ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCES

SCHOOL OF NURSING AND MIDWIFERY

KNOWLEDGE, PRACTICE AND ASSOCIATED FACTORS TOWARDS PREVENTION OF HOSPITAL ACQUIRED INFECTION AMONG NURSES WORKING IN NEONATAL INTENSIVE CARE UNITS OF ADDIS ABABA, ETHIOPIA, 2022

By: FEVEN ALEMAYEHU (BSc, N)

A THESIS TO BE SUBMITTED TO GRAGUATE STUDIES PROGRAM OF ADDIS ABABA UNIVERSITY, COLLEGE OF HEALTH SCIENCES, SCHOOL OF NURSING AND MIDWIFERY DEPARTEMENT OF NURSING IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCES IN NEONATAL NURSING.

MARCH 2023

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Acronyms and Abbreviations

BSI……Blood Stream Infection

CDC……Center for Disease Control and Prevention

CLABSI……Central Line Blood Stream Infection

CVC……Central Vein Catheter

HAI……Hospital Acquired Infections

HCAI…….Healthcare Associated Infections

IP……Infection Prevention

NICUs……Neonatal Intensive Care Units

PPE…….Personal Protective Equipment

WHO…….....World Health Organization

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ABSTRACT

Background: The most common cause of morbidity and mortality in neonatal intensive care units around the world is nosocomial or healthcare associated infections. Up to 40% of reported neonatal mortality in developing countries is attributed to nosocomial infections, which have a 30% incidence in neonatal critical care units.

Objective: The aim of this study was to assess knowledge, practice and associated factors towards prevention of hospital acquired infection among nurses working in neonatal intensive care unit of selected governmental hospitals Addis Ababa, Ethiopia.

Method: Hospital based cross-sectional study was conducted from March 21 – April 21, 2022. Census method was used to obtain the study participants and self-administered questionnaires were used to collect data from 155 participants in selected five governmental hospitals in Addis Ababa, Ethiopia. Data was entered using EPI info version 7.0 statistical software and analyzed using SPSS version 26 statistical package. Bivariate and multivariable logistic regression analysis was also carried out to identify factors associated with the dependent variable. A p-value less than 0.05 were used to declare statistical significance.

Result: Around half (53.5%) of nurses were found to have good knowledge and 56.9% of respondents demonstrated a good practice on infection prevention. Reading guide lines, receiving formal training, working experience, marital status, availability of personal protective equipment and hand hygiene equipment, and availability of infection prevention guide lines were significantly associated ($P < 0.05$) with knowledge and practice of nurses towards prevention of hospital acquired infection.

Conclusion and Recommendation: About more than half of nurses had good knowledge and good practice on hospital acquired infection prevention. This implies significant proportion of nurses had poor knowledge and practice towards prevention of infection. Therefore, institutions should provide trainings and improving sustainable supplies like personal protective equipment and hand washing equipment, and encouraging nurses to read and use infection prevention guideline.

Key words: Hospital acquired infections, Knowledge, Nurse, and Practice

CHAPTER ONE: INTRODUCTION

1.1 Background

Nosocomial infections (NIs) also known as healthcare associated infections (HAI) are the leading cause of morbidity and mortality and common complication with a variety of risk factors and bacteriological profiles in neonatal intensive care units (NICUs) worldwide(1).

Center for Disease Control and Prevention (CDC) defines as nosocomial infection is the infection that occurs 48-72 hours after the admission of a person in the hospital, due to microbial agents either of the patient's microbial flora or the hospital environment(3).

HAI in neonates include catheter-associated urinary tract infections, surgical site infections, Hospital-acquired Pneumonia, central line-associated bloodstream infections, Ventilator associated pneumonia, and skin and soft tissue infections(4). The prevalence of Nosocomial Infection (NI) in Neonatal Intensive Care Unit (NICU) is approximately 30% and is responsible for up to 40% of reported neonatal deaths in developing countries(5).

Hospital-acquired infection preventions are a set of guidelines that professionals must follow in order to significantly reduce the frequency and severity of HAIs. Poor health care worker understanding and compliance related to personal, logistical, and organizational barriers are a few reasons that affect how well these protocols are applied(6).

The key to preventing and reducing the rate of infection associated with healthcare is adherence to infection prevention practices. Therefore the standard precautions to prevent infections should be well-known to and carefully followed by critical care healthcare workers(7).

Despite the fact that it is a multidisciplinary obligation, nurses often play a key role in the prevention of HAIs, and it is regarded an important aspect of nursing care. In Ethiopia, there is a scarcity of evidence about nurses' knowledge and practice regarding HAI prevention. This study will be conducted to analyze nurses' knowledge and practice towards the prevention of HAIs in order to close the gap(8).

1.2 Statement of the problem

Higher morbidity and mortality, as well as longer hospital/ICU stays, greater severity of the underlying disease, increased use of monitoring and treatment equipment, and higher treatment costs are all related to HAI(9).

In 2020 the global neonatal death rate was 17 per 1000 live births; accounting for 2.4 million neonatal deaths. This represents approximately 6500 neonatal deaths every day. Regionally, neonatal mortality was highest in South Asia and sub-Saharan Africa, with the neonatal mortality rate estimated at 24 and 27 deaths per 1,000 live births, respectively, in 2020. A child born in South Asia was nine times more likely to die while a child born in sub-Saharan Africa was 10 times more likely to die in the first month than a child born in a high-income country(10).

Globally, infections cause an estimated 1 million neonatal deaths annually, representing 40% of all neonatal deaths(11)

According to a multicenter point-prevalence study in Turkey, the overall prevalence of HAIs was 7.6%. A point prevalence study from South Africa, the pooled point HAI prevalence in newborns was 7.0 percent. In a research from Marmara University Hospital, the rate of HAIs in the NICU was found to be 11.3 percent(12).

In Ethiopia a prospective cohort study done in northern part of Ethiopia shows about 23% of neonatal death occurs due to infection(13). Another research done in Ethiopia to assess the survival time and predictors of death among neonates diagnosed with neonatal sepsis found that the mortality rate was 8.65 per 100 neonates(14).

The frequency and prevalence of HAIs in Ethiopia's newborn and pediatric populations are poorly understood. Furthermore, earlier studies had only looked at adults(15).

Intubation and ventilation, central venous catheterizations, venous cannula insertions, total parenteral nutrition, and urine catheterizations are among the interventions that expose newborns in the NICU to HCAI(16).

Poor newborn immune defenses, invasive technological interventions, numerous antibiotic exposures, lengthy periods without enteral feeding, and pathogenic, hospital-derived microbial species all combine to put NICU babies at risk of infection(17).

Although resource limitation will restrict the scope of infection control, simple procedures such as hand washing, proper use of standard precautions and physical barriers, and disposal of wastes and decontamination of used instruments/equipment are measures which are used to minimize the occurrence of nosocomial infections in NICU and they are not beyond the reach of healthcare facilities with even very limited resources(1,18).

A study done in two selected tertiary hospitals in Enugu, Nigeria on infection control practices among nurses working in neonatal intensive care units (NICU) revealed that the nurses had a good knowledge of infection control. Despite their awareness of infection control, these nurses had inadequate infection control practices(18).

In Ethiopia, a study done to assess knowledge and practice of nurses towards prevention of hospital acquired infections and its associated factors showed 52.5 % of the nurses had good knowledge; similarly 48.6 % of them had good practice on prevention of HAIs(8)

Evidence suggests that the spread of nosocomial infections could be due to a breach in knowledge and practice among healthcare staff(19). This knowledge and practice gaps of nurses on HAI prevention leads to numerous unfavorable results include longer hospital stays, higher healthcare expenditures, financial hardship for patients and their families, and even death(20).

Adequate knowledge and practice of nurses have a significant contribution for a decreased prevalence of HAIs among hospitalized patients and HCWs(21)

Due to very few literatures on nurses' knowledge and practice towards prevention of hospital acquired infection in neonatal intensive care unit this study was designed to assess the level of nurse's knowledge, practice and associated factors towards prevention of hospital acquired infection. Identifying existing knowledge, practices and associated factors towards prevention of hospital acquired infection is a key step in developing and implementing a successful infection control program.

1.3 Significance of the study

Since nurses stay with patient long period of time to provide care based on the patient needs, this study will have a momentous input in identifying and improving the patterns of hospital acquired infection prevention at the health institution in the study area and baseline information for other researcher, policy maker, programmer and various level of health care institution of decision makers to consider in their plan to fill the necessary gaps based on the finding. This study will help to clarify pictures of problems among hospital acquired infection prevention practice of health care providers in health institution and patients will be benefited from cumulative efforts of health care provider and local planners through implementation of their strategies to enhance the knowledge and practice of nurses which might have significant effect in reducing the incidence of HAI. The study again will be important to create the necessary awareness of health care providers about methods of hospital acquired infection prevention in health institution as well as base line information for further studies.

CHAPTER TWO: LITERATURE REVIEW

Nosocomial infections persist as a major problem in neonatal intensive care units(9). Neonates in the NICU are vulnerable to many nosocomial infections from multiple devices for treating or monitoring their care. Thus, healthcare workers should have sound knowledge and strict adherence to infection control standard precautions(9,22).

2.1 Knowledge of nurses on hospital acquired infection prevention

A study done at Rajshahi Medical College Hospital- Bangladesh to assess the nurse's knowledge and observe their practice to prevent and control neonatal nosocomial infection in maternal and neonatal unit shows that about 100% respondent knows that environment is responsible for neonatal nosocomial infection and about 96% respondent believe that proper hand washing among health workers can reduce neonatal nosocomial infection(23).

A study conducted as an observational cross sectional study at the neonatal intensive care unit of Misurata teaching hospital in Libya, showed among the studied NICU health care workers, the overall mean knowledge score toward standard precautions was 68.4%(9).

Another cross sectional descriptive study conducted in the neonatal units of two tertiary hospitals in Enugu, Nigeria shows many of the respondents (55.2%) defined nosocomial infection as that which is not preventable because it must occur(18).

Facility based cross-sectional study conducted at Aksum Saint Mary hospital shows more than half (52.5%) of the respondents were found to have good knowledge, while substantial proportions (47.5 %) of the respondents were not . From the knowledge items 63.3 % of the respondents answered gloves should be worn if blood or body fluid exposure is anticipated followed by 60% responded use of alcohol based antiseptic for hand hygiene is effective as soap and water if hands are not visibly dirty. And only 23.7% of nurses responded wearing gloves do not replace the need for hand washing(8).

A study done on infection prevention knowledge, practice, and its associated factors among healthcare providers in primary healthcare unit of Wogdie District, Northeast Ethiopia, showed that 70.8% of participants had adequate knowledge about infection prevention. Sixteen (9.4%) were believed that gloves cannot provide complete protection against

acquiring infection. One hundred sixty-three (95.3%) of the study participants answered that washing hands with soap or an alcohol-based antiseptic decreases the risk of transmission of hospital acquired pathogens(24)

A facility-based cross-sectional study design was used to study healthcare workers in the southeast, Ethiopia, revealed 53.7% of the respondents found to be knowledgeable about infection prevention and 59.4% believes gloves cannot provide complete protection against transmission of infections, and those who believe washing hands with soap or use of an alcohol based antiseptic decreases the risk of transmission of healthcare acquired infections and use of an alcohol based antiseptic for hand hygiene is as effective as soap and water if hands are not visibly dirty are 66.2% and 65.1% respectively(25)

2.2 Practice of nurses on hospital acquired infection prevention

A study done in intensive care units of a State University Medical Faculty Hospital in Istanbul shows that 48.2% of them don't leave the catheters inserted in non-asepsis in emergency situations on the patient for more than 48 hours and 64.7% change peripheral intravenous catheters every 72-96 hours. All nurses (100%) participating in the current study followed the principles of asepsis during aspiration and other interventions(26).

A cross sectional descriptive study conducted in the neonatal units of two tertiary hospitals in Enugu, Nigeria shows the handwashing practices of nurses. Many (62.5%) of the subjects do not wash hands at all, while (31.3%) wash hands well before each procedure. Around 91.4% of nurses believe use of safe work practices such as not recapping or bending needles and sterilizing reusable instrument (100%) as methods of prevention of nosocomial infections. Only (31.3%) wash hands before glove use while (62.5%) do not wash hands at all before glove use. Only (21.9%) wash hands before touching each neonate, while (65.6%) do not wash hands at all before touching the neonates. None (0%) of the nurses washes hands well in between care episodes on same patient and (84.4%) do not wash hands at all in between care episodes(18).

Facility based cross-sectional study conducted at Aksum Saint Mary hospital shows among 14 practice based questions, Nearly half (48.6 %) of the respondents had good practice; whereas the remaining 51.4 % respondents had poor practice of HAI prevention(8).

A study done at Debremarkos referral hospital showed that the proportion of healthcare workers who had good practice towards infection prevention activities was found to be 57.3%. Regarding of hand washing practice, 44% and 66.7% of them were washing their hands with soap before patient care, after patient care or after contact with blood(27)

Another facility based cross sectional study done at west Arsi district revealed the proportion of healthcare workers who reported safe infection prevention practice was found to be 36.3% and 69.4% reported that they frequently wash their hands after patient care, 64.2% after removing gloves(25)

Hospital-based cross-sectional study conducted among healthcare workers towards HAIs prevention at university of Gondar comprehensive specialized hospital showed, regarding infection prevention practice, the majority of the respondents 64%, have poor practice towards HAI prevention and half of the respondents 50.4% always change gloves before handling new patient(6)

2.3 Factors associated with nurses' knowledge and practice regarding to hospital acquired infections

2.3.1 Socio demographic factors

A study done on knowledge and attitude among healthcare workers at the surgical department of Tamale Teaching Hospital, Ghana study found a significant association between respondents' marital status and their infection prevention knowledge level. Majority of those married were not knowledgeable and the majority of those being single were knowledgeable(28).

Facility based cross-sectional study conducted at Aksum Saint Mary hospital shows age and sex were not significantly associated and those nurses who had a bachelor degree were more than two times more likely to have a good practice on prevention of HAI as compared to those nurses who had diploma(8).

Another study done on Knowledge, practice and associated factors of infection prevention among healthcare workers in Debre Markos referral hospital, Northwest Ethiopia revealed that age and sex are significantly associated with nurses' knowledge towards hospital acquired

infection prevention. Healthcare workers with advanced age and male healthcare workers were found to be two times more likely to be knowledgeable about infection prevention when compared with females. Healthcare workers whose age 31 and above were about three times more knowledgeable about infection prevention than when compared to those 21-25. In regard to educational level, Healthcare workers with an educational level of Msc or above and were three times and BSC were two times more likely knowledgeable than Diplomas(27).

2.3.2 Personal related factors

Facility based cross-sectional study conducted at Aksum Saint Mary hospital shows length of work experience was found to have significant and independent effect on nurses' knowledge regarding to prevention of HAIs. Nurses who had a work experience of 11–20 years were more than two times more likely to have good knowledge than nurses with < 10 years of work experience(8).

Another study done on knowledge, practice and associated factors of infection prevention among healthcare workers in Debre Markos referral hospital, Northwest Ethiopia, showed experience of above ten years was four times more likely knowledgeable on infection prevention than those had work experience of fewer than five years(27).

Nurses who had work experience of 11–20 years were 1.8 times more likely to have good practice than nurses with less than 11 years of work experience. Those nurses who read guidelines about prevention of HAIs were more than two times more likely to have good practice than nurses who did not read guidelines(8).

2.3.3 Institutional factors

A descriptive cross-sectional study was done among nurses having two years of experience from two tertiary level hospitals in Dhaka city Bangladesh, shows More than half (64%) of the participants reported that hand hygiene agents like- alcohol based hand sanitizer, soap and water were not easily available. Similarly, (84%) reported, clean towels to dry the hands after washing were also not always available. The sinks for washing purposes were inconveniently located and inadequate at the hospital-settings(29).

An observational cross-sectional study which is done in Egypt, among 28 nurses working at the NICU of Benha University Hospital shows the percentage score of the availability of hand-hygiene equipment and supplies in the NICU under study was 73.6%(30).

Another study done on nurses who are working in neonatal intensive care unit of tertiary hospitals in Nigeria shows that Nurses are poor at using physical barriers and decontaminating/sterilizing reusable tools. Even though the majority of nurses use gloves when caring for patients, it's common for one glove to last between five and ten patients before being changed. Some nurses even keep using ripped gloves. They attributed this to a shortage of supplies(18)

Facility based cross-sectional study conducted at Aksum Saint Mary hospital shows formal training on prevention of HAIs was found to have significant and independent effect on nurses' knowledge regarding to prevention of HAIs. Those nurses who had formal training about HAIs were more than one times more likely to have good knowledge than those nurses who had not took training on prevention of HAIs(8).

A study done on Knowledge, practice and associated factors of infection prevention among healthcare workers in Debre Markos referral hospital, Northwest Ethiopia showed, Healthcare professionals who haven't taken Infection prevention training were 75% less likely knowledgeable about infection prevention than those had taken training in infection prevention(27).

Another study done in healthcare facilities of West Arsi District, Southeast Ethiopia showed availability of water for hand washing in the healthcare worker's ward or department, the presence of an infection prevention committee, availability of infection prevention guidelines, and ever having taken training on infection prevention were factors which were significantly associated with healthcare workers' infection prevention practice. When compared to individuals who did not have infection prevention guidelines, healthcare personnel who had it were 3.34 times more likely to practice infection prevention safely. Furthermore, healthcare personnel who had ever undergone infection prevention training were 5.31 times more likely to perform safe infection prevention than those who had not(25).

2.4 conceptual frame work

The concept of this framework was adopted from different literatures and modified accordingly to fit this study(8,25,27,29). It shows the relationship of socio-demographic variables and factors associated for knowledge and practice of nurses on the prevention of HAI among nurses.

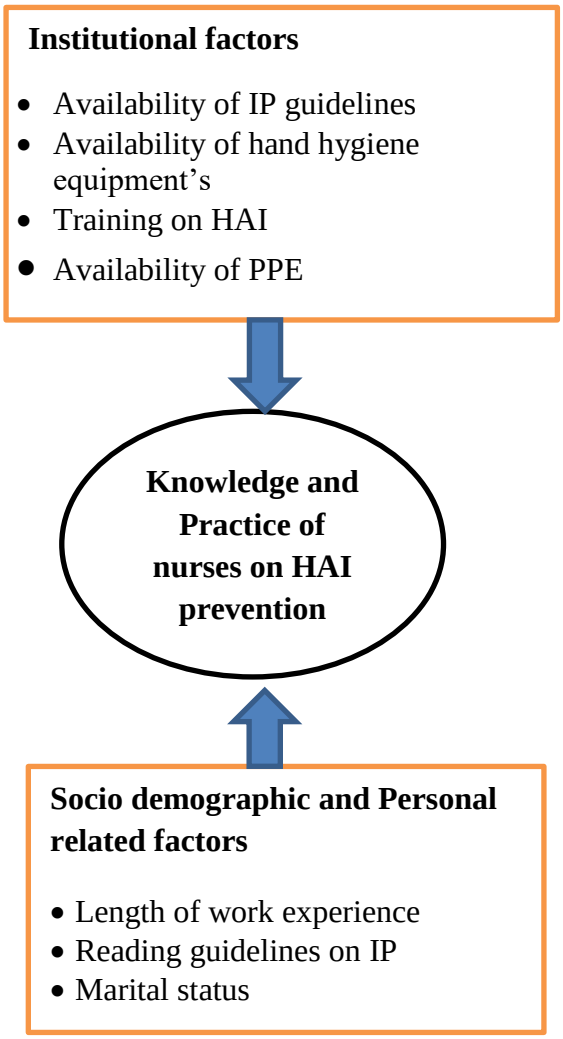

Figure 1: Conceptual Framework on knowledge, practice and associated factors towards prevention of hospital acquired infection among nurses working in neonatal intensive care unit of Addis Ababa, Ethiopia.

CHAPTER THREE: OBJECTIVE OF THE STUDY

3.1. General objective

The general objective of this study was to assess knowledge, practice and associated factors towards prevention of hospital acquired infection among nurses working in neonatal intensive care unit of Addis Ababa, Ethiopia, from March 2022 to April 2022.

3.2. Specific objectives

The specific objectives of the study were

To determine knowledge of nurses towards prevention of hospital acquired infection working in neonatal intensive care unit Addis Ababa, Ethiopia, from March 2022 to April 2022.

To identify factors associated with knowledge of hospital acquired infection prevention among nurses working in neonatal intensive care unit Addis Ababa, Ethiopia, from March 2022 to April 2022

To determine the level of practice of hospital acquired infection prevention among nurses working in neonatal intensive care unit Addis Ababa, Ethiopia, from March 2022 to April 2022.

To identify factors associated with practice of hospital acquired infection prevention among nurses working in neonatal intensive care unit Addis Ababa, Ethiopia, from March 2022 to April 2022

CHAPTER FOUR: METHOD AND MATERIAL

4.1 Study area

The study was conducted in governmental hospitals of Addis Ababa from March to April 2022, Ethiopia. Addis Ababa is Ethiopia's capital and home to the African Union and the UN World Economic Commission for Africa. It comprises 11 sub cities with a total size of 527 square kilometers and have a population of 4,793,699 individuals(31).

The city has 14 governmental Hospitals among these, four hospitals (Police hospital, Ammanuel hospital, Torhayiloch hospital and Yeka Kotebe hospital do not have NICU). So, the study was conducted in five Addis Ababa governmental Hospitals selected by simple random sampling method. These selected Hospitals were Gandhi Memorial hospital (GMH), Dagmawi minillik referral hospital (DMRH), St' Paul's Hospital millennium medical college (SPMMC), St. Petros referral hospital (SPRH) and Ras Desta Damtew Memorial Hospital (RDDMH).

4.2 Study Design and Period

A hospital based cross-sectional study design was conducted from March 2022 to April 2022

4.3 Populations

4.3.1 Source population

The source populations were all nurses working in neonatal intensive care unit

4.3.2 Study population

Selected nurses working in neonatal intensive care unit in selected hospitals and presented at the time of data collection and fulfilled the inclusive criteria.

4.4 Inclusion and Exclusion Criteria

4.4.1 Inclusion criteria

All nurses working in neonatal intensive care unit and available during data collection

4.4.2 Exclusion criteria

Those Nurses who were on leave during data collection and those who were not willing to participate were not included.

4.5 Sample size determination and sampling procedure

4.5.1 Sample size determination

Since there were 155 nurses working in NICU of five selected hospitals, by using census method the study was done in all those 155 nurses working in NICU of selected five hospitals.

4.5.2 Sampling technique

The study was conducted in Addis Ababa governmental hospitals those having neonatal ICU. From those ten (10) hospitals, five hospitals (Gandhi Memorial hospital, Dagmawi Minillik referral hospital, St' Paul's Hospital millennium medical college, St' petros specialized hospital, and Ras Desta Damtew memorial hospital) were selected using simple random sampling method. A list of nurses was obtained from NICU units of each hospital. Then all nurses who were working in the NICUs of selected public hospitals in Addis Ababa were used.

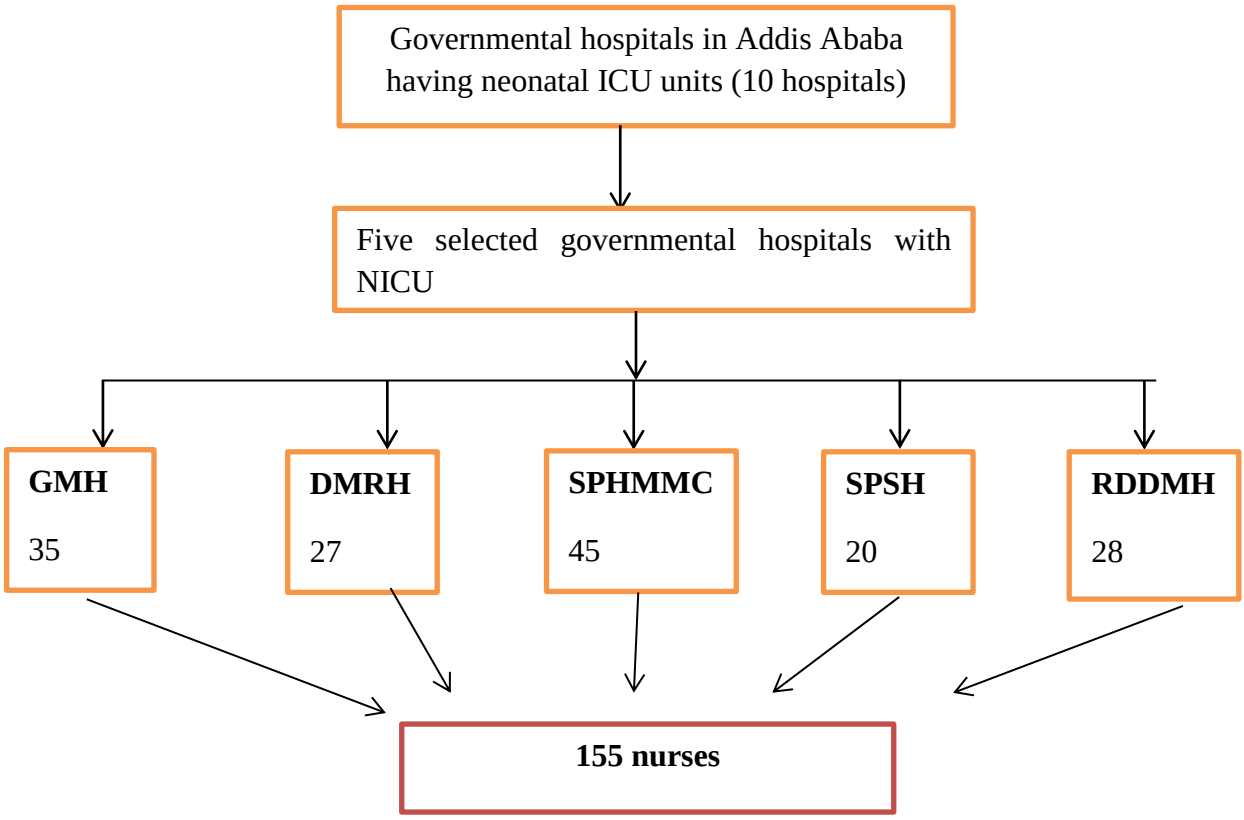

Figure 2: Schematic presentation of the sampling procedure for the knowledge, practice, and associated factors towards HAI prevention among nurses working in NICU of Addis Ababa, Ethiopia.

4.6 Variables

4.6.1 Dependent variables

Knowledge of neonatal nurses towards prevention of hospital acquired infection.

Practice of neonatal nurses towards prevention of hospital acquired infection.

4.6.2 Independent variables

Socio-demographic characteristics such as age, sex, marital status, educational level,

Personal related factors such as reading guidelines on IP, year of experience

Institutional factors such as staff numbers, availability of infection prevention guide lines, availability of hand hygiene equipment's, training on hospital acquired infection, availability of personal protective equipment

4.7 Operational Definition

Knowledge

Knowledge of individual nurses was classified into two groups (having good knowledge and poor knowledge). Respondents who score more than mean value of correct answer on knowledge questions were classified as having good knowledge. Respondents who score less than mean value of correct answers were classified as having poor knowledge on hospital acquired infection prevention assessment tool.

Practice

Infection prevention practices of nurses were classified into two groups (having good practice and poor practice). Respondents who score more than mean of correct answer on practice question were classified as having good practice. Respondents who score less than mean value of correct answers were classified as having poor practice on hospital acquired infection prevention assessment tool.

4.8 Data collection

4.8.1 Data collection tool and procedure

Respondents' knowledge and practice towards HAI prevention were assessed by using structured, self-administered questionnaires. The questionnaire was prepared in English version and was divided into four sections: section-I sociodemographic characteristics of

nurses (05 questions), section II respondents' knowledge towards HAI prevention (12 questions), section-III practice-related questions towards HAI prevention (15 questions), and section-IV associated factor questions on hospital acquired infection prevention (7 questions). The questions were adopted from reviewing similar literatures(7,17,31,33). An item of questions was chosen, and each question has a score value of one point when the answer is correct, and a score of zero points was given when the answer is incorrect. Nurses' total knowledge score was (12) points and classified as the following: "poor knowledge" when the total score < mean value and "good knowledge" when the total score > mean value. The questionnaire for the practice item was Yes-or-No questions, with total score ranged from 0 to 15. The scoring system for nurses' practice questions has a score of one point for the answer "Yes," and a score of zero points for "No." Then, the total score of the practice of nurses was categorized as a score of ≥ mean value considered as good practice and a score < mean value considered poor practice. The associated factor-related item questions also have yes-or-no questions.

Data was collected by five data collectors (BSc. nurses) and two supervisors (BSc. nurses) was employed, training was given for one day on clarification of some terms and assessment tools, aim of the study, concerning need for strict confidentiality of respondents information, time of data collection, timely collection and reorganization of the collected data and submission on due time. The questionnaire was filled by nurses working in neonatal intensive care unit of selected hospitals and data was collected for one month including training and pretest was conducted in 5% of actual sample size in neonatal nurses working in yekatit12 teaching hospital.

4.9 Data quality assurance

Both data collectors and supervisors were received one day training on the objective, methodology of the research and data collection approach. A Pre-test was conducted on 5% of the actual sample size in yekatit12 teaching Hospital, Addis Ababa, three weeks before the actual data collection. Based on the pretest appropriate modifications of the questionnaire was made and adjust accordingly. Data was collected under close supervision of investigators for its completeness, logical consistencies and give appropriate feedbacks.

4.10 Data processing and analysis

The collected data was carefully checked for its completeness and cleaned before entry into computer. Then questionnaire was coded and entered into Epi data version 3.1 then exported to SPSS version 26. Descriptive statistics was used to describe the sample and the results of the descriptive statistics and expressed as percentages and frequencies. Bivariate and multivariable logistic regression was carried out to identify factors associated with the dependent variable. A p-value less than 0.05 were used to declare statistical significance.

4.11 Ethical considerations

Before data collection, ethical clearance was obtained from Addis Ababa University-College of Health Sciences, Department of Nursing and Midwifery, Addis Ababa Health Bureau Public Health Research and Emergency Management Directorate. Ethical permission was asked from Federal health bureau and selected five governmental hospitals. Detail explanations on the aim of the study were explained to the participants and oral permission was requested. The respondents had the right not to participate in the study. They had very minimal risk it only took a few minutes from participants. Confidentiality of data was ensured and the names were never included in socio demographic characteristics of the questionnaire.

4.12 Dissemination of the result

Upon accomplishment of the study, based on the findings, conclusions and recommendations were made. Then the result of the study will be submitted to Addis Ababa University College of Health Sciences school of Nursing and Midwifery, Addis Ababa Health Bureau Public Health Research and Emergency Management Directorate, Federal health bureau and for the selected five governmental hospitals. Moreover, the findings of the study will be published and disseminated through different journals and scientific publications.

CHAPTER FIVE: RESULTS

5.1. Socio-demographic characteristics of the study participants

A total of 155 study participants were invited to participate in the study and 144 nurses enrolled in the study with a response rate of 92.9%. Majority of the respondents 101(70.1%) were females. The mean ± SD score of age of the respondents was 29.45 (4.2). More than half 78(54.2%) of the nurses were unmarried, most 128(88.9%) of the nurses had bachelor degree. 70(48.6 %) of nurses had working experience of less than 5 years.

Table 1: Distribution of Socio-demographic characteristic of nurses working in NICU, Addis Ababa, Ethiopia, April 2022(n=144).

Variables	Response	Frequency	Percentage
Age	20-30	99	68.8
	31-40	41	28.5
	>40	4	2.7
Sex	Male	43	29.9
	Female	101	70.1
Marital status	Married	66	45.8
	Un married	78	54.2
Educational level	Diploma	9	6.2
	BSc degree	128	88.9
	MSc degree	7	4.9
Years of experience	<5	70	48.6
	5-10	60	41.7
	>10	14	9.7

5.2. Knowledge of nurses towards prevention of hospital acquired infection

In this study, Participants were asked 12 questions to assess their knowledge on neonatal HAI prevention, and they were categorized in to two groups based on their score in relation to the mean. The mean score was 9.64(SD = 1.4). More than half 77(53.5%) of the respondents were found to have good knowledge, while substantial proportions 67(46.5%) of the respondents were not. Most of the participants 138(95.8%) know about what neonatal nosocomial infection. 130(90.3%) know common hospital acquired infections. Many of the respondents 120(83.3%) defined nosocomial infection as that which is preventable.

More than two third of nurses 116(80.6%) believe that instruments including spores are destructed by autoclaving. In response to the yes/no question about environment responsible for nosocomial infection 137(95.1%) respondent told yes. Most of them 115(79.9%) believe wearing gloves do not replace the need for hand washing. 135(93.8%) believe inappropriate disinfection procedures increase the risk of getting HAIs among neonates. One hundred fourty (97.2%) of the study participants responded that washing hands with soap or an alcohol-based antiseptic decreases the risk of transmission of hospital acquired pathogens. 90.3 % of the respondents answered gloves should be worn if blood or body fluid exposure is anticipated followed by 56.3% responded use of alcohol based antiseptic for hand hygiene is effective as soap and water if hands are not visibly dirty. Seventy seven (53.5%) were believed that gloves cannot provide complete protection against acquiring infection. And 48.6% of nurses responded they can wear the same pair of gloves for multiple patients as long as there is no visible contamination on the gloves.

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Table 2: Distribution of knowledge of nurses towards hospital acquired Infection Prevention in NICU, Addis Ababa, Ethiopia April 2022 (n=144).

Variable	Response	Frequency	Percentage
Know about neonatal nosocomial infection	Yes	138	95.8
	No	6	4.2
Know common neonatal hospital acquired infections	Yes	130	90.3
	No	14	9.7
Think nosocomial infection is preventable	Yes	120	83.3
	No	24	16.7
Believe instruments including spores are destructed by	Yes	116	80.6
autoclaving	No	28	19.4
Believe environment is responsible for neonatal HAI	Yes	135	93.8
	No	9	6.3
Wearing gloves do not replace the need for hand	Yes	115	79.9
washing	No	29	20.1
Inappropriate disinfection procedures increase the risk	Yes	135	93.8
of getting HAIs among neonates	No	9	6.3
Washing hands with soap or use of an alcohol based	Yes	140	97.2
antiseptic decreases the risk of transmission of HAIs	No	4	2.8
Gloves should be worn if blood or body fluid exposure	Yes	130	90.3
is anticipated	No	14	9.7
Gloves cannot provide complete protection against	Yes	77	53.5
transmission of infections	No	67	46.5
Use of alcohol based antiseptic for hand hygiene is	Yes	81	56.3
effective as soap and water if hands are not visibly dirty	No	63	43.8
Wear the same pair of gloves for multiple patients as	Yes	70	48.6
long as there is no visible contamination on the gloves	No	74	51.4

5.3. Practice of nurses towards prevention of hospital acquired infection

The mean score of the practice questions was 10.6(SD= 3.3). From the respondents more than half of the nurses who were working in NICU 82(56.9%) have good practice towards prevention of HAI. Most nurses 90(62.5%) wash hands well before each procedure. 75(52.1%) wash hands before glove use. 70.1% used soap to wash their hands. Around 111(77.1%) wear gloves at direct contact with a patient. 116(80.6%) change gloves before going to another patient. 98 of nurses, or 68.1%, check gloves for tears or holes before using them. More than two third 122(84.7%) place instruments socked in antiseptic solution after using them. Around 86(59.7%) responded containers disposed of when it becomes three quarters full. 98(88.1%)infectious wastes stored separately from routine waste. Majority of the respondents 130(90.3%) apply antiseptic hand rub to clean hands. More than half 73(52.1%) of the nurses don't washes hands well in between care episodes on same patient. Most of nurses (63.9%) insert IV catheters in non-aseptic way in emergency situation.

Table 3: Distribution of practice of nurses towards hospital acquired Infection Prevention in NICU, Addis Ababa, Ethiopia, April, 2022 (n=144).

Variable	Response	Frequency	Percentage
Wash hands well with soap before each procedure	Yes	90	62.5
	No	54	37.5
wash hands before glove use	Yes	75	52.1
	No	69	47.9
Wash hands with soap after patient care/contact with fluid	Yes	101	70.1
	No	43	29.9
Wear gloves when at direct contact with a Patient	Yes	111	77.1
	No	33	22.9
Change gloves before going to another patient	Yes	116	80.6
	No	28	19.4
Check gloves for holes or tears before used it	Yes	98	68.1
	No	46	31.9
Instruments soaked in antiseptic solution after using them	Yes	122	84.7
	No	22	15.3

Containers disposed of when it becomes three quarters full	Yes	86	59.7
	No	58	40.3
Infectious/contaminated waste stored separately from routine waste	Yes	98	68.1
	No	46	31.9
Apply antiseptic hand rub to clean hands	Yes	130	90.3
	No	14	9.7
Wash hands well in between care episodes on same patient	Yes	69	47.9
	No	73	52.1
Change peripheral intravenous catheters every 72-96 hours	Yes	70	48.6
	No	71	51.4
Insert IV catheters in non-aseptic way in emergency situations	Yes	92	63.9
	No	52	36.1
Follow the principles of asepsis during aspiration and other interventions	Yes	91	63.2
	No	53	36.8
Isolation room for those who are admitted with highly contagious disease	Yes	106	73.6
	No	38	26.4

5.4. Factors associated with nurses' knowledge towards prevention of hospital acquired infection

In this study factors associated with knowledge of nurses about hospital acquired infection prevention were analyzed both in bivariate and multivariate logistic regression. In the bivariate analysis factors which were significantly associated with knowledge about IP was: sex, marital status, educational level, working experience, reading guidelines and ever taking training in IP methods. After controlling the confounding in multivariate logistic regression analysis, marital status, work experience, receive formal training and reading IP guidelines were significantly associated with knowledge about hospital acquired infection prevention.

For thus, nurses who are unmarried were about 34% more Knowledgeable about infection prevention than when compared to the married ones (AOR 0.34(0.15, 0.76). This study revealed that the working experience was found another strong predictor of knowledge towards infection prevention which shows that nurses who had work experience of above five years was two times more likely knowledgeable on infection prevention than those had work experience of fewer than five years (AOR 2.3(1.0,5.2). Furthermore, multiple regression showed, nurses who have taken Infection prevention training were 2.8 times more likely to be knowledgeable about infection prevention than those hadn't take training in infection prevention (AOR 2.8(1.2,6.5). And those nurses who read guidelines on infection prevention were about 3 times more knowledgeable than those who don't read (AOR 2.9(1.3, 6.7).

Table 4 Bivariate and Multivariate analysis of factors associated with knowledge of nurses.

		Knowledge		COR (95%CI)	P-V	AOR (95%CI)	P-V
		Good	Poor				
Marital status	Married	40	26	1	0.08	1	
	Unmarried	37	41	0.58(0.3,1.1)	0.11	0.34(0.15,0.76)	**0.00**
Years of	<5	31	39	1	0.02	1	
Experience	5-10	34	26	1.6(0.8,3.2)	0.16	2.3(1.0,5.2)	**0.04**
	>10	12	2	7.5(1.5,36.2)	0.01	5.7(0.98,33.7)	**0.05**
Receive	No	17	46	1	0.02	1	
Training	Yes	60	21	4.2(2.1,8.6)	0.00	2.8(1.2,6.5)	**0.01**

Read	No	22	40	1	0.02	1	
Guidelines	Yes	55	27	3.7(1.8,7.4)	0.00	2.9(1.3,6.7)	**0.00**

Where: COR-Crude Odd Ratio, PV-P-value, AOR-Adjusted Odd Ratio

5.5. Factors associated with nurses' practice towards prevention of hospital acquired infection

In this study, age, sex, marital status, educational level, work experience, getting of infection prevention training , reading guide lines, availability of hand hygiene equipment's, presence of infection prevention committee, availability of PPE and managing working unit environment, were evaluated as possible factors associated with safe infection prevention practices. Thus, availability, reading and usage of guide lines, availability of hand hygiene equipment and availability of PPE were significantly associated ($P < 0.05$) with practice towards prevention of hospital acquired infection in the multivariable analysis. Healthcare providers who read guide lines on infection prevention were 9.5 times likely to have good infection prevention practice (AOR: 9.5(2.25, 40.5). Those nurses who get available hand hygiene equipment and supplies were 13.3 times more likely to have good infection prevention practice (AOR 13.3(2.4, 74.2). The odds of safe infection prevention practices were 16% higher in those who have an available infection prevention guideline (AOR 0.16(0.03, 0.78). And those who have available PPE were 4.8 times to have good practice towards prevention of hospital acquired infection (AOR 4.8(1.53, 15.1).

Table 5 Bivariate and Multivariate analysis of factors associated with Practice of nurses.

		Practice		**COR**	**P-V**	**AOR**	**P-V**
		Good	**Poor**	**(95%CI)**		**(95%CI)**	
Read Guidelines	No	17	45	1		1	
	Yes	65	17	10.1(4.67,21.9)	0.00	9.5(2.25,40.5)	**0.00**
Availability of hand hygiene equipment	No	9	30	1		1	
	Yes	73	32	7.6(3.24,17.8)	0.00	13.3(2.4,74.2)	**0.00**
Availability of IP guideline	No	22	38	1		1	
	Yes	60	24	4.31(2.12,8.75)	0.00	0.16(0.03,0.78)	**0.02**
Availability of PPE	No	22	36	1		1	
	Yes	60	26	3.74(1.87,7.62)	0.00	4.8(1.53,15.1)	**0.00**

Where: COR-Crude Odd Ratio, PV-P-value, AOR-Adjusted Odd Ratio

CHAPTER SIX: DISCUSSION

Reducing the risk of HAIs and using infection prevention principles are in the control of healthcare workers; therefore, healthcare workers must have correct, up-to-date and appropriate scientific information and practice accordingly. Without adequate infection prevention and patient safety practices both healthcare workers and patients are at risk of acquiring serious bacterial and viral infections(25). The present study was aimed to assess the level of nurse's knowledge and practice on prevention of HAIs and its associated factors in Addis Ababa, Ethiopia.

6.1 Knowledge of nurses towards prevention of hospital acquired infection

Based on the mean score of the participants in this study, 53.5 % of the participants were found to be knowledgeable towards prevention of hospital acquired infection prevention. While substantial proportions 46.5 % were not. This result indicates that nurses who are working in NICUs of public hospitals in Addis Ababa had a significant knowledge gap in HAI prevention. The finding of this study is comparable with other studies conducted in different parts of the world. Nearly similar result was found in the study conducted in Aksum Saint Mary Hospital, Northern Ethiopia and in the West Arsi District, Southeast Ethiopia the overall knowledge of nurses towards prevention of HAI was 52.5 %and 53.7% respectively(8,25). The reason might be that nurses with longer periods of patient care exposure will learn how to prevent HAIs from their own mistakes and the experiences of their colleagues is higher. Additionally, training enhances the likelihood that trainees will receive current information on HAI prevention. In contrary this result is relatively smaller compared to study conducted in Bangladesh, found that the overall knowledge score of nurses was 88.5%(30). The difference might be due to the variation in socio-economic status of the countries in which they could have better access to upgrade their knowledge and difference in clinical environment and sample size.

From the knowledge question items 90.3% of the respondents answered gloves should be worn if blood or body fluid exposure is anticipated and 79.9% of nurses responded wearing gloves do not replace the need for hand washing. This result is higher relative to the study done by Asfaw in which 63.3% of participants answered gloves should be worn if blood or body fluid exposure is anticipated and 23.7% of nurses responded wearing gloves do not

replace the need for hand washing (8). The difference could be due to they use different kinds of study populations.

One hundred forty (97.2%) of the study participants answered that washing hands with soap or an alcohol-based antiseptic decreases the risk of transmission of hospital acquired pathogens. This finding is in line with study done on infection prevention knowledge, practice, and its associated factors among healthcare providers in primary healthcare unit of Wogdie District, Northeast Ethiopia, which was 95.3%(24)

Around 93.8% of respondent knows that environment is responsible for neonatal nosocomial infection. The result is relatively lower compared to Study done at Bangladesh which was 100%(23). The discrepancy could be due to on their study most of them had complete knowledge on infection prevention and majority of them had long year of working experience.

Most of the respondents 83.3% of nurses defined nosocomial infection as that which is not preventable because it must occur it is higher relative to the study conducted at Enugu, Nigeria which was 55.2%(18). This might be due to majority (67.2%) of the respondents had received training on infection control so that they know neonatal nosocomial infection is preventable if the nurses or health care workers strictly adhere to infection prevention methods.

This study revealed 53.5% of nurses believes gloves cannot provide complete protection against transmission of infections, and those who believe use of an alcohol based antiseptic for hand hygiene is as effective as soap and water if hands are not visibly dirty are 56.3 This result is lower relative to the study done on healthcare workers in the southeast, Ethiopia, which was 59.4% and 65.1% respectively(25). The possible explanation for this might be their study includes different study populations, and there is variance in the sample size and study area.

6.2 Practice of nurses towards prevention of hospital acquired infection

Regarding nurse's practice towards HAI prevention based on nurses who scores above the mean about 56.9 % of the participants had good preventive practice where 43.1% had not. This also indicates that there is significant gap in nurse's practice towards prevention of hospital acquired infection. The result is relatively similar with the study conducted in Debremarkos referral hospital and primary healthcare unit of Wogdie District at University of Gondar Comprehensive Specialized Hospital, that was around 57.3%and 55%(24,27). The reason might be due to nurses who get an available supply of hand hygiene and personal protective equipment and also those who read guide lines had higher odds of practice in infection prevention activities. However this result is higher than the studies conducted in other parts of Ethiopia which was 36%, 48.6% and 36.3%(6,8,25). This discrepancy is may be due to in those study areas nurses who get training on HAI prevention and those nurses who read guideline on infection prevention is very low.

In this study 62.5% of nurses wash hands well before each procedure and 52.1% wash hands before glove use it is relatively higher than the study conducted at neonatal units of two tertiary hospitals in Enugu, Nigeria in which 59.4 and 31.3% respectively(18). This might be due their study revealed that there is poor practice towards prevention of infection and it was more pronounced in the areas of effective hand hygiene. This could be due to unavailability of items for hand hygiene including soap.

Around 70.1% of nurses reported that they frequently wash their hands after patient care, this result was similar with the study done at west Arsi district(25).

And also 48.6% of nurses change peripheral intravenous catheters every 72-96 hours and 63.2% of them followed the principles of asepsis during aspiration and other interventions. This was relatively lower compared to a study done in intensive care units of a State University Medical Faculty Hospital in Istanbul which shows 64.7% and 100% respectively(26). The discrepancy could be most neonates treated in the neonatal intensive care units have difficult and thin veins so that nurses face challenges to change the peripheral intravenous catheters every 72-96 hours and also nurses who work in these units had heavy work load.

6.3 Factors associated with knowledge and practice of nurses towards prevention of hospital acquired infection

In the present study some independent variables like marital status, work experience, receiving formal training and reading IP guidelines were significantly associated with knowledge about hospital acquired infection prevention.

This study found a significant association between respondents' marital status and their infection prevention knowledge level. Nurses who are unmarried were 34 times more likely to have good knowledge compared to the unmarried ones. Similar result were found on the studies done on knowledge and attitude among healthcare workers at the surgical department of Tamale Teaching Hospital, Ghana and on knowledge of staff nurses related to prevention of Nosocomial infections in the selected units o Himalayan Institute Hospital(28,32). This may be due to the unmarried ones may have adequate time and opportunity to upgrade their knowledge than the married ones.

The study participants with work experience of 5– 10 years were two times more knowledgeable than those with work experience of < 5years. And, also the respondents with work experience >10 years were six times more likely to be knowledgeable about HAI prevention than those with work experience < 5 years. This is in line with findings from Ethiopia in which as experience increases the odds of having good knowledge increases two and four times respectively (8,27). This might be due to the fact that as the number of years of practice increases, health nurses are exposed to infection prevention information and became more experienced through working with senior experienced staffs. The truth is that as their years of experience increase, so does their need to broaden their knowledge and skills.

Knowledge about infection prevention was significantly associated with ever taking training on infection prevention. Nurses who hadn't ever take training is less knowledgeable than counterparts. This is similar to studies conducted on north west Ethiopia and at Axum St. Marry Hospital in which those who take training is 1 more times and 25% more likely to have good knowledge (8,27). This might be as a result of the nurses' previous understanding of infection prevention principles changing as their knowledge of those concepts has been updated. The finding highlights the necessity of infection prevention training in the improvement of nurses' knowledge.

Moreover, this study, similar to previous studies(8,24), reading of infection prevention guidelines in health institutions also increases the odds of having adequate knowledge about infection prevention. This might be attributed to the fact that nurses who read infection prevention guidelines were more likely to get updated information, which improves their knowledge of infection prevention.

Regarding the practice of nurses some independent variables like availability of hand hygiene equipment, availability of personal protective equipment, availability of IP guideline and reading IP guidelines were significantly associated with practice of nurses towards prevention of hospital acquired infection.

In this study nurses who had available PPE were four times more likely to have good practice towards hospital acquired infection prevention than nurses who hadn't. Similar study result revealed in Debre Markos referral hospital that the health care workers who get an available supply of infection prevention materials had two times more safe infection prevention practice than those healthcare workers who couldn't get infection prevention supplies(27). This might be due to available personal protective equipment and infection prevention supplies encourage the nurses to protect themselves and to make the environment safer place for the neonates.

Although most nurses apply gloves when caring for patients, 19.4% of nurses don't change gloves before going to another patient. Some even (22.9%) don't wear gloves at direct contact with a patient. They attribute this to inadequate supply. Likewise, use of gown and other necessary personal protective equipment's when anticipating body fluid exposure was also inadequate. This could be as a result of inadequate supply.

The present study also found out significant differences in the practice of infection prevention among nurses who had infection prevention guideline in their working department and in those who read it. The odds of good practice were likely to be sixteen and nine times higher in nurses who had available infection prevention guidelines and in those who read the guideline respectively. This finding is in agreement with other similar studies in Ethiopia(8,25,27). This might be due to the fact that reading guide lines increases the chance of the nurses to get up to date information about prevention of HAIs so that they can act accordingly.

Strength and limitation of the study

Strength

- The study involved five of public hospitals found in Addis Ababa city and tried to make the result representative.
- The study tried to explore the factors affecting the nurse's knowledge and practice.
- The data collection procedure was strictly supervised by principal investigator and supervisors.
- Research on newborn health care in developing countries remains sparse,
- This study will provide information on knowledge, practice and associated factors towards prevention of hospital acquired infection among NICU nurses to decrease neonatal mortality.

Limitations of the study

- It is better if this study was supported by observational check list though applying mixed methods (qualitative and quantitative approach).
- This study is vulnerable for the all drawbacks of cross section study design.
- Limited study conducted in the area
- Finally, since the study involved only those who are working in the neonatal units its generalizability is also limited to those who are working in neonatal intensive care units.

CHAPTER SEVEN: CONCLUSION AND RECOMMENDATION

8.1 Conclusion

The result of this study revealed that 46.5% of the participants have poor knowledge towards prevention of hospital acquired infection. In addition, 43.1% of participants were practicing poorly. This implies significant proportion of nurses had poor knowledge and poor practice towards prevention of hospital acquired infection.

Marital status of the participants, work experience, receiving formal training and reading infection prevention guidelines were factors that were significantly associated with the knowledge of nurses towards prevention of hospital acquired infection. On the other hand, reading guideline, availability of hand hygiene equipment, availability of PPE, and availability of infection prevention guidelines were significantly associated with the practice of nurses towards prevention of hospital acquired infection.

Therefore, attention should be given on updating nurse's knowledge, preparing and providing training programs, making hand hygiene and personal protective resources available and establishing latest evidence based global and national guideline.

8.2 Recommendation

For Federal Ministry of Health

It is recommended that to provide in-service and off-service training programs for nurses working in hospitals about infection prevention in collaboration with other stakeholders, based on evidence-based global guidelines with the most recent recommendations.

For hospital administrator

Creating and delivering in-service training programs for nurses on strategies for preventing hospital acquired infections based on the most recent evidence-based international and national recommendations, as well as making infection prevention guidelines available to staff nurses by posting them in nearby places are recommended.

Making the neonatal ICU environment enable nurses to translate knowledge into practice by ensuring availability of hand hygiene equipment's like hand washing sinks, soap and

disinfectants for cleaning and disinfecting equipment's, is also recommended. And also they should provide sustainable personal protective equipment.

For nurses

It is crucial to keep one's knowledge by reading and training as there are numerous new suggestions about the prevention of hospital acquired infections that differ from the earlier ones. Therefore reading the latest prevention guidelines is strongly recommended. It is also very important to ensure self-possessed knowledge is translated into desirable actions. Working based on self-possessed knowledge not only benefits patients but also, it upgrades the nurse's professional achievement and give personal satisfaction.

For researchers

Conducting further study using triangulated study design and addressing the unreached problems in this study in a detail way including, the nurses' attitude regarding prevention of hospital acquired infections is recommended.

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CHAPTER NINE: ANNEXES

ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCES

SCHOOL OF NURSING AND MIDWIFERY

Annex I- English Version of information Sheet and informed consent

Date _____ Time _____ Questionnaire code _____

Good morning/Good afternoon

My name is, ----------I am working as data facilitator for the study being conducted in this Hospital with Feven Alemayehu who is studying her Master's Degree at Addis Ababa University College of Health Sciences department of nursing and midwifery. I kindly request you to lend me attention to explain you about the study.

Title of the study Assessment of knowledge practice and associated factors of hospital acquired infection among nurses who work in neonatal intensive care unit.

Purpose: The purpose of this study is to asses knowledge practice and associated factors of HAI among nurses who are working inn neonatal intensive care units

Procedure and duration: The data is collecting by asking you some question regarding knowledge and your practice on hospital acquired infection prevention and you can ask me back if any unclear questions. This may take 25-30 minutes, so I kindly request you to lend me your time and thank you in advance for doing so.

Risks and benefits: The risk of being participant in this study is null, but only taking few minutes from your time. There would not be any direct payment for participating in this study. But the findings from this research may reveal important information for you and care providers.

Confidentiality: The information you provide us will be confidential. There is no information that will identify you in particular. The findings of the study are general for the study participants and will not reflect anything particular of persons. The questionnaire is coded to

exclude showing names. No reference was made in oral or written reports that could link participants to the research.

Rights: Participation for this study is fully voluntary. You have the right to declare to participate or not in this study. If you decide to participate, you have the right to withdraw from the study at any time and this will not label you for any loss of benefits which you otherwise entitled. You are not expected to answer any question that you do not want to answer.

Contact address: If there are any questions or enquires any time about the study or the procedures, please contact us by the following address.

The Principal Investigator: Sister Feven Alemayehu phone number: +251922494530

Email address: alemayehufeven15@gmail.com.

May I now begin the interview?

If No, thank and stop interviewing If yes, continue interviewing

Informed Voluntary Consent form

I have well understood the participant information sheet. I have clearly understood the purpose of the research, the procedures, the risks and benefits, issues of confidentiality, the rights of participants and the contact address for any queries. I have been given the opportunity to ask questions for things that may have been unclear. I was informed that participants have the right to withdraw from the study at any time or not to answer any question that they do not want. Therefore, I declare my voluntary consent to participate on the study with my initials signature.

This is to be signed face to face in the presence of the data collector.

Signature of participant _____

Name and signature of data facilitator _____

Annex II: English version of Questionnaire

ADDIS ABABA UNIVERSITY

College of Health Sciences School of Nursing and Midwifery

Questionnaire code: _____Date _____

Name of data collector _____Signature_____

Section I: Background characteristics

Serial No.	Socio-demographic Information	Response	Skip
001	Sex	1.Male ☐ 2.Female ☐	
002	Age	_____	
003	Marital status	1.Married ☐ 2.Unmarried ☐	
004	Educational level	1. Diploma ☐ 2. Bsc degree ☐ 3. Msc degree ☐	
005	Years of experience	_____	

Section II : Knowledge related question on HAI prevention for the nurses

101	Do you know what neonatal nosocomial infection is	1. Yes ☐ 2. No ☐	
102	Do you know common neonatal hospital acquired infections	1. Yes ☐ 2. No ☐	
103	Do you think nosocomial infection is preventable	1.yes ☐ 2. no ☐	

104	Do you believe instruments including spores are destructed by autoclaving	1. Yes ☐ 2. No ☐	
105	Do you believe environment is responsible for neonatal hospital acquired infection	1. Yes ☐ 2. No ☐	
106	Wearing gloves do not replace the need for hand washing	1.Yes ☐ 2.No ☐	
107	Inappropriate disinfection procedures increase the risk of getting HAIs among neonates.	1.Yes ☐ 2. No ☐	
108	Washing hands with soap or use of an alcohol based antiseptic decreases the risk of transmission of HAIs	1. yes ☐ 2.No ☐	
109	Gloves should be worn if blood or body fluid exposure is anticipated	1.Yes ☐ 2.No ☐	
110	Gloves cannot provide complete protection against transmission of infections	1.Yes ☐ 2.No ☐	
111	Use of alcohol based antiseptic for hand hygiene is effective as soap and water if hands are not visibly dirty	1.Yes ☐ 2.No ☐	
112	I can wear the same pair of gloves for multiple patients as long as there is no visible contamination on the gloves	1.Yes ☐ 2.No ☐	

Section III : Practice related question on HAI for the nurses

201	Wash hands well with soap before each procedure	1. Yes ☐ 2. No ☐	
202	Do you wash hands before glove use	1. Yes ☐ 2. No ☐	

203	Wash hands with soap after patient care/contact with fluid	1. Yes 2. No	
204	Wearing gloves when at direct contact with a Patient	1. Yes ☐ 2. No ☐	
205	Do you washes hands well in between care episodes on same patient	1. Yes ☐ 2. No ☐	
206	Changing gloves before going to another patient	1.Yes ☐ 2.No ☐	
207	Check gloves for holes or tears before used it	1. Yes ☐ 2. No ☐	
208	Instruments soaked in antiseptic solution after using them	1. Yes ☐ 2. No ☐	
209	Containers disposed of when it becomes three quarters full	1. Yes ☐ 2. No ☐	
210	Infectious/contaminated waste stored separately from routine waste	1. Yes ☐ 2. No ☐	
211	Apply antiseptic hand rub to clean hands	1. Yes ☐ 2. No ☐	
212	change peripheral intravenous catheters every 72-96 hours	1.yes ☐ 2.No ☐	
213	Do you insert IV catheters in non-aseptic way in emergency situations?	1.Yes ☐ 2.No ☐	
214	Do you follow the principles of asepsis during aspiration and other interventions?	1.Yes ☐ 2.No ☐	
215	Is there isolation room for those who are admitted with highly contagious disease	1. Yes ☐ 2. No ☐	

Section IV Associated factor questions on HAI for the nurses

301	Have you ever receive training on infection control	1. Yes ☐ 2. No ☐	
302	Do you read guidelines on infection prevention	1. Yes ☐ 2. No ☐	
303	Is hand hygiene equipment and supplies available?	1. Yes ☐ 2. No ☐	
304	Is infection prevention guideline available in your ward?	1. Yes ☐ 2. No ☐	
305	Is there an infection prevention committee in your ward?	1. Yes ☐ 2. No ☐	
306	Is all personal protective equipment's to prevent the risk of acquiring infection available	1. Yes ☐ 2. No ☐	
307	Do you manage traffic flow and activity pattern in wards procedure areas and operating theater	1. Yes ☐ 2. No ☐	

APPROVAL SHEET

This thesis is my original work in the partial fulfilment of the requirement for the degree of Master of Science in Neonatal Nursing.

Name: Feven Alemayehu

Signature: _____

Date: _____

Place: Addis Ababa University, College of Health Science, School of Nursing and Midwifery, Department of Nursing.

Date of submission:

This thesis has been submitted with my/our approval as university examiner or advisor(s).

_____	_____	_____
Examiner	**Signature**	**Date**

Advisors:

1. Mr. Yohannes Ayalew (RN, PHD fellow)

   Assistant professor

Signature:_____ **Date: _____**

2. Mr. Mekonen Adimasu (BSc, N, MSc, N)

   Lecturer

   Signature: _____ **Date: _____**

STATEMENT OF DECLARATION

By my signature below, I honestly declare and confirm this thesis is my own work. I have followed all the ethical principles in the preparation, data collection, data analysis and completion of this thesis. All scholarly matters that are included in this thesis have been given recognition through citation. I confirm that all sources have been cited and referenced.

This thesis is submitted in partial fulfillment of the requirement for a graduate degree from Addis Ababa University at College of Health Science School of Nursing and Midwifery Department of Nursing. The thesis will be deposited in the digital library of Addis Ababa University. I declare that this thesis has not been submitted to any other institution anywhere for the award of any academic degree, diploma or certificate.

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   Assistant professor

_____ _____

Name of Major Advisor Signature Date

2. Mr. Mekonen Adimasu (BSc, N, MSc, N)

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_____ _____