patients of 30-50 years old
- D. Elderly patients of more than 65 years and women

209. Before inserting a urinary catheter a nurse has to perform all of the following to prevent catheter-associated urinary tract infection except:

- A. Hand hygiene immediately before and after insertion or any manipulation of the catheter device or site.
- B. Only properly trained persons who know the correct technique of aseptic catheter insertion and maintenance are given this responsibility.
- C. Properly secure indwelling catheters after insertion to prevent movement and urethral traction.
- D. None of the above

210. All the following are complications of catheter-associated urinary tract infection except:

- A. Death
- B Hemorrhage
- C. Hypertension
- D sepsis

**SECTION C:** Attitude of nurses towards CAUTI prevention.

**Instruction:** Please read the statement carefully and tick the box that most closely reflects your answer to the following questions.

Use number: 3 for agree “neutral”, 2 and 1 for "strongly disagree".

Statements Nursing		Nursing rate		
		3	2	1
301	Do you think that the use of gloves and gown, during any manipulation of the catheter or collecting bag decrease the incidence of CAUTI?			
302	Do you believe that education about basic catheter care helps to prevent catheter-associated urinary tract infections?			
303	Do you think that catheter-associated urinary tract infection is not a very serious disease?			
304	Do you believe that hospitals put catheter-associated urinary tract infection prevention on a high-priority list that helps for catheter-associated infection?			
305	Do you think that catheter-associated urinary tract infection is a common problem and almost impossible to prevent?			

306	Do you think that maintaining a closed drainage system prevents catheter-associated urinary tract infection?			
307	Do you believe that catheters should be removed whenever it is convenient for a healthcare provider?			
308	Do you believe that catheters can be inserted for nursing staff convenience?			

## SECTION D:

The practice of nurses towards catheter-associated urinary tract infection prevention Instruction: Please read the statement carefully and put an X in the box that most closely reflects your answer to the following questions.

Serial no	Elements performed by nurses to prevent catheter-associated urinary tract infection Catheter	Yes	No
	<b>Catheter indications</b>		
401	Did the patient meet at least one of the appropriate indications?		
402	Are you familiar with the use of catheter alternatives like condoms or absorbent pads?		
403	<b>Hand hygiene</b>		
404	Did you wash your hand before and after insertion?		
405	Did you wash your hand before catheter manipulation?		
406	Did you wash your hand after catheter insertion?		

407	Did you use a pair of sterile gloves when you inserted the catheter?		
	<b>Inserting the catheter</b>		
408	Did you clean the urethra with an antiseptic solution before you inserted the catheter?		
409	Did you use sterile equipment like sterile gloves, drapes, sponges, and solution?		
410	Did you follow the aseptic technique to insert the catheter?		
411	Did you use a single used bottle for lubricant?		
412	Did you secure the indwelling catheter properly after insertion?		
	<b>Catheter maintenance</b>		
413	Did you keep the catheter and collecting tube free from kinking?		
414	Did you always keep the collecting bag below the bladder?		
415	Did you empty the collecting bag regularly and use separate, clean urine collecting jug for each patient?		
416	Did you maintain the closed system all the time?		
417	Did you keep the urine collecting bag out off the floor?		
418	Did you avoid contact with the drainage spigot (end of urine bag) with the collecting container?		
419	Did you use gloves and gown as appropriately, during any?		
	<b>Catheter removal</b>		

420	Did you protect yourself during catheter removal?		
421	Did you record the catheter removed date?		

**Section E** Institutional factors that affect knowledge, attitude, and practice of catheter associated urinary tract infection. Please put “X”

Serial no.	Statements	Groups	Response
501	Is there an available training program related to infection prevention in your institution?	Yes	
		No	
502	If the answer is yes, have you trained?	Yes	
		No	
503	If yes, how many times have you taken the training?		
504	Do you have a catheter insertion and removal protocol/guideline in your working unit?	Yes	
		No	
505	If the answer is yes, did you follow the guideline	Yes	
		No	

**Thank you!!**