ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCES
SCHOOL OF NURSING AND MIDWIFERY
POST GRADUATE PROGRAM

INFECTION PREVENTION PRACTICE, ATTITUDE AND ASSOCIATED FACTORES AMONG NEONATAL INTENSIVE CARE UNIT HEALTH CARE WORKERS IN PUBLIC HOSPITALS IN ADDIS ABABA ETHIOPIA 2020.

BY: -AMINA NESRU (BSc)

A THESIS SUBMITTED TO THE NURSING DEPARTMENT COLLEGE OF HEALTH SCIENCES ADDIS ABABA UNIVERSITY, IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS OF SCIENCE IN NEONATAL NURSING.

JUNE, 2020
ADDIS ABABA, ETHIOPIA

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JUNE, 2020
ADDIS ABABA, ETHIOPIA

APPROVAL SHEET

ADDS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCE

SCHOOL OF NURSING AND MIDWIFERY

I, the undersigned MSc student, declare that I have submitted my original work on a title" Infection prevention practice, attitude and Associated factors among intensive care unit health care workers in public hospitals in Addis Ababa 2020 _____ for the examination.

Submitted by:

_____ _____ _____

Name of student Signature Date

This thesis work has been submitted for examination with my approval as an advisor.

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TABLE OF CONTENT

ABBREVIATION

AA	Addis Ababa
AAU	Addis Ababa University
BSc	Bachelor of Science
GMH	Gandhi Memorial Hospital
TASH	Tikur Anbessa specialized hospital.
ZMH	Zewditu memorial hospital.
SPMMCH	St. Paul Millennium Medical College Hospital.
NICU	Neonatal Intensive Care Unit
HCW	Health Care Worker.
GP	General Practitioner.
HCAI	Health Care Associated Infection
IPC	Infection Prevention Control
NI	Nosocomial Infection
CVC	Central Line Catheterization
MDRO	Multi Drug Resistance Organism
CDC	Centers for Disease Control and Prevention
CLABSI	Central Line Association Blood Stream Infection
PPE	Personal Protective Equipment
IPPS	Infection Prevention and A Patient Safety
ELBW	Extremely Low Birth Weight (<1500kg)
VLBW	Very Low Birth Weight (<2500kg)
HAI	Health Associated Infection
IP	Infection Prevention

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ABSTRACT

Background; Neonatal intensive care is an important part of the hospital and prone to infection. Patients in the neonatal intensive care unit (NICU) are at high risk for healthcare-associated infections. Nosocomial infections are one of the main causes of neonatal morbidity and mortality in low- and middle-income Countries. Little is known about the actual practice and attitude of health care workers in NICU.

Objective: To assess infection prevention practice, attitude and associated factors among NICU health care worker in public hospitals in Addis Ababa Ethiopia 2020.

Method: -facility -based cross-sectional study design was conducted from April 2020 to June 2020 GC in Addis Ababa among 172 health care workers Sample size was determined by census sampling method. Study participants were selected by using convenience sampling technique from 4 public hospitals in Addis Ababa. Data were collected using pre-tested interviewer administered structured questionnaire and adopted data collection tool used. Data were entered into Epi -data 3.1 and exported to SPSS version 25 for analysis. Bivariate and Multivariate logistic regression model was used to identify factors associated with infection prevention practices. result presented using odds ratios with their 95% confidence intervals. A p-value less than 0.05 will be used to declare statistical significance association between outcome and independent variable.

Result; Out of 172 NICU health care workers more than two third 116 (67.4%) of the study participants were found to have safe practice towards infection prevention activities. the rest 56(32.6%) health workers had unsafe practice toward infection prevention activities. Having isolation room who are admitted with highly contagious diseases, clean working environment, Presence of infection prevention committee, and IPPS training in wards were found to be significantly associated with IP practice. Regarding to their Attitude toward IP practice also 116(67.4%)and56(32.6%) had favorable and unfavorable attitude respectively. Profession type, managing traffic flow, hand washing supply had associated to their favorable attitude.

Conclusion; Majority of health care workers' practice and attitude toward Infection prevention and control measures in four public hospitals in Addis Ababa were good and safe practice of health care workers towards infection control.

Key word; Infection prevention, Practice, Attitude, Associated factor ;NICU health care worker.

INTRODUCTION

1.1 Background

Infection prevention and control refers to measures aimed to preventing and controlling infections and transmission of infections in health care setting on admission or may be acquired in health care settings or health care-associated infection(1).

A health care associated infection is an infection that occurs in a patient as a result of care at a healthcare facility and which was not present at the time of arrival at the facility. The term "health care associated infection" has replaced "nosocomial" or "hospital-acquired" infection as evidence has shown that these infections can affect patients in any setting where they receive health care(2).

To identify HAIs, a time frame for onset of an infection must be defined to distinguish an HAI from an infection acquired in the community .Centers for Disease Control and Prevention, defines HAIs as infections that begin on or later day 3 of hospitalization ,on the day of discharge, or on the day after discharge(3).

The increased burden of HCAI in low- and middle-income countries affects especially high-risk populations, such as patients admitted to ICUs and newborns. Rates of healthcare-acquired infections (HAI) in newborns are 20 times higher in resource-limited settings compared to developed country context, with inadequate environmental hygiene and low adherence to infection prevention and control mentioned as potential explanations (4).

The nosocomial infection rate in NICUs has increased over the past several years most reports from the Western world indicate that the incidence ranges from 6%to 25% with a significant variation by birth weight of the babies and treatment condition. A study by the European Group for instance found an infection rate of 7%in seven NICUs, while some workers in Poland reported a higher incidence of 38.5%. In the Middle East, an incidence of 13.7 infections per1000 patient days was recorded in a hospital in Saudi Arabia. Elsewhere in Far East Asia, an incidence of 25.3% was observed by other investigators in Japan(5).

Among hospital-born babies, these infections are responsible for 4%to 56% of all causes of death in the neonatal period, with three quarters occurring in the South-East Asia Region and sub-Saharan Africa(6).

According to the United Nations (UN) mortality estimate in 2013, the neonatal mortality rate in Ethiopia was 28 per 1000 live births. Even though there is an achievement observed in the reduction of neonatal mortality by 48%, still neonatal mortality is high. According to (EDHS) 2011 it ranges from as low as 53/1000 live births in Addis Ababa to as high as 169/1000 live births in Benishangul- Gumuz region(7).

Adherence to Infection prevention practices is the key to preventing and reducing the rate of healthcare associated infection. Intensive care unit health care professionals have the responsibility to protect critically ill patients against infection especially those who are immune compromised, in order to enhance their recovery, prevent deterioration of their health, and achieve high quality nursing care. Therefore, critical care health professionals should have familiarity with and adhere strictly to standard precautions to prevent infections (8).

Several studies have shown varying tendencies in practice about infection control based on a group of HAI and their years of experience. Recent literature also documents differences of actual awareness of infection transmission and control, its understanding and application by (9)

Internationally, it is essential that effective infection prevention strategies are implemented in the provision of health care in order to achieve optimum response to disease outbreaks and by extension overall patient care and protection of health care associated infections from occupational risk of contracting diseases(10)

Nosocomial infections are a common occurrence in the neonatal intensive care unit. Hand hygiene, invasive procedures and Central venous catheterization has been associated with nosocomial infection. staff education can reduce central venous catheter–related nosocomial infection rates(11).

1.2 Statement of the problem

Healthcare-acquired infections (HAIs) are a common universal challenge mainly in low and middle- income countries. An estimated 10% of hospitalized patients in developed countries and 25% in developing countries develop HAIs which subsequently result in adverse healthcare outcomes such as increased morbidity, and mortality. Prolonged hospital stays and a significant economic burden. the frequency of HAIs is an unevenly distributed more than 90% of these infections occur in developing countries(11).

Nosocomial infections may involve any organ; however, blood, urinary tract, surgical wounds, and the lower respiratory tract are more frequently involved as compared with other organs. Various factors such as prematurity, low birth weight, prolonged hospitalization, use of broad-spectrum antibiotics, and particularly the use of invasive procedures such as intubation, ventricular shunt, intra-vascular catheter, and parenteral nutrition with fat emulsions facilitate the development of such infections, and increase their incidence (12).

Variations in definitions and reporting mean that exact global burden of HAIs is difficult to quantify but Higher incidence in NICUs than other ICUs because of unique vulnerabilities of neonates and environmental risk factors specific to NICUs (13).

Globally, newborn deaths account for 45% of under-five deaths Three-quarters of newborn deaths result from three preventable and treatable conditions including prematurity, events during childbirth and neonatal infections (14).

Neonatal infection contributes substantially to neonatal morbidity and mortality and is an ongoing major global public health challenge. According to the World Health Organization (WHO), four million newborn children die each year during the first four weeks of their lives. Of these, 75% die prematurely during the first week of life. The major causes of neonatal deaths globally were estimated to be infections (35%),(15).

In sub-Saharan Africa, 1.2 million babies die before they reach 28 days of life and the major newborn killer in Ethiopia, which accounts for more than one-third (33%) of neonatal deaths of the deaths are due to nosocomial infections (16).

Neonatal infection is an important cause of morbidity and mortality among neonates in developing countries accounting for 30-50% of total deaths each year. Childhood mortality is often used as broad indicator of the social development or a specific indicator of health conditions of a country (17).

Associated with high mortality, morbidity and treatment costs which pose as barriers to improving health seeking behavior Low-cost, “bundled” interventions using systems quality improvement approaches for improved infection control are needed especially neonatal intensive care unit more at risk and need more study and attention (18) .

Nosocomial infections are an important cause of mortality in neonatal intensive care units (NICUs). The aim of this study is to asses practice, attitude and associated factors of NICU health worker towards infection prevention.

1.3 Significance of the study

In developing countries, especially in Africa, the occurrence of neonatal nosocomial infection is the primary cause of neonatal morbidity and mortality as well as the healthcare professional are confirmed means of passage of transmitting pathogenic microbes within the neonatal intensive care units and need attention to simple preventive strategies which focus on Evidence based practice and good attitude toward infection prevention is the only way to reduce neonatal mortality due to infection. Newborn are the future hope of a family and a country at large. So, they need care and attention to their health and wellbeing.

Since the study focuses on, practice and attitude of neonatal intensive care unit health professional toward infection prevention. the study is helpful to plan preventive measures and provision of effective preventive care for health professionals. and will be the result; for hospitals concerning practice and attitude also the HCW will be able to do their practice and attitude status and to put their effort and upgrade them to the future of toward infection prevention of NICU health worker.

Ministry of health also will able to use the result to plan appropriate interventions. policy maker also can use it to generate a new policy and researchers will use as a baseline data while they want to do further studies on it.

2. LITERATURE REVIEW

2.1 Overall prevalence of health care associated infection in NICU.

Healthcare-associated infection is a common problem in patients from neonatal intensive care units and it is one of the leading causes of death in this group of patients. the rate of healthcare-associated infections (HAIs) increases with decreasing gestational age and birth weight. (18).

The health care associated infection rate in NICUs has increased over the past several years; most reports from the Western world indicates that the incidence ranges from 6%to 25% with significant variation related to gestational age ,birth weight and the general condition of the infants and the treatment required (7).

In united states of America 1.7 million annually, causing approximately 99,000 deaths and severe morbidity and 33,000 infants are diagnosed with HAI each year in NICUs (19).

A study by the European Study Group found an infection rate of 7%in seven NICUs, while some workers in Poland reported a higher incidence of 38.5%. In the Middle East, an incidence of 13.7 infections per1000 patient days was recorded in a hospital in Saudi Arabia. Elsewhere in Far East Asia, an incidence of 25.3%was observed by other investigators in Japan.(2).

In developing countries, especially in Africa, the incidence of neonatal nosocomial infections even though several factors promote the high incidence rates of these infections generally reported in all NICU admissions (20).

The inconsistency in infection rates has been attributed to gestational age, distribution of neonates surveyed for the report, and the specific environment and care practices (21).

These statistical data clearly indicate a disparity in the global picture of these infections as the burden appears to weigh more in resource-limited countries than in developed countries. The incidence of neonatal nosocomial infections managed in NICU is inversely proportional to gestational age and birth weight. In neonates with birth weight less than 1.5kg, it ranges from 5 to 32%; in those weighing less than 1kg, it rises to 40% and up to 46% in babies born before the third trimester (5).

According to the current united nation estimate, the neonatal death reduced by 48% from the 1990 estimate to 28 per 1000 live births in 2013 while the reduction rate of under-five mortality rate was about 67% (6).

The16 EDHS reported that neonatal mortality rate is 29/1000 live birth, which has a reduction from the 2005 EDHS report of 39/1000 live births and 2011EDHS report of 37/1000 live birth. The common causes of neonatal mortality in Ethiopia are infection, asphyxia, and preterm birth (21).

In fact, among several risk factors identified for these infections in NICUs, birth weight appears to be the most important risk factor this observation is supported by several studies which indicate that the risk of nosocomial infection increases with reduction in birth weight(13).

Etiology of infections amongst newborns across the placenta, mothers birth canal environment with in health care facility by this source Gram-negative organisms (e.g. klebsella pneumonia) often multidrug resistant (MDR), opportunistic infections (e.g., coagulase-negative Staphylococcus spp.) and gastrointestinal infections (13).

Lower birth weight, younger gestational age, immune compromised neonate, co-morbidities [congenital anomalies]it can be risk factors for neonatal infection health care-related risk factors that increase the risk of infection in Intensive care stays are, poor hand hygiene practice, lack of IP guide line, shortage of PPE, unsafe injection, Presence of invasive medical devices, Antimicrobial therapy which may lead to multiple drug resistance organism (MDRO) infections, Overcrowding and Understaffing Ward layout (sinks, bed spacing), Contact with colonized/ infected family, visitors, or healthcare workers, Proximity of colonized neonates. Increased length of stay (22).

Central Line Associated Blood Stream Infections, Ventilator Associated Pneumonia, Catheter Associated Urinary Tract Infection, Surgical Site Infection are the main types of neonatal infection in Low and Middle Income Countries Hospital-born babies in are at ↑risk of infections given poor infection-control practices. About70% resistant to ampicillin and gentamicin and many might be untreatable (4).

2.2 Practice and Attitude of NICU health care workers toward infection prevention:

poor practice and undesirable attitude of NICU health care workers for infection prevention are a major cause of increasing morbidity, mortality, and health care costs among hospitalized patients worldwide. Good infection prevention practice is mandatory to prevent the transmission of health care associated infections especially where infectious diseases rate high like intensive care unit. Hand washing compliance among health professionals in general is low especially in developing countries like Ethiopia (23).

Good practicing regarding standard precautions is the most important way to control the hospital infections. due to the critical role of HCW in patient care, they should have essential and updated information regarding infection prevention control among nurses and other professional's in neonatal units (24).

Standard precautions include certain measures such as hand hygiene, sharps safety, staff health, use of personal protective equipment (PPE), equipment safety, single use policy, waste management and environmental cleaning. Many infection control measures, such as appropriate hand hygiene and the correct application of basic precautions during invasive procedures are simple and of low-cost, but require staff accountability and behavioral change, in addition to improving staff education, reporting and surveillance systems (25).

Improved compliance in hand hygiene with standard alcohol-based rub can reduce the rate of nosocomial infections by as much as 40%. Hand hygiene was frequently done using with soap and water or antiseptic solution. This was confirmed by 91.3% of casual workers, 75% of nurses, 71.4% laboratory staff as well as support staff and 57.1% of clinicians (26).

A study conducted in Egypt in 2014 showed that Implementing standard precautions like safety injection, isolation precautions (contact, droplet, and airborne precautions) decreases the risk of nosocomial infections and the need for invasive procedures increases (27).

The practice of health care worker is still low. this problem is exacerbated in resource limited settings, like Nepal south Asia, Africa. HCAI remain a major cause of preventable morbidity and mortality in developing countries where infection rates are relatively higher due to poor infection control practices and overcrowding of hospitals (28).

Infection control practice and attitude among Nepalese HCWs in the attitude section, only 46 of the HCWs (14%) answered all of the questions correctly The nurses were more fearful of becoming infected and more likely to believe that infected patients should be treated only in specialist centers. Overall, 70% of those reported compliance with hand washing, but only 56% of the doctors washed their hands before or after patient examination. There was poor adherence with wearing protective clothing, including protective aprons (33%)or masks (47%) in situations carrying a high risk of splashed blood or body fluids. Recapping of used needles on a regular basis was reported by 91%of the doctors, but only 69% of the nurses (P , .001) (29).

The proportion of HCAIs are much higher in sub-Saharan Africa 18.9% in Mali, 14.8%, in Tanzania, 9.8% in Algeria and 14.90%, in Ethiopia and the majority of healthcare adherence towards infection prevention practice is still very low. For this, improving the practice and attitude of healthcare workers towards infection prevention is paramount to reduce the burden of HAIs (30).

A study done in General Hospital Ikot Ekpene AkwaIbom State, Nigeria, revealed that Observations on the practice of hand washing revealed that 42.2% of respondents always practiced hand washing and 34.3% practiced occasionally, while 23.5% never practiced hand washing (31).

In an observational study conducted among health professionals in a Tertiary Hospital in Ghana, a hand washing compliance rate ranging from 9.2% to 57% among doctors and 9.6% to 54% among nurses was reported (32).

Alike other African countries, HCAI in Ethiopia is a major public health problem with adherence to the precautions of infection prevention practices among HCWs is questionable and not addressed well Conversely, the Federal Ministry of Health (FMOH) of Ethiopia undertook a multitude of initiatives to protect patients and HCWs by setting standards and guidelines Although, in many healthcare settings, resources are constrained and control of the risk of acquiring HCAIs is a bit challenging and HCWs lack adequate knowledge and motivation to implement the recommended infection prevention practice(33).

Hand washing compliance among health professionals in general is unacceptably low especially in developing countries like Ethiopia (range, 5%–89%; average, 38.7%)(34).

A study indicated in Jimma University Hospital in Southwest Ethiopia also showed that hand washing practice by the nursing staff was inadequate. This study demonstrated that only 43.2% of the nursing staff practice adequate hand washing while 56.8% of them practice inadequate handwashing (35).

A study done in 2011 by Night project and Engender Health in Ethiopia showed that health care workers do not usually wash their hands on arrival to work place before putting on gloves(23).

A study conducted in Health Institutions of Bahir Dar City Administration showed that 82.5% of health professionals had hand hygiene practice after completing the procedure they perform and about 50.8% wash their hand before the procedure. The overall hand hygiene practice score was 69.0% (36).

A study done in healthcare facilities of West Arsi District, Southeast Ethiopia: a facility-based cross-sectional revealed, knowledge and practice of HCW 53.7% and 36.3% 32.4, of the respondents were assessed as knowledgeable and reported safe infection prevention practices respectively (40).

Another study done in Northwest Ethiopia health care workers in Debre Markos referral hospital, 86 (57.3%) of respondents demonstrated a good practice on infection prevention (12).

2.3 Factors influencing practice and attitude of NICU health care workers toward infection prevention:

Factors that may influence practice and attitude toward infection prevention have been determined objectively in several epidemiological and observational studies. Predicting variables include educational status, professional category, and year of work experience, working in an intensive-care unit, sex of the participants, availability of personal protective equipment and ever taking training on infection prevention methods were factors which were significantly associated with practice about infection prevention (11, 37).

In the bivariate analysis, age, service years, sex of the participants, and educational level were found to be significantly associated with practice of surgical site infection prevention activities. However, only age, sex, and educational level of the participants were found to be significantly associated in the multivariate analysis. Female nurses were about 2 times more likely to practice surgical site infection prevention activities as compared to male nurses (AOR = 2.35, 95% CI: 1.58, 3.50). Those nurses who are 30 years or older were about 2 times more likely to practice surgical site infection prevention actives as compared to those who are less than 30 years old (AOR = 1.79,95% CI: 1.08, 2.97) (38).

The presence of infection prevention guidelines, and having ever taken ever taking training on infection prevention were found to be significantly associated in the multivariable logistic regression analysis. Healthcare workers who have infection prevention guidelines available were 3.34 times more likely to practice safely infection prevention compared to those who do not have guideline for their practice (AOR = 3.34, 95% CI: 1.65, 6.76). In addition, healthcare workers who have ever taken training on infection prevention were about 5.31 times more likely to practice safe infection prevention than those who have not received training (AOR = 5.31, 95% CI: 2.42,11.63) (39).

According to multiple regression analysis of this study, available supply of infection prevention increases the utilization of those supplies for the prevention of Hospital-acquired infections, Heath care workers who get an available supply of infection prevention (as soap, mask, and infection prevention guideline) had higher odds of practiced infection prevention activities (AOR= 2.156, 95%. CI = [1.90–4.357]) than those healthcare works can’t get infection prevention supplies and this study revealed that healthcare workers with an educational level of MSc or above were four times (AOR = 4.15, 95%, CI = [1.381–7.41])

more likely practice infection prevention activities than those healthcare works with diploma professionals and BSC holders were two times (AOR = 1.959, 95%, CI = [1.970–4.685]) more likely practiced infection prevention activities than those healthcare works with diploma professionals in respectively(11).

High patient-to-nurse ratio, Lack of trained IPC practitioners and limited opportunities for staff training interference with HCW–patient relationships, lack infection prevention control guidelines, and lack of awareness of the risk of cross-transmission of pathogens, high workload and understaffing, lack of role models and lack of scientific information showing a definitive impact of on HAI rates (38).

A shortage of health-care workers is an important constraint in sub-Saharan Africa where more than 24% of the global burden of disease occurs and where only 3% of the world′s health-care workers are employed (20).

Environmental risk factors associated with the transmission of infections are significant and related to seasonal changes (40).

2.4 Studies Related to Practice and Attitude of health workers:

Different published studies were show about infection prevention of health workers knowledge, attitude and practice together. I try to review only practice and attitude part of health care workers.

The study Published by: The University of Chicago revealed that, a disconnect existed between central venous catheters (CVC) knowledge HCWs did not know the relationship between bacterial hand counts and rings and fingernail s, and did not believe rings or long or artificial fingernails increased the risk of Nis (41).

The study conducted in Atlanta USA responded (response rate 47.3%). illustrated heterogeneity of CLABSI and MRSA prevention knowledge and practices and underscores the need for further research to define optimal strategies and evidence-based prevention recommendations for neonates (9).

The study done in Northwestern Nigeria found Knowledge and practices of infection control among healthcare workers are a cross-sectional study. Found that doctors; 174/198 (87.9% with nurses having better knowledge 139/152 (91%) About 52% of doctors and 76% always practice hand hygiene in between patient care and concluded that unsatisfactory (42).

The study done in Amhara Regional Ethiopia, the study showed that more than half of the nurses who participated in the survey had inadequate knowledge about the prevention of infection. Moreover, more than half of them were practicing inappropriately (38).

A Study conducted in Afar region, Ethiopia found that majority, 60 (65.9%), of them were knowledgeable and 31 (34.1%) were not knowledgeable. However, the majority of health professionals, 51 (56.0%), had poor practice and 40 (43.0%) of them had good practice of hand washing (23).

Study done at 2 university hospitals in Addis Ababa, Ethiopia HCWs**.** Knowledge Attitude and practice were completed by physicians (51%) and nurses (49%). While hand hygiene knowledge was fair, self-reported practice was suboptimal.(43).

Another study in Addis Ababa from 30 governmental healthcare facilities found that Two-third of (66.1%), the healthcare workers had good infection prevention practices. having positive attitude towards infection prevention practices (37).

2.5 Conceptual frame work

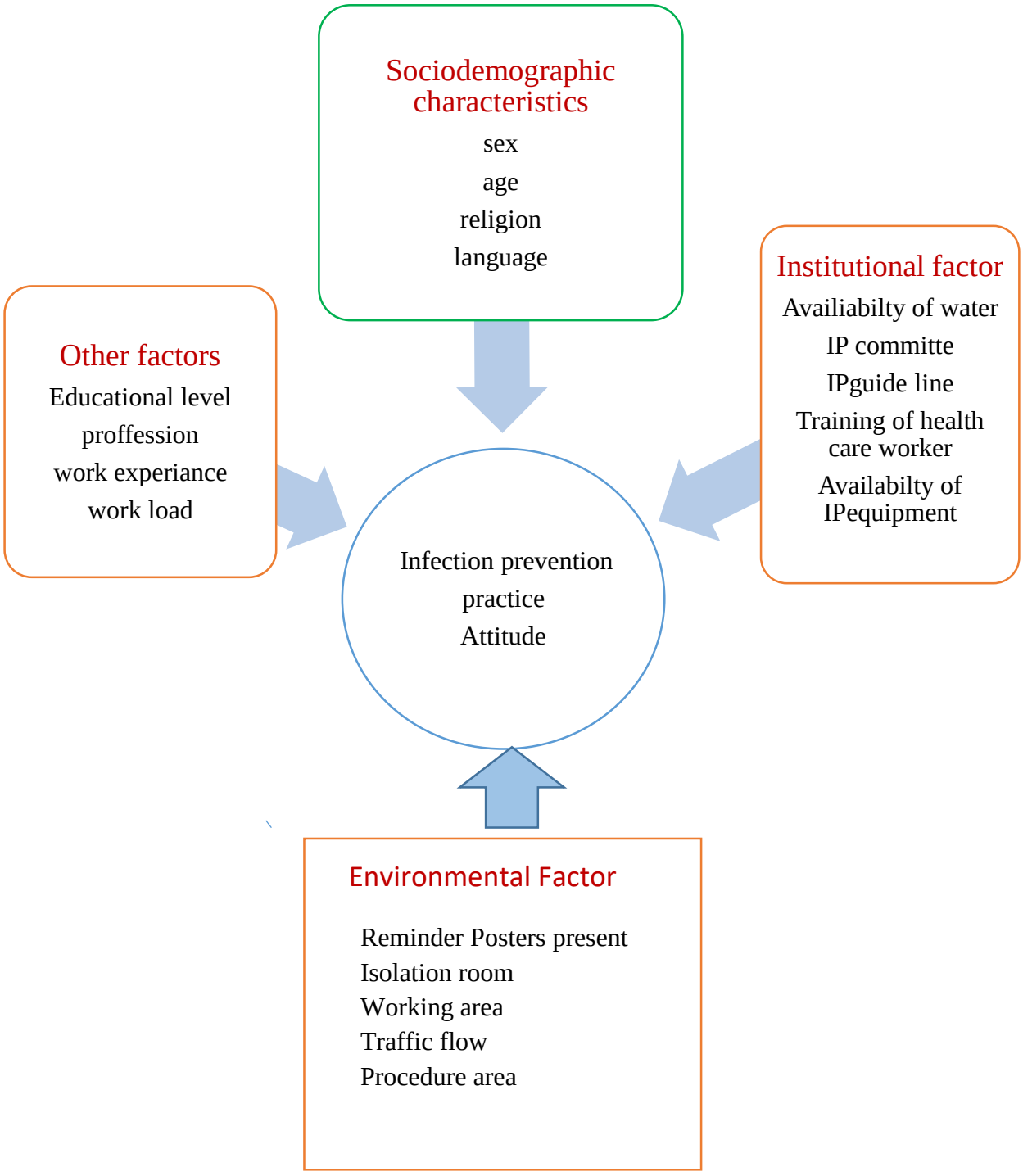


FIGURE 1: SCHEMATIC PRESENTATION OF CONCEPTUAL FRAMEWORK OF NURSES PRACTICE AND KNOWLEDGE……INFECTION PREVENTION THAT IS ADAPTED FROM DIFFERENT LITERATURES (44, 45).

3. OBJECTIVE

3.1 General objective

- To assess practice, attitude and associated factors of infection prevention among neonatal intensive care unit health care worker in public hospitals in Addis Ababa Ethiopia, 2020 GC.

3.2 Specific objective

- To assess practice of health care workers toward infection prevention working in NICU public hospitals in Addis Ababa, Ethiopia, 2020 GC.
- To determine attitude of health care workers toward infection prevention working in NICU public hospitals Addis Ababa, Ethiopia, 2020 GC.
- To identify' factors affecting practice of health workers to ward infection prevention in NICU public hospitals Addis Ababa, Ethiopia, 2020 GC.
- To identify factors affecting attitude of health workers to ward infection prevention NICU public hospitals Addis Ababa, Ethiopia, 2020 GC.

4 METHOD AND MATERIALS

4.1 Study area and period

This study was conducted in Addis Ababa, the capital city of Ethiopia. There are a total of thirteen public hospitals in the city. Out of which ten have NICU, > these four hospitals were selected using simple random lottery method., namely: Tikur Anbesa Specialized Hospital (TASH),), Gandhi Memorial Hospital (GMH) and St. Paul Hospital. (SPMMCH) and Zewditu Memorial Hospital (ZMH) from march 2020 to April 2020.

Addis Ababa has a population of 3,475,952 according to the 2007E.C. Its area is estimated to be 530 km2With altitudes ranging from 2,200 to 3,000m above mean sea level.

The city has an average temperature of 22.8°C and average rainfall of 1,180.4 mm. It has 41 hospitals (13 governmental and 28 NGO and private) 29 health centers, 122 health stations, 37 health posts and 382 modern private clinics.

Tikur Anbessa Specialized Hospital is one of the referral hospitals which has its own pediatric and Neonatal ICU and OBS-GNY. Nurses 35 intern 8 resident 6 and 1 neonatologist working in Neonatal intensive care unit. The neonatal care unit, which is functional and provides service for both babies born in the hospital and in other hospitals and brought for care.

St. Paul Hospital Millennium Medical College is a referral hospital in Addis Ababa. It was built by the Emperor Haile Selassie in 1961, with the help of the German Evangelical Church. The hospital was established to serve the economically under privileged population, providing Services free of charge to about 75% of its patients. In 2007, it became a medical college and its core services include the provision of medical care, teaching and research. It provides medical specialty services to an estimated number of 110,000 people annually who are referred from all over the country with its own NICU and OBS-GNY department. 49 nurse,5 residents 3 intern, total of 57 workers in Neonatal intensive care unit.

Zewditu Memorial Hospital is found in Addis Ababa, Ethiopia and it is one of the largest referral hospitals. It was founded in 1976 E.C. It has NICU and OBS-GNY department. In NICU there are 25 nurses, 5GP, 4 interns. a total of 34.

Gandhi Memorial Hospital was founded in 1948. It was purposely built for maternity and baby care. In Neonatal intensive care unit and labor ward Gandhi Memorial hospital is a

governmental hospital which specializes in maternity services. The hospital was established in 1951E.c. The hospital daily manages 30 -40 delivery cases of pregnant mothers who come from various corners of Addis Ababa and nearby towns. there are 24nurse, 8 intern,4GP, 5 residents, a total of 41.

4.2 Study design

Health facility-based cross-sectional study was conducted in selected public hospitals of Addis Ababa, Ethiopia.

4.3 Source and Study Population

4.3.1 Source of Population

The source of populations was all HCW working neonatal intensive care unit

4.3.2 Study Population

ALL HCW working in selected public hospitals Namely, Tikur Anbesa Specialized Hospital (TASH), Zewditu Memorial Hospital (ZMH), Gandhi Memorial hospital. (GMH) and St. Paul millennium medical college (SPMMCH) Hospital.

4.4 Eligibility criteria

4.4.1 Inclusion criteria:

- All HCW who were working in neonatal intensive care unit of at selected hospitals.

4.4.2 Exclusion criteria

Some HCW was excluded from the study because of the following:

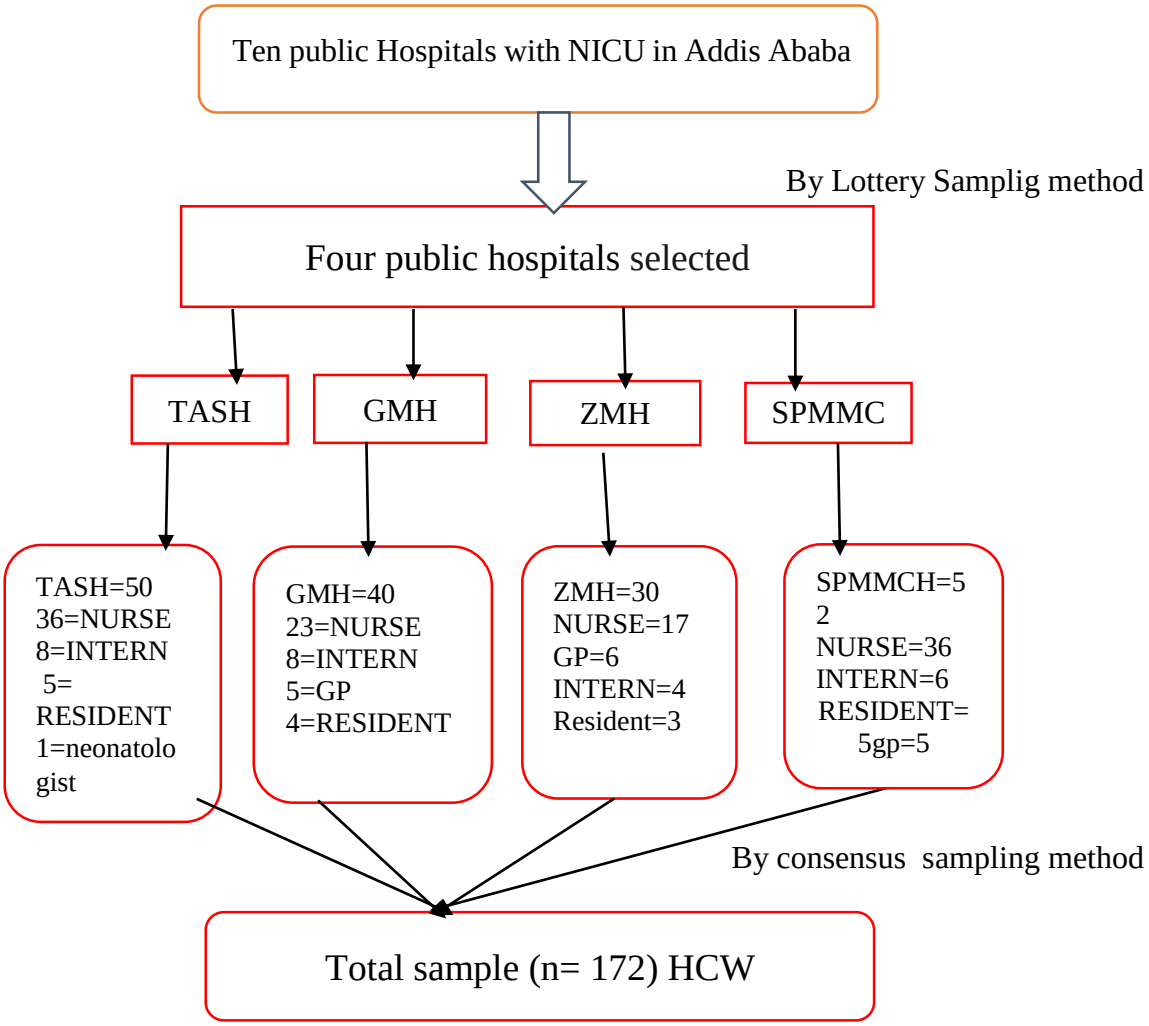
- HCW who did not give consent were excluded from the study.

4.5 Sample size determination

The sample size was determined by taking all samples collected from nurses, interns, residents, and GP working in neonatal intensive care unit, the sample size was determined by census sampling method. all the number of study population which is 182 health workers. So, it is convenience sampling technique.

4.5.1 Sampling procedure

To select the study area from the total of thirteen public hospitals those have NICU, four hospitals TASH, ZMH, GMH and St. Paul hospitals were selected by simple random lottery method. by using Consensus sampling method total number of NICU health worker form selected hospital was participated in this study.



KEY:

SPMMCH=St paoul millinium medical colledge and hospital

TASH=Tikur Anbesa specialized hospital

GMH=Gandhi memorial hospital

ZMH=Zewditu memorial hospital

Figure 2; Schematic presentation of sampling procedure the study.

4.5.2 Data collection tools and procedure

Data was collected by using pretested, structured self-administered questionnaire which consists of socio-demographic information and attitude. Their practice level was collected by observation using check list. the questionnaire is adopted and modified from WHO tool assessment guide line and prepared in English version. the questionnaire has three parts, which contains: -

Part I- 8 Questions of socio-demographic characteristics and other factors, (6, 29).

Part II- 15 question of related to attitude of nurses interns and residents on infection prevention (24, 37, 46, 47).

Part III- 30 question practice of nurses and intern, and residents on infection prevention (1, 24, 46-53).**Part IV -10** questions to assess environmental and health facility related factors (25, 48-55).

part II and **part III** questions are measure the health care workers attitude and practice of infection prevention and scoring equal and above the mean , safe practice and attitude, scoring below the mean, unsafe practice and attitude.

Four data collector were trained BSC holder nurses with 2 BSc nurse supervisors. Training was given for two days on clarification of some terms and assessment tools, aim of the study, concerning need on strict Confidentiality of respondent's information, time of data collection, timely collection and Reorganization of the collected data from respective hospitals and submission on time.

The questionnaires were filled by HCW working in NICU except practices part that done by observation of assigned supervisor. Data were collected form March 2020-April 2020.

4 .6 Study Variables and measurement

4.6 1 Dependent variables

- Attitude
- Practice

4.6.2 Independent variables

- Socio-demographic data.
- Sex
- Age
- language
- profession
- Availability of IP guide line
- Availability of IP committee
- Availability of water
- Educational status/profession
- Nurse patient ratio
- Availability of PPE equipment
- In- service training
- Experience of health workers

HCW' attitude towards infection prevention in NICU was measured by 15 five point Likert scale questioners. Attitude scores were summed up out of 75 points. A total score ranges from 0-75 were collapsed in to favorable and unfavorable attitude using mean as a cut-off point (12,40).

The study participants infection prevention practice was measured by 30 items observed by checklist recorded as correct (coded 1)and incorrect (coded 0) as practiced by the professionals. Finally, the total score of observed practice were categorized as safe and unsafe using mean as cut off value (38,40).

4.6.3 Operational Definition

Practice is defined as an act of performing given procedure(s) according to a set standard. Scores less than the mean score were considered un satisfactory (unsafe) practices & scores from equal and above the mean are considered safe practice(satisfactory) this operational definition works for all. adapted from similar studies(8, 29).

Safe practice: study participants who were observed performing correct practices.>=the mean score of the recommended infection prevention practice are said to have safe practice.

Unsafe practice: study participants who were performed to the practice questions < the mean score of the recommended infection prevention practice are said to have unsafe practice.

Favorable attitude: - Those responded correctly > = the mean for attitude questions.

Un favorable attitude: -HCW those responded correctly < the mean for attitude questions

Neonatal Intensive Care Unit: the room where very sick neonates are treated and given care.

Neonate: the baby after delivery up to 28 days.

Nosocomial infection= Infection that is not present or incubating when the patient arrives at the hospital, but is acquired in the hospital from other patients, health workers, or the environment.

4.7 Data quality control

Carefully designed questionnaire was adopted for data collection, and pretest was done to the questionnaire is pretested 5% at Y/12/M/H on the sample size of ten by asking participants to fill the questionnaire.

The questioner prepared in English language Based on the test result, some questions and abbreviations was excluded from the questionnaire used during research data collection.

4.7.1 Data Processing and Analysis

Data were verified, coded and entered to Epi Data Info Software and then exported and analyzed by SPSS version 25 Software. It is processed by carrying out simple descriptive statistics using frequency, percentage, and central tendency were conducted. and bivariate analysis was carried out to describe association between pairs of variable, Factors which are significant for bivariate association was observed with p- value < 0.05 and were retained for subsequent multivariate analysis using logistic regression to control for possible confounders and 95% CI are used to determine the significance of the associations.

4.7.2 Ethical Consideration

Ethical clerance was obtained from researsh ethics commite of the schoolof nursing and midwifriy . permission was obtaiend Addis Ababa public health research and emergency management directorate .After clerance from IRB of theschool. the hospitals were informed about objective of the study through a support letter from AAU. And written permission was obtaiend from the hospital administration before starting data collection .Information sheet was provided to the participants and their consent was obtained by signing on the questionnaire. The investigator was assuerd their right to stop at any time. For confidentiality purpose, the name of the participants was not included in the questionnaire. The participants have the right to stop filling the questionnaire, jump any questions they wanted to and answer whatever they feel right.

4.7.3 Dissemination of the Results

The results of this study will be disseminated or communicated to Addis Ababa public health research and emergency management directorate. University of Addis Ababa College of Health Science, Department of nursing and midwifery, Addis Ababa health Bureau,Federal Ministry of health, Governmental hospital of Addis Ababa, local institutions and other concerned bodies through publication on appropriate journal. Effort will be made to presenton professional association meetings.

5 RESULT

5.1 Socio demographic characteristics of the study participants

A total of 172 health professionals were participated in the study from 182 invited participants with a response rate of (94%) the ratio of health workers to hospitals distribution was TASH 50(29.1%), GMH 40 (23.3%), SPMMCH 52(30.2%) ZMH 30 (17.4%) represented respectively Majority,126 (75%) were female, and 43 (25%) were male and almost near to half, 74 (43%) were in the age group between 25 and 29 years old. The mean age of the respondents was 29.26 (SD ± 6.14) (95% CI;28,35-30.15) Concerning the professional categories of respondents 111 (69.5%) were nurses, 26(15%) were interns,16(9.3%) were general practioner,19((11%) were Residents.

Their marital status of 91 (52.9%) were single and79 (45.9%) were married, 1.2% widowed.

A higher proportion 129 (75%) of the respondents was first degree and 111 (64.5%) of healthcare workers were nurses among the total respondents, all HCW of them were from NICU department.

Regarding the work experience of the respondents, majority (65%) of the respondents had 1 to 5 years of experience, 20 % had 5-10 years of experience and 15% of the respondents had work experience more than 10 years. The mean age of work experience was 5.6 years.

TABLE 1 ; SOCIO DEMOGRAPHIC CHARACTERISTICS OF NICU HCW IN PUBLIC HOSPITALS IN ADDIS ABABA 2020.(N=172)

Variables	Age category	frequency	Percentage %
Age	20-24	30	17.4%
	25-29	74	43%
	30-34	43	25%
	>35	25	14.6%
Sex	Male	43	25%
	female	126	75%
Educational level	Under graduate	28	16.1%
	First degree	129	75%
	MSC and above	15	8.1%
Profession	Intern	26	15.1%
	Nurse	111	64.5%
	GP	16	9.3%
	Resident	19	11%
Marital status	Single	91	52.9%
	Married	79	45.9%
	Widowed	2	1.2%
Language	Amharic	153	89%
	Oromiffa	9	5.2%
	Other	3	1.7%
Experience(year)	1-4	99	57.6%
	5-10 year	55	32%
	10 -15 year	12	7%
	>=20 year	6	3.5%
Working Area	TASH	50	(29.1%),
	GMH	40	(23.3%),
	SPMMCH	52	(30.2%)
	ZMH	30	(17.4%)
Had taken IP training	Yes	105	(61%)
	No	67	(39%)

5.2 Practice of NICU health care workers towards infection prevention in Public hospitals Addis Ababa 2020.

The mean score of the correct practice was 22.92 (SD ± 6.223) In this study, the proportion of healthcare workers who had safe practice towards infection prevention activities was found to be 116 (67.4%) (95%CI;60.5-74.4), the rest 56 (32.6%) (25.6-39.5) had unsafe practice infection prevention practice among the study participants.

Regarding of hand washing 123.8(72%) of them well practiced hand washing, remove jewelers (43%), during washing (74.4%) applying the correct technique with soap before patient care, 132(76.5%) health care workers Applying PPE during procedure, 147(85.5%) practice of safe injection, IV fluid preparation and medication. 107(62%) Prevention of needle stick injury and waste management health care workers were practiced.

Regarding to sociodemographic characteristic Participants with the age of >=25(83.9%), female participants (71.3%) those who had 5-10 years of work experience (83.3%), Educational level those had first degree (73.6%), married participants (75.9%) had high score of safe practice of infection prevention. in type of profession nurses 79.3% were had safe practice than the other profession (table 2).

TABLE 2 ; PRACTICE OF NICU HEALTH CARE WORKERS TO WARD INFECTION PREVENTION IN PUBLIC HOSPITALS ADDIS ABABA 2020(N=172)

Variables		practice	
		Yes	No
1	Removal of watches and jewelry during hand wash	74(43%)	98(57%)
2	Apply correct technique for hand hygiene	128(74.4%)	44(25.6%)
3	Apply antiseptic hand rub to clean hands	152(87.8%)	21(12.2%)
4	Changing gloves between patients	140(81.4%)	32(18.6%)
5	Wash hands with detergent before and after patient care	126(73.3%)	46(26.7%)
6	use cover gloves for each patient or any point of care?	118(68.6%)	54(31.4%)
7	Use cover gowns inside NICU	152(88.4%)	20(11.6%)
8	Use face masks for invasive procedure.	118(68.6%)	54(31.4%)
9	Care with suction of respiratory tract	117(68%)	55(32%)
10	Use alcohol or antiseptic after patient care.	154(89.5%)	18(10.5%)
11	Use aseptic technique when preparing and delivering injection and fluid preparation	137(79.7%)	35(20.3)
12	Medications and fluids are prepared in a clean area free from contamination or contact with blood, body fluids, or contaminated equipment.	140(81.4%)	32(18.6%)
13	Follow product-specific recommendation for use, storage and handling.	135(78.5%)	37(21.5%)
14	Is the medication preparation area free of opened single dose vials or opened single use containers?	141(82%)	31(18.0%)
15	If open multi-dose vials are present, are they dated and within the Beyond Use Date	123(71.5%)	49(28.5%)

	(BUD) and the manufacturer's expiration period?		
16	Review and re-prescribe intravenous fluids at least every 24 hours	154(89.5%)	18(10.5%)
17	Inspect for and discard medications with visible contamination or breaches of integrity (e.g. Cracks, leaks).	152(90.1%)	17(9.9%)
18	Each intravenous fluid order is valid for administration of a single bag of fluid, re-spike or re-hang an intravenous fluid bag	120(69.8%)	52(30.2%)
19	During fluid administration patient identification	167(97.1%)	5(2.9%)
20	the patency of the intravenous access	149(86.8%)	23(13.4%)
21	check type of intravenous fluid	167(97.1%)	5(2.9%)
22	calculated rate, pump settings	167(97.1%)	5(2.9%)
23	recent pathology results	159(92.4%)	13(7.6%)
24	Anticipate and take measures to prevent sudden patient movement during and after injection.	142(82.6%)	30(17.4%)
25	Recap used needles before disposal	80(46.5%)	92(53.5%)
26	Marking the fill line at the three quarters full level.	91(52.9%)	81(47.1%)
27	Are sharps containers positioned at 52" to 56" above floor?	95(55.2%)	77(44.8%)
28	place containers in high traffic areas (corridors outside patient rooms or procedure rooms)	87(50.6%)	85(49.4%)
29	discard sharp materials separately from other wastes	147(85.5%)	25(14.5%)
30	Treat infectious wastes with appropriate disinfectants	108(62.8%)	64(37.2%)

5.3 Attitude of NICU Health care workers toward Infection Prevention in Public Hospitals Addis Ababa 2020.

The Attitudes among HCWs about infection prevention in this study, fifteen questions were posed to the participants. The responses or findings are showed that 116 (67.4%) (95% CI25.6-39.5) of the workers had a favorable attitude towards infection prevention, while, 56 (32.4%) of workers had unfavorable attitude. the mean score 53.5 (SD ±10.0) out of 75score.

Overall, as per the socio-demographic variables, this study showed that there is variation between age, work experience sex, profession and educational level. in terms of age those who are >=25 age had 87%, above >=5years work experience had 79%, from profession Interns had 84.6% and male participants had 76.7%, regarding to educational level those have masters and above had 86.7%, and married respondents79.7%, had favorable attitude.

TABLE 3: ATTITUDE OF NICU HEALTH CARE WORKERS TOWARD INFECTION PREVENTION IN PUBLIC HOSPITALS IN ADDIS ABABA ,2020(N=172)

	QUESTIONS	RESPONSE	FREQUENCY
1	Hand washing is unnecessary when gloves are worn	Yes No	154(89.6%) 18(10.4%%)
2	Hand washing b/n every patient encounter unnecessary	Yes No	150(87.2%) 22(12.7%)
3	Hand washing damages nails and nail polish	Yes No	135(77.9%) 38(22.1%)
4	Hand washing facilities are not conveniently place	Yes No	94(54.6%) 78(44.8%)
5	Hand washing is the single effective mechanism to prevent spread of infection?	Yes No	108(62.5%) 64(37.3%)
6	Alcohol based hand rub has the ability to eradicate micro-organisms compared to water?	Yes No	129(75) 43(24.9%)
7	feeling comfortable caring every patient even if they have any symptoms of infection	Yes No	138(80.2%) 34(19.8%)
8	Willingness to treat patients with infectious disease?	Yes No	132(76.8%) 40(23.2%)
9	Vaccination of healthcare workers is necessary	Yes No	116(67.5%) 56(32.5%)
10	Unlimited visitors and non-essential staff contact with patients are cause of HCAI	Yes No	128(74.4%) 44(25.7%)
11	Occupational safety training important for health profess.	Yes No	119(69.2%) 53(30.8%)
12	PPE protect HCWs from infection	Yes No	133(77.4%) 39(22.7%)
13	HCAI is a major globally health concern especially in our country	Yes No	121(70.3%) 51(29.6%)
14	HCAI is easily preventable by our setup and you are the most responsible to this	Yes No	124(72%) 48(27.9%)
15	Workplace risk assessment is important for occupational safety	Yes No	124(76.4%) 48(23.6%)

Table 4 ; Summary of Attitude Results of Health Care Workers Using the Likert Scale in Addition to Yes or No Response.

		Category				
		Strongly agree	Agree	Neutral	Disagree	Strongly disagree
No	Variable	Freq. (%)	Freq. (%)	Freq. (%)	Freq. (%)	Freq. (%)
1	Hand washing is unnecessary when gloves are worn	7(4.1%)	10(5.8%)	1(0.6%)	71(41.3)	83(48.3%)
2	Hand washing b/n every patient encounter unnecessary	4(2.3%)	14(8.1%)	4(2.3%)	6839.5%)	82(47.7%)
3	Hand washing damages nails and nail polis	2(1,2%)	21(12.2%)	15(8.7%)	93(54.1%)	41(23.8%)
4	Hand washing facilities are not conveniently place	10(5.8%)	55(32%)	13(7.6%)	79(45.9%)	15(8.7%)
	Variable	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
		Freq. (%)	Freq. (%)	Freq. (%)	Freq. (%)	Freq. (%)
5	Hand washing is the single effective mechanism to prevent spread of infection?	13(7.6%)	40(23.3%)	11(6.4%)	102(59.3%)	6(3.5%)
6	Alcohol based hand rub has the ability to eradicate micro-organisms compared to water?	4(2.3%)	30(17.4%)	9(5.2%)	120(69.8%)	9(5.2%)
7	feeling comfortable caring every patient even if they have any symptoms of infection	4(2.3%)	18(10.5%)	12(7%)	128(74.4%)	10(5.8%)
8	Willingness to treat patients with infectious disease?	9(5.2%)	23(13.4%)	8(4.7%)	131(76.2%)	1(0.6%)
9	Vaccination of healthcare workers is necessary	19(11%)	31(18%)	6(3.5%)	115(69.9%)	1(0.6%)
10	Unlimited visitors and non-essential staff contact with patients are cause of HCAI	13(7.6%)	29(16.9%)	2(1,2%)	123(71.5%)	5(2.9%)
11	Occupational safety training important for health profess.	19(11%)	32(18.6%)	2(1.2%)	110(64%)	9(5.2%)
12	PPE protect HCWs from infection	16(9.3%)	21(12.2%)	2(1.2%)	131(76.2%)	2(1.2%)
13	HCAI is a major globally health concern especially in our country	14(8.1%)	22(12.8%)	15(8.7%)	116(67.4%)	5(2.9%)
14	HCAI is easily preventable by our setup and you are the most responsible to this	5(2.9%)	39(22.7%)	4(2.3%)	121(70.3%)	3(1.7%)
15	Workplace risk assessment is important for occupational safety	11(6.4%)	35(20.3%)	2(1.2%)	112(65.1%)	12(7%)

TABLE 5 INSTITUTIONAL AND ENVIRONMENTAL FACTORS ASSOCIATED WITH ATTITUDE AND PRACTICE OF INFECTION PREVENTION AMONG NICU HCW

	factors				
		TASH(50)	SPMMCH(52)	GMH(40)	ZMH(30)
1	IP guide line available	Yes	Yes	Yes	Yes
2	Hand hygiene reminder	Yes	Yes	Yes	Yes
3	hand washing supply	YES	Yes	Yes	Yes
4	Isolation room	No	Yes	Yes	Yes
5	Clean environment	Yes	Yes	Yes	Yes
6	Manage traffic flow	No	No	Yes	Yes
7	P PE available	Yes	Yes	Yes	Yes
8	Presence of IP committee	Yes	Yes	No	Yes
9	Revising Staffing level	No	Yes	No	No

5.4 Factors Associated with practice of NICU health care worker toward Infection Prevention in Public Hospitals in Addis Ababa 2020.

In the bivariate analysis, profession, Isolation room who are admitted with highly contagious diseases, clean working environment at the end of the working time, Hand washing supply, managing traffic flow and activity pattern, had taken IPPS training in wards, Presence of infection prevention committee, on infection prevention were factors which were significantly associated with practice of NICU HCW p-value (<0.05).

In multi variate analysis However, only, profession, having isolation room who are admitted with highly contagious diseases, Presence of infection prevention committee and IPPS training in wards were found to be significantly associated in the multivariable logistic regression analysis. Nurses had 3.8 times more safe practice (AOR=3.672 95% CI;1.128-11.95) than other professions. healthcare workers that did not IP training are 20% times less likely to practice IP safely (AOR = 0.23, 95% CI: 0.076, 0.69) Hospitals who having isolation room were 9 times more practice on infection prevention practice those have not isolation room (AOR=8.78, 95% CI;2.403,32.09) significantly associated.

TABLE 6 BIVARIATE AND MULTIVARIATE ANALYSIS ON, PRACTICE AND ASSOCIATED FACTORS OF INFECTION PREVENTION AMONG NICU HEALTH CARE WORKERS IN PUBLIC HOSPITALS ADDIS ABABA, 2020.

Variables		Practice				
1 Profession		safe	unsafe	COR(95%)	AOR(95CI)	p-value
	Intern	9(34.6%)	17(65.4%)	4.588(0.175-1.972)	3.672(1.128.11.95	0.01
	Nurse	88(79.3%)	23(20.7%)	4.251(1.547-11.681)		
	GP	10(62.5%)	6(37.5%)	1.852(.478-7.17)		
	Resident	9(47.4%)	10(52.6%)	1	1	
2	IPPS Training	105(61%)	67(39%)	0.324(0.167-0.628)	0.200(0.076-0.526)	0.009*
3	Isolation room	98(57.0%)	74(43.0%)	2.829(1.413-11.68)	8.782(2.403-32.09)	0.001*
4	Clean environment	131(76.2%)	41(23.8%)	.347(.168-.716)		0.04*
5	Hand washing supply	107(62.2%)	65(37.8%)	1.280(0.657-2.492)		0.046*
6	Managing traffic flow	105(61%)	67(39%)	.324(.167-.628)		0.001*
7	Presence of IP committee	133(77.3%)	36(22.7%)	.302(.118-.771)	.079(.021-.302)	0.000*

5.5; Factors Associated with Attitude of NICU Health Care Worker toward Infection Prevention in Public Hospitals in Addis Ababa 2020.

In the bivariate analysis in the socio demographic profession, taken IP training and other institutional factors like hand washing supply, manage traffic flow, presence of infection prevention committee, had association with Attitude of NICU HCW to ward infection prevention. With p-value ($p<0.05$).

when we come to multivariate analysis only profession, managing traffic flow, hand washing supply had a significant association. GP 14% less likely (AOR; 0.138(0.021-0.905) had un favorable attitude toward infection prevention from other profession. hand washing supplies, those who had hand washing supplies in their institution 4.7 times (AOR;4.702(1.239-17.83) had more favorable attitude than those do not. managing traffic flow in their working area 0.340 times (AOR;0.340(0.147-0.789) had favorable attitude those do not manage traffic flow. this may be due to health workers need more safe and calm area enable to good thinking for attitude regarding infection prevention.

Table 7 Bivariate and Multivariate Analysis on, Attitude and Associated factors of infection prevention among NICU health care workers in public hospitals Addis Ababa, 2020

VARIABLES		Attitude		COR(95%)	AOR(95CI)	P-value
profession		favorable	Un favorable			
1	Intern	22(84.6%)	4(15.4%)			
	Nurse	71(64.0%)	40(36%)			
	GP	7(43.8%)	9(56.3%)	0.146(.030-71)	0.138(0.021-0.905)	0.039*
	Resident	16(84.2%)	3(15.8%)	1	1	
2	manage traffic flow	105(61%)	67(39%)	0.454(0.236-0.871)	0.340(0.147-0.789)	0.012*
3	hand washing supply	107(62.2%)	65(37.8%)	2.687(1.308-5.5)	4.702(1.239-17.83)	0.023*
4	presence of IP committee	133(77.3%)	36(22.7%)	0.768(0.35-1.6)		0.049*
5	taken IP training	105(61%)	67(39%)	0.785(0.410-1.5)		0.046*

6 Discussion

Infection prevention is one of the most important challenges in the health institutions. For this, the study assessed, practice, Attitude and associated factors towards infection prevention among NICU HCWs. This study showed that the percentage of health care workers with safe overall Practice was 116(67.4%). The rest 56(32.6%) had unsafe practice. In this study,116 (67.4%) of the workers had a favorable attitude towards infection prevention, while, 56 (32.6%) of workers had un favorable attitude. this result showed that HCW infection prevention practice directly or indirectly had associated with their attitude toward infection with p-value 0.047.

Health workers had 123.8(72%) safe practice hand washing. 132(76.5%) health care workers Applying PPE during procedure, 147(85.5%) practice of safe injection, IV fluid preparation and medication107(62%) Prevention of needle stick injury and waste management health care workers were practiced.

This study finding is higher when compared with finding from the studies done in Nigeria, revealed that Observations on the practice of hand washing only 42.2% of respondents always practiced hand washing and 34.3% practiced occasionally, while 23.5% never practiced hand washing (31).

Other observational studies showed that among health professionals in a Tertiary Hospital in Ghana, a hand washing compliance rate ranging from 9.2% to 57% among doctors and 9.6% to 54% among nurses was reported. In this study, more than half (72%) of HCWs had a safe hand washing practices (32).

This result also greater than the study done in Bahir Dar City Administration showed that, the overall hand hygiene practice score was 69.0% (36).

This result is higher than the studies conducted in Northwest of Ethiopia (57.3%) (12), North Ethiopia (42.9%) (39) and West Arsis Zone, Ethiopia (36.3%) (40).

Difference in practice could be attributable to the difference in study settings, sampling technique and HCWs experiences. Educational level. This might be so because healthcare workers with higher educational level might have acquired essential information, hence they might acquire infection prevention course Since HCWs in the capital cities had better work experience and get the opportunities for various infection prevention trainings, the likelihood of having better prevention practice will be higher than HCWs residing in the country-side.

This study identified 132(76.5%) of the HCWs apply PPE during patient care procedures, likely to generate splashes of body fluid into the eye and the mouth. this finding is much higher than the study finding from Northern Ethiopia (10.4%) (39).

This Discrepancy could be due to dissimilarity in level of awareness on infection prevention practices and PPE supply and utilization difference of the study populations.

Safe injection practice like use of sterile syringes and needles, injection verification before administering, method of sharp waste disposal and HCWs needle recapping practice were used as the main factor for safe injection practices. In this study Above 147(85.5%) performed safe injection practices. This finding is better than the study finding from Northwest Ethiopia (57%) (12).

In this study Prevention of needle stick injury and waste management 107(62%), this study finding is lower when compere to the study done Addis Ababa 2019 reported that (98.3%) of HCWs disposed sharps or needles immediately after use in safety box and waste management (38). This study finding also lower when compere to the study finding in Northern Ethiopia (79.5%).

This study revealed that 116 (67.4%) of the workers had a favorable attitude towards infection prevention, while, 56 (32.6%) of workers had un favorable attitude. compared to Another study done in Addis Ababa from 30 governmental healthcare facilities found that Two-third of (66.1%), the healthcare workers had good infection prevention. having positive attitude towards infection prevention practices (37).

This finding of attitude greater than study finding in North West Ethiopia (55.6%) (12). Eastern Ethiopia (53.1%). these differences might be due to differences in the awareness of HCWs and Training exposure.

6.1 Strength of the study

- Tools (Questionnaire) used to collect data was adopted from validated sources and other guide lines.
- The data collection procedure was strictly supervised by principal investigator and supervisors.
- Their practice level was evaluated by observation using check list.
- Research on newborn health care in developing countries remains sparse,
- This study will provide information on practice, attitude and associated factors of
- of infection prevention among NICU health care workers to decrease neonatal mortality.

6.2 Limitation of the study

- Since this study was a cross –sectional study design, the nature of the study may be difficult to ascertain the causal relationship between the study.
- shortage of time for data collection and analysis of results.
- Some hospitals have their own International Research Board, IRB. So, it took long time to get ethical clearance especially at St. Paul Hospital and Zewditu hospital.
- Problem of transport service to reach different hospitals is also one of the limiting factors.

7 CONCLUSION

Majority of health care workers' practice and attitude toward Infection prevention and control measures in four public hospitals in Addis Ababa were good and safe practice of health care workers towards infection control.

Variables such as, only having clean environment, isolation room who are admitted with highly contagious diseases Presence of infection prevention committee and taking IPPS training in wards were found to be significantly associated with their practice. but Educational status, work experience. Profession has no significant association with infection prevention practice.

Variables such as, only profession, managing traffic flow, hand washing supply had associated to their attitude. when we compare hospitals from hospitals showed that ZMH,90.0%, GMH, 87.5%, TASH, 72.0%, SPMMCH, 34.6% had practice score. regarding their attitude,40%, 87.5%,74%, 61,5% of attitude respectively.

8 Recommendation

The following actions are recommended to FMOH, to teaching and Referral Hospital,
To Addis Ababa HB,

- Efforts need to be focused to awareness of the impact of HCAI and implications of infection prevention requisitions.
- Based on the findings from this study, the two teaching hospital had low score of infection prevention practice this is due to high number of admission of student and patient from different region of the country. So this had great impact on infection prevention control practice. they should minimize the no of students as well as strict managing traffic flow from all side.
- Strengthening of in-service training to NICU Health workers specially for intern and resident on infection prevention must be given periodically and regularly and follow up is required.
- Strict observational supervision at each hospital to follow infection prevention guidelines must be done.
- Hiring enough staff, handling and encouraging them are required for example by giving them a chance for further study.

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ANNEX I: INFORMATION SHEET

Title of Research; Infection prevention practice, attitude and associated factors among neonatal health care workers in public hospitals in Addis Ababa Ethiopia 2019.

Institution: Addis Ababa University, College of Health Sciences, School of Department of Nursing and Midwifery (Post Graduate Program).

Name of sponsor: Addis Ababa health Bureau (AAHB)

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Co -Advisor; ABDISA BOKA (M.Sc.**)**

Background Information; hospital-acquired infections or Nosocomial infections constitute a global health problem. They lead to significant morbidity and mortality in both developed and resource-limited countries. The neonatal intensive care unit (NICU) is a suitable environment for disseminating these infections; the aim of this study is to assess practice, attitude and associated factors of infection prevention among neonatal intensive care unit health care workers in public hospitals in Addis Ababa Ethiopia from march 2020 –April 2020.

ANNEX II: CONSENT FORM

ADDIS ABABA UNIVERSITY COLLEGE OF HEALTH SCIENCE SCHOOL OF NURSING AND MIDWIFERY.

Hello!! My name is ……I am here on behalf of Amina Nesru Ahmed. Who is a master's student in Addis Ababa University, college of health Science School of department of nursing and midwifery she is working thesis on infection prevention practice, attitude and associated factors among neonatal health care workers.

the purpose of this study will be conducting the assessment of infection prevention practices, attitude and associated factors among NICU health care workers in public hospitals Addis Ababa, Ethiopia, 2019. for the partial fulfillment of Master's Degree in neonatal nursing.

The questionnaire contains both closed and open ended questions and will be provided in self-administered form. You are therefore kindly requested to provide genuine answers to the questions. The information you provide is confidential and is used only for the purpose of this study. If you have any question, don 't hesitates to ask the data collector. our cooperation and participation until the completion of the questionnaire is very necessary for the successful completion of the study. We therefore ask your genuine willingness. However, you have the right to refuse if you are not voluntary to participate by making thick mark in -No' in the box below.

1. **yes I** understand the above information and I am volunteer to participate in this study

   Signature _____Date_____

2. **No if you are not voluntary please stop here.**

Data collectors Name_____, date _____sign: _____

Questionnaire code: _____

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Annex III: ENGLISH QUESTIONNAIRES

Part I: socio-demographic characteristics of HCW in public Hospital Addis Ababa, 2019.

No	Socio demographic	Response
1	Sex	1 male 2 female
2	Age	….in years
3	Profession	1 nurse 2 intern 3 GP 4 resident
4	Educational level	1 under graduate 2 diploma 3first degree 4 masters and above
5	Work experience	---------in years
6	Marital status	1 single 2 married 3 divorce 4 widowed
7	Language	Amharic 2 Oromifa 4 other 3Tigirigna

Part II: Questions to Assess Attitude of HCW towards infection prevention

NO	QUESTIONS	Strongly agree	Agree	Neutral	disagree	Strongly disagree
1	Hand washing is unnecessary when gloves are worn.					
2	Hand washing between every patient encounter is unnecessary					
3	Hand washing damages nails and nail polish					
4	Hand washing facilities are not conveniently placed or well designed					
4	Hand washing is the single most effective mechanism to prevent spread of infection?					
5	Alcohol based hand rub has the ability to eradicate micro-organisms compared to water?					
6	feeling comfortable caring every patient even if they have any symptoms of infection					
7	Willingness to treat patients with infectious disease?					
8	Vaccination of healthcare workers is necessary					
9	Unlimited visitors and non-essential staff contact with patients are cause of HCAI					
10	Occupational safety training is important for health professionals.					
11	PPE protect HCWs from infection					
12	HCAI is a major globally health concern especially in our country					
13	HCAI is easily preventable by our setup and you are the most responsible to this					
14	Workplace risk assessment is important for occupational safety					

Observation checklist for IPC Sheet

Name of facility: ----------

Name of supervisor: ----------

Role of worker ----------

Date completed: ----------

Part III: Observational check lists to assess practice of HCW toward infection prevention

I.	HAND WASHING PRACTICE.	YES	NO	N/A
1	Removal of watches and jewelry during hand wash			
2	Apply correct technique for hand hygiene			
3	Apply antiseptic hand rub to clean hands			
4	Changing gloves between patients			
5	Wash hands with detergent before and after patient care			
II	**APPLYING PPE DURING PROCEDURE**	**YES**	**NO**	**N/A**
1	use cover gloves for each patient or any point of care?			
2	Use cover gowns inside NICU			
3	Use face masks for invasive procedure.			
4	Care with suction of respiratory tract			
5	use alcohol or antiseptic after patient care.			
II.	**PRACTICE OF SAFE INJECTION IV FLUID PREP. AND MEDICATION**	**YES**	**NO**	**N/A**
1	Use aseptic technique when preparing and delivering injection and fluid preparation			
2	Medications and fluids are prepared in a clean area free from contamination or contact with blood, body fluids, or contaminated equipment.			
3	Follow product-specific recommendation for use, storage and handling.			
4	Is the medication preparation area free of opened single dose vials or opened single use containers?			

5	If open multi-dose vials are present, are they dated and within the Beyond Use Date (BUD) and the manufacturer's expiration period?			
6	Review and re-prescribe intravenous fluids at least every 24 hours			
7	Inspect for and discard medications with visible contamination or breaches of integrity (e.g. Cracks, leaks).			
8	Each intravenous fluid order is valid for administration of a single bag of fluid, re-spike or re-hang an intravenous fluid bag			
9	check of the six rights of administration prior to administer 1 patient identification, 2 the patency of the intravenous access, 3 type of intravenous fluid, 4calculated rate, pump settings 5 recent pathology results			
III.	**PREVENTION OF NEEDLE STICK INJURY WASTE MANAGEMENT**	**YES**	**NO**	**N/A**
1	Anticipate and take measures to prevent sudden patient movement during and after injection.			
2	Recap used needles before disposal			
3	marking the fill line at the three quarters full level.			
4	Are sharps containers positioned at 52" to 56" above floor?			
5	place containers in high traffic areas (corridors outside patient rooms or procedure rooms)			
6	discard sharp materials separately from other wastes			
7	Treat infectious wastes with appropriate disinfectants			

Part IV; Associated factors of infection prevention practice and attitude among HCW toward infection prevention.

A	**Environmental factors**	**YES**	**NO**	**N/A**
1	Hand Hygiene reminder posters present?			
2	Isolation room who are admitted with highly contagious diseases			
3	Clean working environment at the end of the working time			
4	Managing traffic flow, and activity pattern in wards, procedure areas and operating theater			

B	**Institutional factors**	**YES**	**NO**	**N/A**
1	IP guide line available			
2	Are all hand washing supplies, such as water, soap and paper towel, available?			
3	Are all PPE available			
4	Presence of infection prevention committee			
5	had taken IPPS training			
6	Staffing levels are reviewed if admission rates exceed			