ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCE

DEPARTMWNT OF EMERGENCY MEDICINE

ASSESSMENT OF KNOWLEDGE AND PRACTICE OF NURSES AND MIDWIVES WORKING IN INTENSIVE CARE UNIT AND DELIVERY ROOM TOWARDS NEONATAL RESUSCITATION WITH ASSOCIATED FACTORS AT SELECTED HOSPITALS IN ADDIS ABABA

BY

MESAY BOGALE /BSC/

A THESIS SUBMITTED TO ADDIS ABABA UNIVERSITY, COLLEGE OF HEALTH SCIENCE, DEPARTMENT OF EMERGENCY MEDICINE, IN PARTIAL FULLFILLMENT OF THE REQUIRMENTS FOR DEGREE MASTER OF SCIENCE IN EMERGENCY MEDICINE AND CRITICAL CARE NURSING

JUNE 2017

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ETHIOPA

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACRONYMS AND ABBREVIATION

AA ……Addis Ababa

AAU ……....Addis Ababa University

ABC.....Airway Breathing and Circulation

APGAR.....Appearance, Pulse, Grimace, Activity & Respiration

BSC…….. Bachelor of Science

CPAP..... Continuous Positive Airway Pressure

CPR.....Cardiopulmonary Resuscitation

EMONC.....Emergency Maternity of Neonatal Care

EMS ……..……Emergency Medical Services

EMSC ……..……Emergency Medical Service for Children

GMH.....Gandhi Memorial Hospital

HBB .....Help Baby to Breath

ICU…… Intensive Care Unit

IRB.....Institutional Research Board

LSCS..... Lower Segment Caesarean Section

MSC…….. Master of Science

NICU .....Neonatal Intensive Care Unit

OBS-GNY…….Obstetrics and Gynecology

PEED.....Positive End Expiratory Pressure

PPV.....Positive Pressure Ventilation

SD……...Standard Deviation

SPHMMC.....St. Paul Hospital Millennium Medical College

SPSS.....Statistical Package for Social Sciences

TASH ……..……..Tikur-Anbessa Specialized Hospital

U5MR……Under Five Mortality Rate

WHO…….World Health Organization

ZMH……..…….Zewditu Memory Hospital

ABSTRACT

Introduction: Neonatal resuscitation is an intervention performed to a new born baby who has difficulty in air way breathing and circulation. As the first few moments of a newborn's life is the most critical time, it needs effective emergency care to prevent lifelong consequences. The quality of resuscitation and stabilization of a neonate immediately after birth has a significant effect on neonatal morbidity and mortality.

Globally, 1.4 million newborn deaths occur in South-East Asia Region each year. In Ethiopia, the neonatal mortality rate is 37/1000 live births and prenatal asphyxia is an important contributor to death (8, 10).

Objective: The objective of this research is to assess the knowledge and practices of nurses and midwives working in neonatal intensive care unit and delivery room towards neonatal resuscitation and associated factors at selected referral hospital in Addis Ababa, Ethiopia.

Method: Descriptive quantitative institution-based cross-sectional study data collection was conducted in selected referral hospitals: Tikur Anbessa, Gandhi, Zewuditu and St. Paul, in Addis Ababa, Ethiopia, from April to May 2017. Data was verified, coded and entered to EpiData version 3.1 Software. Verified and coded data was then exported and analyzed using SPSS version 20 statistical Software.

Result: Response rate of the study was 95.5%. Majority of the respondents, (52%), were midwives. Three-fourth of the respondents, (76.2%), were females. The overall knowledge of midwives and NICU nurses were 89.9% (mean = 15.22 and SD=2.65). The overall practice of midwives and NICU nurses were 66.9% (Mean= 14.5 SD = 2.46). Knowledge of neonatal resuscitation had association with working experience and practice.

Conclusion and Recommendation: The participants had good knowledge but poor practice. Repeated in-service training, fulfilling equipment and hiring of enough staff are required.

Key wards: Neonatal Resuscitation, Knowledge, Practice, Midwives and Nurses

1 INTRODUCTION

1.1 Background of the Study

Neonatal resuscitation is an intervention performed to a new born baby who has difficulty in air way breathing and circulation. As the first few moments of a newborn's life is the most critical time, it needs effective emergency care to prevent lifelong consequences. Proper resuscitation requires essential equipment and knowledge of necessary protocols before delivery. Prior knowledge of the gestational age of the newborn is helpful in anticipating the need for resuscitation because low birth weight and premature delivery predispose infants to the need for resuscitative efforts (1).

Newborn babies are completely dependent on others for every aspect - feeding, warmth, and comfort. In the first hour or two after birth, most babies are in an alert, wide awake phase. This offers a wonderful opportunity for parents to get to know their new baby. The newborn baby begins to breathe and cry almost immediately after birth indicating the establishment of active respiration. But this is not true all the time and some babies might need resuscitation and the quality of resuscitation and stabilization of a neonate immediately after birth has a significant effect on neonatal morbidity and mortality (2, 3).

The transition from fetus to newborn infant is the most dramatic physiologic change that occurs in the human lifespan. The fetus that received all of its oxygen and nutritional needs via the placenta must now use two entirely different and essentially dormant organ systems, heart and lung, to meet these needs (4, 5). Babies die after birth because they are severely malformed, are born very prematurely, suffer from obstetric complications before or during birth, have difficulty adapting to extra uterine life, or because of harmful practices after birth that lead to infections (6).

Globally, 1.4 million newborn deaths occur in South-East Asia region each year. Of these 20 countries with the highest neonatal mortality rates, 16 are in African countries. These are: Nigeria (19%), Democratic Republic of Congo (14%), Ethiopia (8%), Tanzania (5%), and Uganda (4%)). Despite this great progress, 6.3 million children died in 2013. Sub-Saharan Africa and South Asia together account for 4 out of 5 under-five deaths. One in eleven children born in Sub-Saharan Africa still dies before the age of five. This is nearly 15 times the average in high-

income countries. Each year, over a million children who survive birth asphyxia develop time for a child's survival. In Africa, one million neonatal deaths occur on the day of birth and close to two million occur in the first week of life (8, 10).

The neonatal mortality rate in Ethiopia is 37 per 1,000 live births. Hence, identifying the reasons for neonatal admission and mortality in a hospital setting is crucial to improve the quality of existing practices in the hospital (11).

Reducing neonatal mortality is increasingly important not only because the proportions of under-five deaths that occur during the neonatal period is increasing as under-five mortality declines, but also because the health interventions needed to address the major causes of neonatal deaths generally differ from those needed to address other under-five deaths (12, 13). It is also facility-readiness and access to resuscitation in Ethiopia (2013-2014), where facility delivery is 15%, staff trained to resuscitate 56%, facility with resuscitation equipment 59% and access to resuscitation 8% (14).

As many researches done still show there is a gap and low newborn resuscitation, this research is constructed on objective knowledge, practice and factors affecting midwives and nurses among neonatal resuscitation (7-9). The first 28 days of life represent the most vulnerable period.

1.2 Statement of the Problem

Neonatal resuscitation is a worldwide problem which is a major contributor of morbidity and mortality especially in the developing nations with low resource settings (15). A study conducted in Western Nigeria shows that the knowledge of nurses on neonatal resuscitation was poor, (59.8%) (9). Another study conducted in Kenya in 2012 shows knowledge of nurses on neonatal resuscitation was inadequate 68 (35.4%). The study conducted in Ethiopia in 2014 shows knowledge and skills of health providers on neonatal resuscitation was sub standardized (16).

In Ethiopia, the neonatal mortality rate is 37/1000 live births and prenatal asphyxia is an important contributor. Like many African countries, Ethiopia has made a significant progress towards millennium development goal. But, present trends are not adequately showing improved neonatal resuscitation and newborn care.

In most hospitals where this research was done, there was often no provision by skilled resuscitators to attend high risk deliveries. Various programs have been developed to address this shortfall. But, it is often emphasized on training of health care providers and fails to reach (17).

The main aim of this study is to assess the knowledge and practice of midwives and nurses towards neonatal resuscitation and if there is a gap in knowledge and practice of midwives and nurses, to find solutions to fill the gap.

1.3 Significance of the Study

Newborn neonates are the future hope of a family and a country at large. So, they need care and attention to their health and wellbeing. Understanding knowledge and practice of neonatal resuscitation among nurses and midwives who attend delivery of newborn and associated factors around the working environment are very important in designing and implementing interventions at national and international levels.

So, the information obtained from this study will be useful for the hospitals and decision makers in planning, implementing and evaluating various interventions related to neonatal morbidity and mortality rate. The study is helpful to plan preventive measures and provision of effective neonatal resuscitation to save life. It focuses on knowledge, practice and associated factors of midwives and nurses towards neonatal resuscitation.

2 LITERATURE REVIEW

2.1 Overall Prevalance of Neonatal Resuscitation

According to WHO study in 2012 on basic newborn resuscitation, about one quarter of all neonatal deaths are caused by birth asphyxia globally. In the study, birth asphyxia was defined as the failure to initiate and sustain breathing at birth. Effective resuscitation at birth can prevent a large proportion of these deaths.

A prospective cohort study was conducted for reasons of admission and neonatal outcome in the neonatal care unit of a tertiary care hospital in Addis Ababa St Paul's Hospital Millennium Medical College from March 1, 2015, to May 31, 2015 us it was reported. The

most common primary diagnoses at admission to the neonatal care unit were prematurity with respiratory problem (36.6%), neonatal sepsis (22.7%), and asphyxia (16.2%). Out of the 216 neonates studied, 50 (23.2%) died. High case fatality was observed among neonates with the diagnosis of prematurity with respiratory problem (40.5%) and asphyxia (40.0%). Under multivariate analysis, diagnosis of asphyxia was an independent predictor of mortality (27).

2.2 Knowledge of Midwives and Nurses Towards Neonatal Resustation

Cross sectional study design conducted in Afghanistan in 2013 assessed the capacity for newborn resuscitation and factors associated with providers' knowledge and skills found that from a total of interviewed 82 doctors and 142 midwives at 78 facilities, more than 80% of health providers had been trained on newborn resuscitation. But midwives were more likely than doctors to receive such training as part of pre-service education. No significant differences were found between doctors and midwives on knowledge or confidence in performing newborn resuscitation. On knowledge questions are 66% and 71% respectively. Training was associated with greater knowledge multivariable model that adjusted for facility type, provider type, and years of experience offering EMONC services (19).

Cross-sectional observational study was conducted in Department of Pediatrics, University College of Medicine and JNM Hospital, Kalyani, West Bengal, India in 2014 to determine the knowledge and practice of neonatal resuscitation among nursing staff. In the practical test performance evaluation was done in four parts: 1) preparation of personnel, equipment and supplies; 2) initial steps of resuscitation; 3) positive pressure ventilation; 4) Chest compression.
It was found that the nursing staff has average knowledge in all 4 steps and in all, correct answers to step 3 have the highest percentage (20).

According to a study conducted in Kenya in 2012, at University of Nairobi, assessment of knowledge on neonatal resuscitation amongst health care providers in Kenya consisted of 192 health care personals drawn from all counties of Republic of Kenya. The nurses and clinicians were asked to complete questionnaires. All the participants were aged 23 years and above with at least a certificate training. Most medical providers had heard of neonatal resuscitation (85.4%), with only 23 receiving formal training. The average duration of neonatal training was 3 hours

with 50% having missed out on practical exposure. When asked on steps of resuscitation, only 68 (35.4%) of the participants scored above 85%. More than 70% of them considered their knowledge about neonatal resuscitation inadequate and blamed it on inadequate medical training programs (22).

A study done in Tanzania and reported in 2014 indicates that knowledge of essential newborn care health worker knowledge (assessed with the described knowledge assessment) improved significantly from 23% in 2010 to 41% in 2012. Correct responses to questions on sepsis rose by approximately 15%, and knowledge of equipment required for essential newborn care rose by 34%.

A study was conducted in Khartoum State Teaching Hospitals in 2011 by collecting data from 96 nurse midwives and interviewed using structured questionnaire and observation check list to assess knowledge, attitude and practice. The result showed that the study population had a fair knowledge level (50.6%) (24).

Cross-sectional study was conducted in Ethiopia at University of Gondar in 2014 on Knowledge and skills of neonatal resuscitation of health professionals at a university teaching hospital. One hundred and thirty-five of 150 participants were included in this study with a response rate of 90.0%. The overall mean scores of knowledge and skills of midwives, nurses and residents were 19.9 (SD=3.1) and 6.8 (SD=3.9) respectively. The mean knowledge scores of midwives, nurses, pediatric residents and obs-gyn residents were 19.7 (SD=3.03), 20.2 (SD=2.94), 19.7 (SD=4.4) and 19.6 (SD=3.3) respectively.

The knowledge of midwives, nurses and residents about neonatal resuscitation was sub standardized (26).

2.3 Practice of Midwives And Nurses Towards Neonatal Resustion

Cross sectional study design conducted in Afghanistan in 2013 assessed the capacity for newborn resuscitation and factors associated with health providers' knowledge and skills and found that from a total of interviewed 82 doctors and 142 midwives at 78 facilities on the skills assessment, 75% of doctors and 83% of midwives felt very confident in their ability to perform newborn resuscitation. Training was associated with greater knowledge ($p < 0.001$) and clinical

skills ($p < 0.05$) in a multivariable model that was adjusted for facility type, provider type, and years of experience offering EMONC services (19).

Cross-sectional observational study was conducted in Department of Pediatrics, University College of Medicine and JNM Hospital, Kalyani, West Bengal, India in 2014 to determine the knowledge and practice about neonatal resuscitation among nursing staff. Still, in the practical test the results were different. In preparation of equipment they have average incomplete practice. In initial steps of resuscitation all participants have done something but most have done it incorrectly or incompletely. But, there was very poor performance in the last 2 steps vis-à-vis positive pressure ventilation and chest compression. Most of them (79.3%) knew nothing about how to do positive pressure ventilation or chest compression. The rest knew it incorrectly. Only one or two participants knew it perfectly (20). They have very poor practical experience in using bag–mask ventilation and chest compression. Thus, workshops are needed on 'hands on' demonstration of the first one minute of neonatal resuscitation for the nursing staff (20).

A study was conducted in Tanzania on cross-sectional health facility surveys from July – August 2010. The program conducted a cross-sectional health facility survey to gather baseline information on the quality of maternal and newborn care in facilities targeted for support in 12 regions of Tanzania included in the first year of program rollout. Essential newborn care in the 52 facilities sampled into the study of 489 newborns was observed in 2010 during their immediate postpartum period and 560 newborns were observed in 2012. In both years, at least one observation was conducted at every facility visited – the range of observations conducted was 216- 294 in health centers/dispensaries and 195–344 in regional hospitals.

Assessments, observations and quality of care show details of the assessment of essential newborn care at the two time points. Overall achievement on the index score for newborn care went from 39% to 73%, representing an increase of 34 percentage points. High achievement in cord care and drying and wrapping of the newborn was seen at both baseline and follow-up. The areas that showed the most improvement were placing the newborn on the mother's abdomen skin-to-skin immediately after birth (an increase of 35 percentage points and helping to initiate breastfeeding within one hour, 42% increase**.** Immediate newborn care practices in the quality of maternal and newborn health care survey, 2010 and 2012, universal adherence to cord cutting

with a clean blade (e.g., sterile pair of scissors) was seen in both 2010 and 2012. Delayed cord clamping significantly increased over the two years by 12% in regional hospitals and by 10% in lower-level health facilities while end-line performance on overall essential newborn care steps was similar across levels of health care facility, lower-level health facilities were more likely than regional hospitals to promote immediate breastfeeding. This was statistically significant in 2010.

WHO recommended practice of placing the newborn skin-to-skin on the mother's abdomen immediately following delivery increased from baseline to end line. Mothers and newborns were often subsequently separated in the hour following birth. While this study did not allow quantification of subsequent mother-newborn separation in the first hour, it was observed that newborns were often placed on the same bed alongside the mother, were taken to a separate room, or the mother left the delivery room to return to the antenatal area without the newborn, which was brought to her later (23).

A study was conducted in Khartoum State Teaching Hospitals in 2011 by collecting data from 96 nurse midwives and interviewed using structured questionnaire and observation check list to assess knowledge, attitude and practice. In spite of this their performance was poor (41.1%) towards immediate care of the newborn (24).

A study was conducted in Pumwani Hospital, Kenya in 2008. Effect of newborn resuscitation training on health worker practices was conducted at randomized, controlled trial with health workers receiving early training with NRT (n = 28) or late training (the control group, n = 55). The training was adapted locally from the approach of the UK Resuscitation Council. The primary outcome was the proportion of appropriate initial resuscitation steps with the frequency of inappropriate practices as a secondary outcome. Data were collected on 97 and 115 resuscitation episodes over 7 weeks after early training in the intervention and control groups respectively. Training providers demonstrated a higher proportion of adequate initial resuscitation steps compared to the control group (trained 66% vs control 27%; risk ratio 2.45, [95% CI .1.75–3.42] adjusted for clustering). In addition, there was a statistically significant reduction in the frequency of inappropriate and potentially harmful practices per resuscitation in the trained group (trained 0.53 vs. control 0.92; mean difference (25).

Cross-sectional study was conducted in Ethiopia at University of Gondar in 2014 on Knowledge and skills of neonatal resuscitation of health professionals at a university teaching hospital. One hundred and thirty-five of 150 participants were included in this study with a response rate of 90.0%. The overall mean scores of knowledge and skills of midwives, nurses and residents were 19.9 (SD=3.1) and 6.8 (SD=3.9) respectively. Mean skill score of midwives was poor (59.2%).The skills of midwives, nurses and residents about neonatal resuscitation were sub standardized. (26)

2.4 Conceptual Framwork

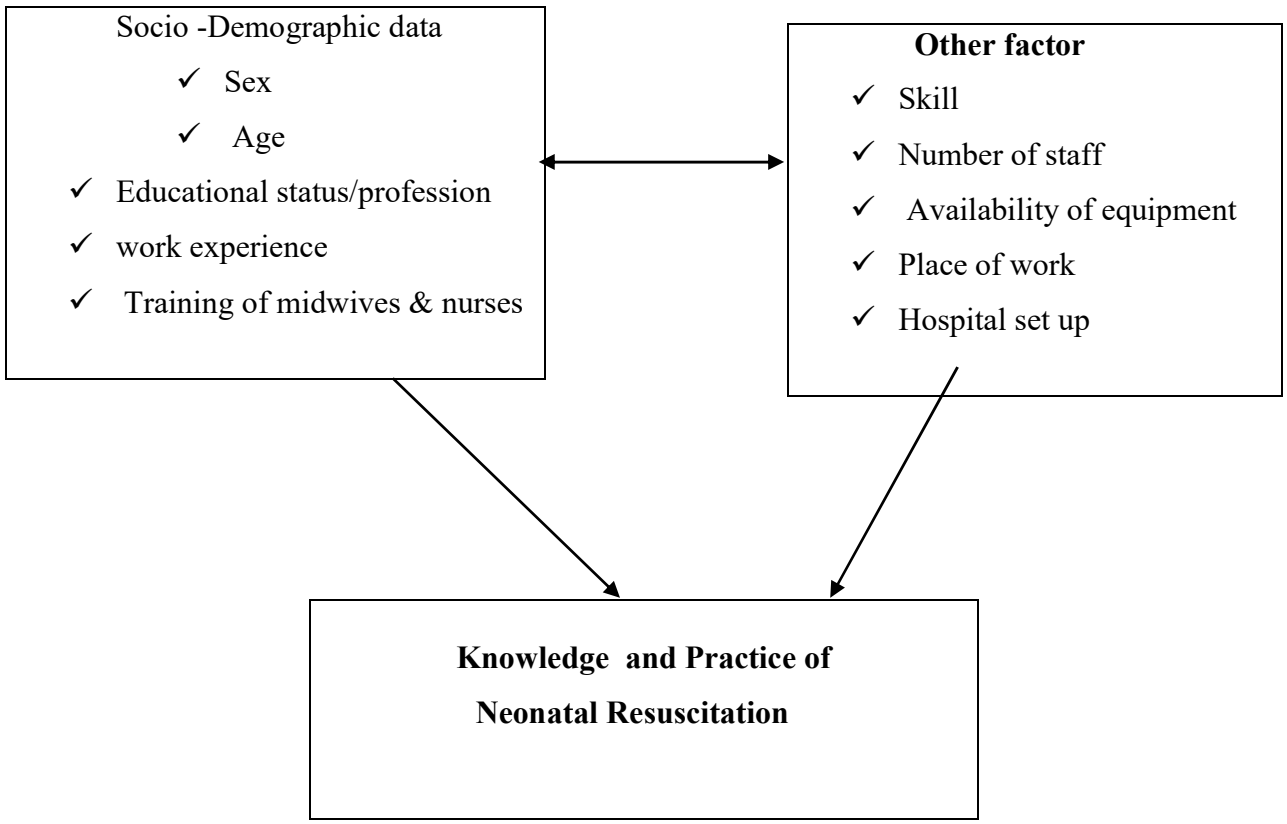

Figure 1 Conceptual frame work

3 OBJECTIVE

3.1 General Objective

The general objective of this study is to assess knowledge and practice of nurses and midwives working in intensive care unit and delivery room towards neonatal resuscitation with associated factors at selected public hospital, in Addis Ababa, in 2017.

3.2 Specific Objective

The specific objectives of this study are:

- ✓ To assess the knowledge of nurses and midwives working in NICU and delivery room towards Neonatal resuscitation at selected hospitals in Addis Ababa.
- ✓ To assess practice of nurses & midwives working NICU and delivery room towards neonatal resuscitation at selected hospitals in Addis Ababa.
- ✓ To identify factors associated with neonatal resuscitation in NICU and delivery room at selected hospitals.

4 METHOD AND MATERIALS

4.1 Study Area and Period

This study was conducted in four selected referral hospitals in Addis Ababa, namely: Tikur Anbesa Specialized Hospital (TASH), Zewditu Memorial Hospital (ZMH), Gandhi Memorial Hospital (GMH) and St. Paul Hospital.

Addis Ababa is the capital city of Ethiopia with a population of 3,475,952 according to the 2007 E.C. population census with annual growth rate of 2.7%. Its area is estimated to be 530 km^2 with 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 (27).

Tikur Anbesa Specialized Hospital is one of the referral hospitals which has its own pediatric ICU and OBS-GNY. The number of nurses in labor ward and NICU is totally 50. The hospital

has a 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. In NICU and labor ward there are a total of 41 nurses.

Zewuditu Memorial Hospital is found in Addis Ababa, Ethiopia and it is one of the largest referral hospitals. It was founded in 1976 E.C. by Seventh Day-Adventists Church. It has NICU and OBS-GNY department. In NICU and labor ward there are a total of 38 Nurses.

Gandhi Memorial Hospital was founded in 1948. It was purposely built for maternity and baby care. In NICU and labor ward, there are a total of 43 nurses.

4.2 Study Period

The study was conducted from December 2016 to June 2017**.**

4.3 Study Design

A descriptive institution-based cross-sectional study was conducted in selected hospitals of Addis Ababa, Ethiopia.

4.4 Source and Study Population

4.4.1 Source of Population

The source population was all nurses and midwives in selected hospitals: Tikur Anbesa Specialized Hospital (TASH), Zewditu Memorial Hospital (ZMH), Gandhi Memorial Hospital (GMH) and St. Paul Hospital.

4.4.2 Study Population

The population used for study was all midwives and nurses working in delivery room and neonatal intensive care unit of selected hospitals.

4.5 Inclusion and Exclusion Criteria

4.5.1 Inclusion Criteria

Nurses and midwives fulfilling the following criteria were included in the study:

- ✓ All midwives who were working in delivery room of selected hospitals.
- ✓ All nurses who were working in neonatal intensive care unit of at selected hospitals.

4.5.2 Exclusion Criteria

Some nurses and midwives were excluded from the study because of the following:

- ✓ Those who were not voluntary to participate in the study.
- ✓ Those who were on leave.

4.6 Sampling Size and Sampling Procedure

4.6.1 Sample Size Determination

Since I have taken all samples collected from nurses and midwives working in neonatal intensive care unit and in delivery room as sampling size, the sample size is all the number of study population which was 180. So, there was no need for calculating the sample size and convenient sampling method was used. That is it is all inclusive.

4.6.2 Samplling Procedure

To select the study area simple random lottery method was used. That means there are a total of thirteen (13) public hospitals in Addis Ababa. Among this, three are excluded (Emmanuelle Psychiatric Hospital doesn't give delivery and neonatal care service, Army Force and Police Hospitals are excluded since permission was not granted). From the rest ten (10) hospitals, four hospitals (TASH, ZMH, GMH and St. Paul hospitals) were selected using simple random lottery method.

4.6.3 Operational Definition

Knowledge: Good knowledge considers overall knowledge of questions. If the respondents answer greater than mean of score which is 15.22 in this study, it is good knowledge. However, if participants answer less than mean score, it is poor knowledge.

Practice: Good practice considers overall knowledge of questions. If the respondents answer greater than mean of score, which is 14.55 in this study, it is good practice. If participants answer practice questions less than mean score, it is poor practice.

Neonatal resuscitation: It is a care given to all newborn infants starting from delivery of the head to the first 28 days and it includes keep baby warm (prevent hypothermia), position, clear airway, dry and stimulate, evaluate breathing, cord care, give oxygen as necessary, initiate breastfeeding in the first one hour, administer eye ointment, administer vitamin k intramuscularly, weigh the newborn when it is stable and warm, delay bathing of the baby for 24 hours after birth, advice mother on neonatal danger signs and postnatal care.

Resuscitation: Any care given to a baby after delivery to make it survive and stable.
NICU (Neonatal Intensive Care Unit): the room where very sick neonates are treated and given care.

Neonate: the baby after delivery up to 28 days.
Delivery room: the place where pregnant mother delivers baby.
NICU nurse: Nurses who are working in intensive care unit.
Midwives: Health professionals working only in delivery room.

4.6.4 Data collection Tools and Procedure

Data was collected using pretested standard questionnaires from adopted literature which are composed of questions of knowledge and practice on neonatal resuscitation. Four trained data collectors were involved during the data collection. The data collectors assisted participants in understanding questions which might have been vague or differently perceived. The data collectors were composed of health professionals who could elaborate some of the contents of the questionnaire to be used. Data collection was strictly supervised by two supervisors.

4.7 Study Variables

4.7.1 Dependent Variables

- Knowledge of midwives and nurses in delivery room and NICU on neonatal resuscitation.
- Practice of midwives and nurses in delivery room and NICU on neonatal resuscitation.

4.7.2 Independent Variables

- ✓ Socio-demographic data .
- ✓ Sex
- ✓ Age
- ✓ Place of work/department
- ✓ Educational status/profession
- ✓ Hospital set up
- ✓ Availability of equipment
- ✓ In- service training
- ✓ Number of staff
- ✓ Skill of midwives and nurses

4.8 Validity and Reliability (Data Quality Assurance)

Carefully designed questionnaire was adopted for data collection, and pretest was done to measure the validity and reliability of the questionnaire. The questionnaire was pretested at Yekatit 12 Hospital on the sample size of ten by asking participants to fill the questionnaire. Based on the test result, some questions and abbreviations were excluded from the questionnaire used during research data collection.

4.8.1 Data Processing and Analysis

Data was verified, coded and entered to EpiData info Software and then exported and analyzed by SPSS version 20 Software. It was processed by carrying out simple descriptive statistics (mean and standard deviation) and used for quantitative variables and frequency with percentage distribution for categorized variables.

4.8.2 Ethical Consideration

To conduct this research, the investigator had got ethical clearance from AAU, college of Health Science, Department of Emergency Medicine. Information sheet was provided to the participants and their consent was obtained by signing on the questionnaire. The investigator told their right to stop at any time. For confidentiality purpose, the name of the participants was not included in the questionnaire. The participants had the right to stop filling the questionnaire, jump any questions they wanted to and answer whatever they feel right.

4.8.3 Dissemination of the Results

The results of this study will be disseminated to AAU, Department of Emergency Medicine and those hospitals where study was conducted. It will also be submitted to national or international peer review Journals for possible publication.

5 RESULT

5.1 Respondent Coverage

Out of 180 conveniently selected midwives and NICU nurses, the questionnaires were filled by 172 participants in the study were taken for the analysis whereas that of eight participants were rejected since their questionnaires were incomplete. So, the response rate of participants was 95.5%, of which majority of respondents, 91 (52%), were midwives and the rest were NICU nurses, (47.1%) (n=81). The ratio of nurses to hospitals distribution was 2:1:1:1 in TASH, GMH, St. Paul and ZMH respectively. When presented in percentage, TASH was 50(29.1%), GMH 43(25%), St. Paul 41(23%) and ZMH 38(22.1).

5.2 Socio-Demographic Characteristics of Study Population

Out of 172 participants in the study, 131(76.2%) were females and the rest were males. Majority of the participants, 135(78%), were in the age group of 20-30 and the least participants age was above 41 years.

Regarding their educational status, more than 80% of nurses were BSC nurses with work experience of 1 to 5 years. These are 65.7% of the total participants.

Table 1. Socio- demographic data characteristics of NICU nurses and midwives working in delivery rooms at selected hospitals in Addis Ababa.

Variable		Frequency ($N_o = 172$)	Percentage (%)
Sex	F	131	76.2
	M	41	23.8
Age	20-30	135	78.5
	31-40	31	18
	41 and above	*6*	3.5
Level of education	Diploma	24	14.0
	Degree	143	83.1
	Master	5	2.9
Work experience	1-5 years	113	65.7
	6-10 years	40	23.3
	11-15 years	13	7.6
	16 and above	6	3.5
Working department	NICU	81	47.1
	Delivery room	91	52.9
Name of hospitals	BLSH	50	29.1
	GMH	43	25.0
	ZMH	38	22.1
	St. Paul	41	23.8

5.3 Knowledge of Midwives and NICU Nurses

Among midwives and NICU nurses who had participated in this survey, 118(68.6%) did not receive in-service training. The rest had training regarding immediate newborn care. A total of 169 (98.3%) of midwives and NICU nurses had good knowledge on immediate problem of new born baby.

Most respondents of this study, 135(78.5%), have good knowledge to place new born baby on mother's abdomen immediately after delivery, 32(18.6%) of respondents had poor knowledge.

When asked what they would do if the baby did not cry, the majority, 95(55.2%), of the respondents answered they would do suction if there was secretion which indicates that they have good knowledge. Some, 51(29.7%), responded they would stimulate the baby while the remaining, 24(14%), said they would call for help and do cardio pulmonary resuscitation which indicates that they have poor knowledge in both cases.

When we see chest compression pressure uses, majority, 123(71.5%), of the respondents answered they would do depression to the sternum 1/3 to 1/2 diameter of the chest, which is the correct answer showing they have good knowledge

On term babies born through meconium stained liquor, participants responded they would do suction of oral cavity and nose after delivery, 130(77.3%), showing they have good knowledge.

Regarding resuscitation high risk/unstable new born baby after delivery, most respondents, 97 (56.4%), replied they would resuscitate at dedicated new born corner in the delivery room and hence have good knowledge.

On the basic equipment required, most respondents, and 157 (91.3%), have good knowledge. On initial steps of neonatal resuscitation, all respondents have good knowledge.

The majority, 94(54.7%), of participants responded resuscitation should be stopped when heart rate is >100 BPM, have good knowledge and 30(17.4%) have poor knowledge.

The study result shows the mean knowledge of midwives and nurses is 15.22 and the standard deviation is 2.65

Table 2 Knowledge of midwives and NICU nurses

A. Variable	Midwives	NICU nurses	Total (%)
Immediate newborn care knowledge	89(51.7%)	80(46.5%)	169(98.2%)
Knowledge of CPR	62(36%)	61(35.5%)	123(71.5%)
Initial step of NR	60 (34.9%)	53(30.8%)	113(65.7%)
When to start CPR	83(48.3%)	48(27.9%)	131(76%)
When do you stop resuscitation	94(54.6%)	40(23.3%)	134(78%)

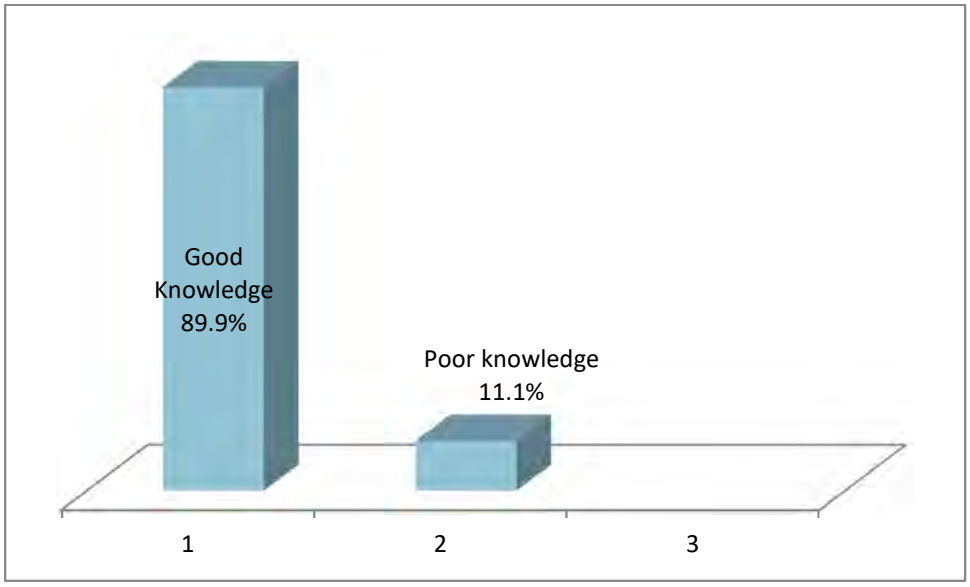

Figure 2 Knowledge score of midwives and NICU nurses at TASH, GMH, ZMH and St. Paul Hospitals

5.4 Practice of Respondent

On neonatal resuscitation, from the total of 172 participants (66.9%) (n= 115) have poor practice and 57(33.1%) have good practice. Majority of participants, 99(57.6%) have practiced CPR. Those who did practice endotracheal tube insertion were 146(84.9%) and have poor practice. The rest, 26(15.1%) of the total have good practice.

Table 3 Practice of midwives and NIC nurses

Variables	Midwives	NICU nurses	Total
CPR practice	56(32.6%)	43(25%)	99(67.6%)
Bag & musk ventilation	79(45.9%)	73(42.4%)	152(88.3%)
Practice suck nose then mouth	73(80%)	38(46.9%)	111(64.5)
Immediate cut cord	46(50.5%)	32(39.5%)	78(45.3%)

Among participated midwives and nurses, those who faced lack of equipment during neonatal resuscitation were 123(71.5%) and those who faced lack of trained assistant were 93(54.1%) .

Majority of participants 117(68.0%) who responded that a baby should be positioned on back or side with slightly extended neck have good practice. Those respondents, 12(7.0%), who said the baby should be positioned hyper- extended neck and those, 42(24.4%), who reported that a baby should be positioned in flexed neck have poor practice.

From total participants 111(64.5%%) who reported that the rule is sucking nose and then mouth have poor practice and those, 56(32.6%), who reported sucking mouth and then nose have good practice .

Regarding chest compression to breath ratio, those, 158(91.9%), who said three compressions to one breath in neonatal resuscitation has answered well. The investigation result shows the overall mean of practice of midwives and NICU nurses was 14.55 and the standard deviation is 2.46.

Table 4 Associated Factors

Variable	Delivery room	NICU room	Total
Lack of equipment	61(67%)	62(76.5%)	123(71.5%)
Shortage of Oxygen	47(51.6%)	52(64.2%)	99(57.6%)
Ration of to newborn care1:6	71(78%)	35(43.2%)	106(61.6)
Guideline not follow NR	52(57.1%)	47(58.0%)	99(57.6%)

From the total participants in NICU room, 130(75.6%) respondent used CPAP and in the delivery room, 123(71.5%) not used. This shows that midwives have not practiced on CPAP. Because it is more available in NICU than delivery room.

From the total participants in NICU, 148(86.0%) respondent used oxygen saturation monitor, and those in delivery room, 92(53.5%) did not use.

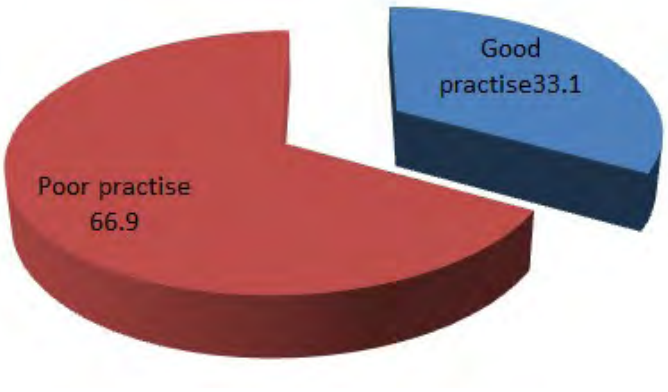

Figure 3 Practice score of midwives and NICU nurses in TASH, GMH, ZMH and St. Paul Hospitals.

5.5 Associated Factor Analysis of Neonatal Resuscitation Of Knowledge and Practice Using Bivariet and Multivariable Logistic Regression.

Bivariate logistic regression was conducted to assess those variables which have influence over neonatal resuscitation knowledge and practice among nurses and midwives working in NICU and delivery room.

This study shows knowledge of neonatal resuscitation has no statically significant association with independent variables since p- value is greater than 0.05. But it has association with work experience {p value =0.41(2.33(0.331-17.545)}. Even if it is not significant, the study shows those NICU nurses and midwives who have more than 10 years' experience are two times more knowledgeable than those who have less than five years' experience.

Table 2 Logistic regression analysis variable with Knowledge of neonatal resuscitation among midwives and NICU nurses in TASH, GMH, ZMH and St. Paul hospitals

Variables	Category	COR (95% CI)	(P-Value)
Age	Age1	1.275(0.709-2.93)	0.417
	Age2	0.194(0.22-1.706)	0.139
	Age3	0.187(0.020-1.796)	0.147
Sex	Male	0.703(0.347-1.424)	0.328
		1.113	0.541
Profession	NICU Nurse	0.913(0.502-1.663)	0.767
		1.068	0.753
Education	Edu1	0.476(0.067-3.396)	0.459
	Edu2	o.715(0.116-4.408)	0.718
Work experience	Work1	2.431(0.428-13.816)	0.316
	Work 2	1.333(0.218-8.159)	0.756
	Work3	2.333(.0.310-17.545)	0.410
Department	Delivery Room	1.044(.574-1.902)	0.887
		1.000	1.000

From the above table, there is no significant association with variables based on logistic binary regression and p- value is not less than 0.05.

Table 3 Logistic regression analysis variable with practice of neonatal resuscitation among midwives and NICU nurses in TASH, GMH, ZMH and St. Paul hospitals

Variable	Category	COR (95% CI)	(P-Value) of COR	AOR(95% CI)
Age	Age1		1.000	
	Age2	2.236(0.240-20.879)	0.480	
	Age3	0.606(0.68-6.882)	0.748	
Sex	Male	0.818(0.393-1.704)	0.592	
	Female	1.418	0.605	
Profession	NICU Nurse	0.797(0.422-1.505)	0.484	
	Midwives	1.429	0.489	
Educational	Educa1	0.667 (0.641-69.344)	0.112	418
	Educa2	9.000 (0.978-82.857)	0.002	.000
Work experience	Workex1	1.266 (0.221-7.254)	0.791	0.912(0.091-9.143
	Workex2	0.833 (0.136-5.113)	0.844	0.899(0.082-9.817)
Working Department	Delivery room	1.300(0.688-2.456)	0.419	
	NICU nurse	1.759	0.015	
Training	Onetime	0.509(0.132-1.969	0.328	1.00
	Two time	0.142(0.032-0.34)	0.011	2.7 (0.84 – 8.7)
	three time	0.226(0.019-2.706)	0.241	1.7 (0.45 – 5.8)
	Zero time	17.667	0.000	0.283 (0.054-1.482)

Regarding of knowledge score total of NICU nurse that were 81, 65(80.2%) have good knowledge 16(19.8%) have poor knowledge.

Midwives count 91. From this, 88 (96.7%) have good knowledge, 3(3.3%) have poor knowledge. Out of the total of 81 NICU nurses, 29(35.8%) have good practice, 52(64.2%) have poor practice. Out of 91 midwives 28(30.8%) have good practice, 63 (69.2) have poor practice

Table 2 Practice and knowledge of midwives and NICU nurses in TASH, GMH, ZMH and St. Paul hospitals in Addis Ababa.

KNOWLEDGE					
			Knowledge		Total
			Poor	Good	
Types of the profession	NICU Nurse	Count	16	65	81
		% within Types of the professions	19.8%	80.2%	100.0%
	Midwife	Count	3	88	91
		% within Types of the profession	3.3%	96.7%	100.0%
Total		Count	19	153	172
		% within Types of the profession	11.0%	89.0%	100.0%
PRACTICE					
			practice		Total
			Good	Poor	
Types of the Profession	NICU Nurse	Count	29	52	81
		% within Types of the profession	35.8%	64.2%	100.0%
	Midwife	Count	28	63	91
		% within Types of the profession	30.8%	69.2%	100.0%
Total		Count	57	115	172
		% within Types of the profession	33.1%	66.9%	100.0%

6 DISCUSSION

This study showed that the percentage of midwives and NICU nurses with good overall knowledge was 89.9% (n=153) whereas those with poor overall practice was 66.9% (n=115). In this study, 96.7% (n=88) of midwives had a good mean knowledge score which is above the mean score of 14.55

The mean knowledge score of NICU nurses and midwives was 89.9% which is good. This finding was in disagreement with the same study from Ghana which was (43.9%) (28) whereas that of Gonder University was (43.9%) (26). The low level of performance could be due to limited exposure to real cardiopulmonary resuscitation cases during the undergraduate course, lack of certification processes before leaving the university and updating training. The finding was in sharp contrast to the result of a study from Khartoum University, Sudan (51.9%) (29). This difference in the score might be due to the difference in the quality of the training given to the midwives and the facilities available. In this study, the mean knowledge score was very low, (19.8%). This score was lower than that of a study in India, (69.1%) (30). The discrepancy could be due to the difference in the quality of training on neonatal resuscitation and the facilities available for neonatal resuscitation.

In our study, the mean practice score of midwives was poor, (69.2%). This finding was similar to the study conducted at a university of Gondar in which mean skill score of midwives was poor, (59.2%)(1 9). This poor practice in both studies might be due to there is no availability of simulation-based training, updating training, and certification process, inadequate basic neonatal resuscitation equipment and not follow the guide lines.

This study also showed that the mean practice score of NICU nurses was poor, (64.2%), and this was similar to that of a study conducted in Western Nigeria, (59.8%) (9), which might be due to the absence of standardized training during the undergraduate and postgraduate courses.

In this study, training was associated with greater practice based on logistic binary regression (p value = 0.011 training two-times, ; COR: (0.054-1.482), zero times,0.000. Education p value = 0.002, COR: 0.00. It shows significant association with neonatal resuscitation hence it was done by multiple regressions. Similar study conducted in Afghanistan in 2013 assessed the capacity

for newborn resuscitation and factors associated with health providers' knowledge and skills. Training was associated with greater knowledge multivariable model that was adjusted for facility type, provider type, and years of experience offering EMONC services (19).

Majority of participants CPR 99(57.6%) have practiced or participated on neonatal resuscitation. Similar study done in Department of Pediatrics, University College of Medicine and JNM
The findings in this study suggest that most of participants (57.6%) respond there is shortage of availability of equipment in resuscitation area.

Similar study conducted in western Nigeria in 2015 showed lack of essential neonatal resuscitative equipment observed in this study has also been reported in Zimbabwe and South Africa and may be a reason why good neonatal resuscitation skills are failing to develop, since the acquired knowledge cannot be put into practice (31, 32) .

In our study, the mean skill score of midwives was poor (59.2%). This finding was not consistent with a study conducted in Afghanistan. This discrepancy might be due to the availability of simulation-based training, updating training, and certification process before graduation in Afghanistan which is not existed in our case. The mean skill score of nurses was poor (55.8%).
Our finding is similar to that of a study conducted in Western Nigeria (59.8%) (16) This might be due to the absence of standardized training during the undergraduate and postgraduate courses.

7 STRENGTH AND LIMITATION OF THE STUDY

7.1 Strength of the Study

Tools (Questionnaire) used to collect data was adopted from validated sources and other hospitals. The data collection procedure was strictly supervised by principal investigator and supervisors. Research on newborn resuscitation in developing countries remains sparse, with 90% of research being done in developed parts of world which experience just 10% of the problem. This study will provide information on knowledge, practice and associated factors of neonatal resuscitation, to decrease neonatal mortality.

7.2 Limitation of the Study

The major limiting factors of the study were 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. Problem of transport service to reach different hospitals is also one of the limiting factors.

8 CONCLUSION AND RECOMMENDATION

8.1 Conclusion

Even though few respondents received in-service training on neonatal resuscitation onetime and some of them did not take, the study results shows respondents have good knowledge but they have poor practice gap on neonatal resuscitation.

Most respondents mentioned that problem faced during neonatal resuscitation was lack of equipment and trained assistants. Most respondents have neonatal guideline but they do not follow it.

From data obtained from of respondents, ratio of midwives and NICU nurse to newborn care was 1:4 and more than that. This shows the number of staff members required is not enough.

8.2 Recommendation

Based on the findings from this study, strengthening of in-service training to midwives and NICU nurses on neonatal resuscitation must be given periodically and regularly.

Continuing of supporting midwives and NICU Nurses to increase knowledge and practice on neonatal resuscitation by providing repeated in-service training and follow up is required.

Strict observational supervision at each hospital to follow neonatal guidelines must be done. Hiring enough staff, handling and encouraging them are required for example by giving them a chance for further study.

The department should fulfill all supplies which is important for neonatal resuscitation. Further detail investigation on knowledge and practice of midwives and NICU nurses on neonatal resuscitation is recommended.

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ANNEXES

Annex 1: Information Sheet

Name of the investigator: Mesay Bogale (BSC, MSC candidate)

Research title: Assessment of knowledge and practice of nurses working in neonatal intensive care unit and midwives working delivery room towards neonatal resuscitation at selected hospitals such as Black Lion, Gandhi, Zewudetu and St. Paul in Addis Ababa, Ethiopia.

Research objective: the aim of this study is to assess knowledge and practice of NICU nurses and midwives towards neonatal resuscitation at selected hospitals such as Black Lion, Gandhi, Zewudetu and St. Paul in Addis Ababa, Ethiopia.

Study procedure: Among from 13 referral government hospital in Addis Ababa, four hospitals were selected by simple random method.

Confidentiality: the collected information will be kept confidential and used only for research purposes. No one except the members of the research team will have access to the information collected. The personal information of the respondents will not be notified.

Benefits of the study: For your participation in the study no payment will be granted or has no any special privilege to you. But, participating in the study and giving your genuine information will provide great input to bring change in quantity of health service to neonatal resuscitation.

Risks of the study: The procedure does not bear any physical or psychological trauma. Furthermore, you will not be forced to respond to information you do not know.

Consent: Your participation in the study will be totally based on **your willingness**. You have the right not to participate from the beginning, or you may stop participating at any time after starting the participation.

Rights as a participant: If you have any questions about the study please be free to ask and contact me. Your participation in this survey is voluntary and you can choose not to answer.
Do you want to continue? yes---------- No----------

Thank you in advance for your help!

Person to contact: if the data collectors or other hospital administrative staffs have any question regarding the study they are free to contact me in person or by the following addresses:

MESAY BOGALE
Tel.: 0913 11 68 60
Email: mesay10@yahoo.com

Annex 2: Hospital Consent Form

This study will be conducted in four selected referral hospitals such as BLSH, GMH, ZMH and St. Paul. Black Lion Specialized Hospital is the main teaching and referral hospital. The main objective of this study is to assess knowledge and practice of nurses who are working in NICU and midwives who are working in delivery room towards on neonatal resuscitation.

In this study data will be collected from the nurses who are working in NICU and midwives who are working in delivery room. Any personal information will be maintained throughout the study process and no unauthorized access to the information is allowed.

Finally, the hospital has all the right to refuse to participate in this study at any time. If you have any questions or need further information regarding the planned study you are free to get clarification from the principal investigator or from the institution or through the following address: MESAY BOGALE, Tel.: 0913 11 68 60 (the principal investigator). Therefore, if you would like to participate in this study, would you please confirm it by signing here?
Thank you very much.

Participant---------- principal investigator----------

Annex III

Annex 3: Questinnare

Addis Ababa University

College of Health Science

Department of Emergency Medicine

Date _____

Code number of the checklist _____

My name is Mesay Bogale, second year MSC Emergency medicine and critical care nursing student. This study will be conducted in four selected referral hospitals such as BLSH, GMH, ZMH and Saint Paul Hospitals. The main objective of this study is to assess knowledge and practice of nurses who are working in NICU and midwives who are working in delivery room towards on neonatal resuscitation.

The hospital has all the right to refuse to participate in this study at any time. If you have any questions or need further information regarding the planned study you are free to get clarification from the principal investigator or from the institution or through the following Address**: Mesay Bogale,** Tel.: 0913 11 68 60 (the principal investigator). Therefore, if you would like to participate in this study would you please confirm it by signing here?

Thank you very much.

Participant Signature_____

Principal Investigator Signature_____

Part-one: Socio-Demographic Data

1) Age _____
2) Sex: 1) Male 2) Female
3) Profession: 1) NICU Nurse 2)Midwife
4) Level of education: 1) Diploma 2) Degree 3) Masters
5) Work experience: 1) 1-5year 2) 6-10years 3) 11-15 years 4) 16years and above
6) Working department: 1) Delivery room 2) Neonatal Intensive Care Unit (NICU)
7) Name of Hospital where you work: 1) Tikur Anbessa 2) Gandhi 3) Zewuditu 4) St. Paul

Part -Two Questionnaires on Knowledge

8) Did you receive in-service training on neonatal resuscitation care?
   1) Yes 2) No
9) If yes, how many times have you got in-service training?
   1) One 2) Two 3) Three 4) Zero
10) Do you know the immediate problem of new born baby?
   1) Yes 2) No
11) If yes, what are the problems? (more than one answer is possible)
   1) Hypothermia 2) Asphyxia 3) Infection
12) Where do you keep the baby immediately after delivery?
   1) In the mother's abdomen 2) Clean and separate place/table
   3) Put simply on any place 4) Others specify_____
13) What do you do if the baby did not cry immediately after delivery?
   1) Suction if there is secretion 2) Stimulating the baby 3) Call help and start cardio-pulmonary resuscitation 4) Others specify_____
14) If a newborn baby has persistent apnea what is the immediate action to be done?
   1) Continue tactile stimulation a little bit more vigorously 2) Give positive pressure ventilation quickly 3) Give free flow oxygen 4) Other _____
15) The best indicator of effective bag and mask ventilation is?
   1) Rising heart rate and audible breath sounds 2) Rise in oxygen saturation
   3) Chest movements symmetrically 4) 2 &3
16) During chest compression how much pressure do you use?

1) Depress the sternum to 1/3rd to ½ diameter of the chest
2) There is no strict guideline; it varies depending upon the weight of the baby
3) Go on increasing pressure still there is no response

17) For term babies born through meconium stained liquor, one of the following is to be done?
1) Suction of oral cavity and nose after delivery 2) Endotracheal suction of active baby vigorous 3) End tracheal suction of no vigorous baby 4) Endotracheal suction of all babies born through meconium stained liquor

18) Where do you resuscitate high-risk/unstable newborn baby after delivery?
1) In the dedicated newborn corner in the delivery room
2) In a separate room near the delivery room
3) In the NICU or separate adjacent room
4) Anywhere

19) What is the basic equipment for neonatal resuscitation? More than one answer is possible
1) Heat source 2) Suction 3) Bag and mask 4) Oxygen linens

20) What is initial step of neonatal resuscitation?
1) provide warm environment 2) head position "neutral position" 3)clear airway and drying baby stimulation for breath 4) All

21) Resuscitation should be started? 1) After 1st minute APGAR score
2) After 5th minute APGAR score 3) Immediately

22) When do you stop resuscitation? (More than one answer is possible)
1) When baby is cried 2) When breathing rate (BR) < 30 beat per minute (BPM)
3) When the bay is gasping 4) When heart rate (HR) > 100 beat per minute (BPM)

Part 3: practice Assessing question

1) Have you ever practiced or participated in the neonatal resuscitation?
1) Yes 2) No

2) If the answer for Q No. 1 is yes, what was the procedure? More than one answer is possible
1) CPR 2) Endotracheal tube insertion 3) Bag and musk ventilation 4) Other _____

3) What problems did you face during neonatal resuscitation?

1) Lack of equipment 2) Lack of trained assistant 3) Lack of oxygen 4) Absence of guideline 5) Others (specify) _____

4) What is the correct position of baby resuscitation?

1) A baby should be neutral positioned by placing small towel under the shoulder and slightly extended neck 2) Flexed neck

3) Hyper extended neck 4) Other (specify)_____

5) In sucking baby's nose and mouth, the rule is

1) Sucking the nose then mouth 2) Sucking mouth then nose

3) Sucking mouth only 4) Sucking nose only

6) The ratio of neonate chest compression to breath is?

1) 3:1 2) 4:1 3) 2:15 4) 5:1

7) Do you have neonatal resuscitation guide line?

1) Yes 2) No

8) If yes, do you follow it during neonatal resuscitation?

1) Yes 2) No

9) How do you begin ventilation of the term neonate with bag and mask during resuscitation?

1) Oxygen attached to bag and mask but without reservoir
2) Oxygen attached to bag and mask with reservoir
3) Only bag and mask without any reservoir or oxygen

10) What is the routine practice in your delivery room regarding cutting of the umbilical cord?

1) Cord is cut immediately after the delivery of the baby
2) Cord is cut after a delay of a minute of the delivery of the baby
3) Cord is cut after pulsations stop
4) Cord is cut after 5 minutes

11. What resuscitative materials do you use? /More than one answer is possible/

1) Bulb syringe & suction catheter 2) Bag and mask 3) Endotracheal tube

4) Other_____

12 What is ratio of NICU nurse to newborn care? 1) 1:1 2) 1:3 3) 1:4 4) _____

13 What is the ratio of midwives to newborn care? 1) 1:1 2) 1:3 3) 1:4 4) _____

14 Do you use CPAP (continues positive airway pressure) and PEEP (positive end expiratory pressure) in the delivery room?

1) Yes 2) No

15 Do you use CPAP (continues positive airway pressure) or PEEP (positive end expiratory pressure) in NICU room?

1) Yes 2) No

16 Do you use oxygen a saturation monitor in the resuscitation area of NICU?

1) Yes 2) NO

17 Do you use Oxygen saturation monitor in the resuscitation area of delivery room?

1) Yes 2) NO

18 Do you think shortage of an oxygen source in the resuscitation area of NICU?

1) Yes 2) No

19 Do you think shortage of an oxygen source in the resuscitation area of delivery room?

1) yes 2) NO