ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCE

SCHOOL OF NURSING AND MIDWIFERY

KNOWLEDGE, PRACTICE AND ASSOCIATED FACTORS TOWARD NEONATAL RESUSCITATION AMONG NURSES AND MIDWIFES IN SOUTH WOLLO GOVERNMENTAL HOSPITALS, NORTHEAST ETHIOPIA 2018.

MASTERS THESIS IN PEDIATRICS AND CHILD HEALTH NURSING.

BY: GEBEYAW BISET (BSC).

JUNE 20, 2018

ADDIS ABABA, ETHIOPIA.

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PRINCIPAL INVESTIGATOR: GEBEYAW BISET (BSC).

ADVISOR: 1. KETEMA BIZUWORK (MSC).

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A THESIS SUB MITTED TO THE SCHOOL OF GRADUATE STUDIES OF ADDIS ABABA UNIVERSITY COLLEGE OF HEALTH SCIENCE SCHOOL OF NURSING AND MIDWIFERY IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS OF SCIENCE IN PEDIATRICS AND CHILD HEALTH NURSING.

JUNE 20, 2018

ADDIS ABABA, ETHIOPIA

APPROVAL SHEET

I, the undersigned MSc student, declare that I have submitted my original thesis on a title knowledge, practice and associated factors toward neonatal resuscitation among nurses and midwifes in south Wollo governmental hospitals to the institutional review board of Addis Ababa university college of health science school of nursing and midwifery.

Submitted by:

Gebeyaw Biset (BSC). _____ _____
Name of student Signature Date

This thesis by Gebeyaw Biset is accepted in its present form by the board of examiners as satisfying thesis requirement for the degree of masters in pediatrics and child health nursing.

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STATEMENT OF THE AUTHOR.

By my signature below, I declare and affirm that this thesis is my own work. I have followed all ethical principles of scholarship in the preparation, data collection, analysis, interpretation and completion of this thesis. All scholarly matter that is included in the thesis has been given recognition through citation. I affirm that I have cited and referenced all sources used to prepare this document. Every serious effort has been made to avoid any plagiarism in the preparation of this thesis. This thesis is submitted in partial fulfilment of the requirement for the degree of masters from the School of Graduate Studies at Addis Ababa University. The thesis is deposited in the Library of Addis Ababa university and is made available to the user under the rules of the library. I strongly declare that this thesis has not been submitted to any other institution anywhere for the award of any academic certifications. Brief quotations from this thesis may be used without special permission provided that accurate and complete acknowledgement of the source is made. Requests for permission for extended quotations from, or reproduction of, this thesis in whole or in part may be granted by the Head of the School or Department or the Dean of the School of Graduate Studies when in his or her judgment the proposed use of the material is in the interest of scholarship. In all other instances, however, permission must be obtained from the author of the thesis.

Name: Gebeyaw Biset (BSC).

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Date: 20/06/2018

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BIOGRAPHICAL SKETCH.

I was born in Amhara regional state north Wollo zone, Lasta woreda, kulmesk kebele in 1982 E.C. I attended primary school at Wondewossen Kassa full cycle elementary school; the former kulmesk full cycle elementary school, secondary at debre tsihay full cycle secondary school and preparatory at St. Lalibela higher preparatory school.

I was graduated from University of Gondar with BSc in nursing in 2004 E.C. I had a total of 4 years experiences with 1 years and 6 months in Legehida woreda health centres, 6 months at dessie health science college as instructors of Graduate Assistant one (GA-I) for 4 month and Wollo University as Graduate Assistant two (GA-II) for one year and as assistant lecturer for additional one year. Currently; I am working at Wollo university as instructor of assistant lecturer in paediatric and child health unit.

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ACRONYMS

AAU	Addis Ababa University.
AHA	American Heart Association.
BMV	Bag and Mask Ventilation.
EDHS	Ethiopian Demographic Health Survey.
HBB	Helping Baby Breath.
HCP	Health Care Professionals
LMICs	Low and Middle-Income Countries.
NICU	Neonatal Intensive Care Unit.
NR	Neonatal Resuscitation.
NRP	Neonatal Resuscitation Program.
PALS	Pediatrics Advance Life Support.
PPV	Positive Pressure Ventilation.
SSA	Sub-Sharan Africa.

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ABSTRACT

Background: The neonatal period is the most vulnerable time for child's survival because of the highest mortality and morbidity. One quarters of the global neonatal mortality is attributed to asphyxia; the highest burden of which is disproportionately concentrated in low and middle-income countries including Ethiopia. Poor resuscitation due to incompetent health care provider contributed significantly to this asphyxia related mortality and morbidity.

Objective: The aim of the study is to assess knowledge, practice and associated factors toward neonatal resuscitation among nurses and midwifes in South Wollo public hospitals, Ethiopia.

Methods: Institutional based cross-sectional study design was employed among 143 study subjects selected by simple random sampling method. Self-administered questionnaire and interview guide were used to collect data. Data was coded and entered into EPI data software version 3.1 and exported in to SPSS version 20 for analysis. Logistic regression was computed to see the possible associations of factors with the dependent variables and p-values of less than 0.05 in multivariate analysis was declared significant.

Result: One hundred and forty-three participants were included with a response rate of 100%. Only 32.9% and 24.5% of the participants had good knowledge and practice towards resuscitation respectively. Lack of training (AOR:3.44, 95% CI:1.54-7.68), absence of guideline (AOR:3.8, 95% CI:1.68-8.58) and lack of supportive supervision (AOR:2.49, 95% CI:1.1-5.6) were significantly associated with poor knowledge score, whereas absence of guidelines (AOR: 2.83, 95% CI:1.12-7.15) and lack of supportive supervision (AOR:5.28,95%CI:1.86-14.96) were significantly associated with the poor performance of the participants. Specialization with neonatology (AOR:0.19, 95%CI: 0.047-0.8) were associated with a higher performance of neonatal resuscitation.

Conclusion: Knowledge and practice of nurses and midwifes toward neonatal resuscitation were inadequate. Training were found to be a single predictor for knowledge while supportive supervision and guideline were predictors for both knowledge and practice. Continuous and regular training and supportive supervision for nurses and midwifes should be strengthen.

Key words: Neonate, asphyxia, Resuscitation, Knowledge, Practice.

1. INTRODUCTION

1.1. Background

The first 28 days of life is called the neonatal period. Incontrovertibly, it is the most vulnerable and high-risk time in life because of the highest mortality and morbidity in this period. The average daily mortality rate during this period is close to 30-folds higher than during the post neonatal period [1-3]. According to the recent report of the United Nations Inter-Agency Group for Child Mortality Estimation (UNIGME), 2.6 million newborns were died globally by the end of 2016. Neonatal mortality accounted for 46% of all under-five deaths increasing from 41% in 2000 [4]. Nearly all of the deaths were occurred in low and middle income countries (LMICs) where asphyxia contributed to almost 23% of these deaths [4, 5]. Despite a global reduction in under-five mortality in the last decade, neonatal mortality have not decreased to the same extent particularly in LMICs [6].

Asphyxia, defined by failure to initiate and sustain breathing contributed significantly to the high burden of neonatal mortality and morbidity [2, 7-9]. According to WHO reports of 2016, close to 700, 000 neonatal deaths were attributed to asphyxia. However, the majority of the deaths due to asphyxia could be prevented by adequate resuscitation practice which would then lead to a decline in the overall neonatal mortality [10]. Thus, to have an adequate impact on neonatal mortality associated with asphyxia, neonatal resuscitation with skillful provider is crucial [6].

Neonatal resuscitation is defined as to revive or restore life to the neonate [11]. It requires the use of specialized knowledge and skill to initiate and stabilize the cardiopulmonary functioning of the neonate and regular practice to maintain provider's competency [12]. Different factors including providers characteristics like educational level, experience, specialization; and institutional characteristics like training, availability of guidelines, availability of equipment affect competency of neonatal resuscitation and thereby neonatal outcome [13, 14].

1.2. Statement of the problem

Globally 2.6 million new-borns were died by 2016 (7,000 deaths every day) [3, 4]. The vast majorities of deaths take place in developing countries and approximately 70% occurs in South-east Asia (39%) followed by Sub-Sharan Africa (SSA) (38%). Five countries from LMICs; India, Pakistan, Nigeria, Democratic Republic of Congo and Ethiopia accounted for half of all the global new born deaths [4, 15]. SSA is the region of home to most of the highest mortality countries in the world with 1 child in 13 dying before the first birthday compared to1 in 189 in high-income countries [3, 4]. Five SSA countries; Nigeria, DR Congo, Ethiopia, Tanzania and Uganda accounted for 50% of the total African new born deaths [16]. Neonatal mortality rate in Ethiopia had remained high (29/1000), contributing to 120, 000 deaths every year [11, 17].

Asphyxia is one of the leading cause of neonatal mortality and morbidity globally [3, 7, 18]. According to WHO report of 2012, about one quarter of the global neonatal deaths are caused by asphyxia. Further from WHO 2015 report, it is responsible for 23% of neonatal mortality and 11% of all under five mortality [2, 9]. Furthermore, from 2013 Report of Global Development Alliance (GDA)**,** out of 139 newborns; 16 million babies needed help to breathe with simple resuscitation, 1 million babies needed help to breathe with advanced resuscitation and close to 700,000 died from asphyxia [12]. This figure had suggested that asphyxia had an overwhelming effect on neonatal survival and therefore, HCPs providing service for the neonate need to be proficient in resuscitation technique to avert asphyxia related morbidities and mortalities.

The burden of asphyxia is disproportionately concentrated LMICs with the highest incidence in SSA countries [16, 19]. It is responsible for 27% to 30% of neonatal deaths in resource-limited countries [13]. Asphyxia is the second most common cause of neonatal mortality in SSA accounted for 24% of neonatal mortality [16]. Studies in Nigeria and Zambia had indicated that asphyxia had contributed for a greater proportion of neonatal mortality [18, 19]. According to EDHS 2011, asphyxia is the second most common cause of neonatal mortality in Ethiopia (25%) [11]. Study in southwestern Ethiopia had indicated 47.5% of neonatal mortality is attributed to asphyxia. Furthermore, study in northern Ethiopia revealed that asphyxia had contributed to 31% of neonatal mortality [7, 8].

Asphyxia is not the only cause for neonatal mortality, but also result in a serious long-lasting morbidity among survivals. Half of asphyxia survivals from developing countries resulted in long term abnormal neurological examinations [19].

Despite asphyxia had a devastating effect on neonatal mortality and morbidity, competency towards resuscitation had remained a significant challenge [20, 21]. Many neonates in developing countries die unnecessarily from asphyxia because health care provider have not had the necessary knowledge and skill on how to give simple resuscitation [22]. Nurses and midwifes had a considerable knowledge and skill gap in all area of resuscitations [23-26]. Poor knowledge in diagnosing asphyxia as well as poor skill in neonatal resuscitation had persisted contributing to major gaps for the quality of services [27]. This suggested that lack of competency in neonatal resuscitation is one of the impediments for saving the asphyxiated baby. Therefore, further research is needed to investigate barriers contributing to poor resuscitation.

Knowledge and skill falloff as well as poor retention of knowledge and skill shortly after training had contributed significantly towards poor resuscitation [28, 29]. This could be due to lack of continuous and regular supportive supervision, refreshment training, or it may be associated with lack of resuscitation guidelines, equipment and supplies. Thus, continuous and regular research is needed to explore factors contributing to poor knowledge and practice and to implement strategic interventions for the improvement of the quality of new born health care.

Despite the high burden of asphyxia on neonatal mortality and morbidity, poor resuscitation had persisted significantly[27]. Barriers contributing to poor resuscitation had remained unidentified. Researches on the area of competency had remained scarce especially in low resource countries including Ethiopia [30, 31]. Moreover, to the best of the investigators knowledge, there has been no similar studies done in south Wollo Zonal health institutions. Therefore, the aim of this study is to determine knowledge and skill gaps as well as its determinants toward neonatal resuscitation among nurses and midwifes in south Wollo governmental hospitals.

1.3. Significance of the study

To have an adequate impact on neonatal mortality and morbidity due to asphyxia, midwives and nurses are expected to have appropriate knowledge and skill towards neonatal resuscitation. Given the high burden of asphyxia, HCPs must be skillful and knowledgeable on how to provide successful neonatal resuscitations. Understanding knowledge and practice of HCPs on neonatal resuscitation is very crucial because knowledge and practice change over time as new evidence arises. Therefore, it is important to conduct regular and continuous assessment of skill and knowledge to keep them congruent with the current knowledge and practice.

The information obtained from this study will:

Firstly, help policy makers, hospital managers and other stakeholders in planning, implementing and evaluating various interventions related to neonatal morbidity and mortality.

Secondly, help in developing strategies and guidelines that enhances knowledge and skill of health care providers towards neonatal resuscitation.

Thirdly, helpful to plan preventive measures and provision of effective skilful neonatal resuscitation to save the lives of the neonate.

In a broader perspective, it is a great resource for different level of stakeholders like: health care professional, governmental and nongovernmental managers and researchers.

Finally, the finding of this study contributes significant information for researchers interested in this field about knowledge and practice towards neonatal resuscitation among health care providers.

2. LITERATURE REVIEW

2.1. Overview of neonatal resuscitation.

Neonatal Resuscitation is a set of interventions used to assist the airway, breathing and circulation of a neonate following birth to 28days of life. About 10-15% of neonates need basic resuscitation with stimulation, suctioning and BMV and around 1% need advanced resuscitation to survive [11, 32]. NR begins immediately with newborn assessment and proceed with stimulation, suctioning, BMV, chest compression and administration of medication and volume expander accordingly [33]. Skilful NR is crucial for the reduction of asphyxia associated neonatal mortality and morbidity. A well trained and skillful health care provider successfully resuscitated an average of 84% of asphyxiated neonate. Although resuscitation by trained and skill full Health Care Provider can avert about 30% of all new born deaths, only one-eighth of neonates had access to this intervention [20, 21, 34].

Over all between 2013 and 2015 about 75% of HCPs were trained; up to 88% facilities were equipped with neonatal resuscitation materials but access to resuscitation had remained about 50%. In Bangladesh 48% of HCPs were trained, 55% of facilities were equipped with resuscitation materials but access to resuscitation had remained only 15%. Similarly, in Uganda 44% of HCPs were trained**,** 53% of health facilities were equipped with resuscitation materials, but access to resuscitation had remained only 25% [6, 20]. In the same year, the government of Ethiopia had trained 56% of HCPs and equipped 59% of health facilities, however, access is limited to only 8% of the neonate. Poor competency towards resuscitation had persisted contributing to gaps for the quality of neonatal services [12, 20, 27]. According to the Ethiopian Pediatrics Society of 2013, out of 43,393 births in 116 health facilities, 2,090 asphyxiated babies were successfully resuscitated by health workers who had received training. An assessment of 60 health facilities with 8,080 deliveries; 212 needs resuscitation at birth and 180(85%) of them survived after resuscitation while 453(6%) were stillbirths [12].

2.2. Knowledge towards neonatal resuscitation.

Provider's competency towards NR is very crucial to save the lives of the neonate. However, from several studies, it has been noted that nurses and midwifes had a considerable knowledge gap in all areas of neonatal care and resuscitation. In contrast, other studies had identified no competency gap in knowledge of neonatal resuscitation [23, 35-37]. A study among 192 participants in Kenya showed that only 35.4% had adequate knowledge towards neonatal resuscitation (score of 85% and above) while 70% of the participants scored less than average in all steps of resuscitation [24]. A similar cross-sectional study in Pakistan showed that among 49 midwifes, only 49% had good knowledge. From this study, only 42.85% midwives knew the correct order of initial steps of resuscitation and BMV; 26.53% midwives answered the correct rate of PPV. However, 67.34% and 69.38% of midwifes had better knowledge in the area of preparation, and correct sequences of suctioning respectively [38]. Similar study in Nigeria had revealed that majority of nurses had very good knowledge in the basic skills needed for the management of birth asphyxia [39].

The finding of the study in India had showed that nurses had poor mean score knowledge towards neonatal resuscitation (57%) [22]. Another study in India showed that among 93 nurses, only 34% nurses got a score of 85% and above in all steps of resuscitation. Only 67% and 81% nurses scored above 85% in the preparation/initial steps and BMV [40]. More study in India among NICU nurses showed that 40% of nurse had average knowledge and the remaining 33.33% and 26.66% had good and poor knowledge score respectively [41]. A study in Iran among 48 nursing and midwifery students based on Objective Structured Clinical Examinations (OSCE) showed that 56% of nurses respond correctly for knowledge questions [37].

Study in Sri Lanka among nursing staffs showed that 79.3% knew nothing about how to provide PPV or chest compression, the rest knew it incorrectly, only one or two participants knew it perfectly [35]. A cross sectional study in Ethiopia had suggested that the overall knowledge of nurses and midwifes was an average which was 50%; poor for those nurses (48.2%) and average for midwifes (51.8%). From a total of 22 knowledge items, midwifes scored an average of 11.4 items and nurses scored 10.4 items. Only two midwifes and none of the nurse were able to answer all 22 knowledge questions [42].

Another cross-sectional study in Ethiopia showed that the mean knowledge scores of midwives and nurses were 42.8% and 43.9% respectively. In this study 64.2% of nurses respond to the correct suctioning, 66.7% Effective mask ventilation, 60.4% depth of chest compression during CPR and 50.9% the dose of adrenaline for neonates during CPR. The finding of this study had implied that emphasis should be placed on determining the extent of conceptual knowledge of midwives in order to increase their competency towards neonatal resuscitation [23].

2.3. Practice towards neonatal resuscitation.

From several studies it has been noted that nurses and midwifes had a considerable gap in all areas of new born care and resuscitation practices. In contrast, other studies had identified no competency gap toward neonatal resuscitation practices [23, 35, 37]. A study in Kenya on skills of neonatal resuscitation had indicated that from different neonatal resuscitation steps, airway clearance was the most commonly performed step (85%), drying and stimulation fairly performed (60%) while BMV was the least (45%) performed step of neonatal resuscitation [43].

The finding of the study from Baghdad on practices level of nurses at delivery unit had indicated that from a total of 40 nurses 30% had poor practice and 70% acceptable practice but none of them had good practice toward neonatal resuscitation [36]. A similar study in Nigeria had revealed that only about 10% of the nurses involved in the management of asphyxia adopted appropriate high level of practices [39]. This finding had implied that the raise of neonatal mortality associated with asphyxia may be related with poor resuscitation practices.

The finding from India had showed that nurses had poor mean score practice in the area of pre-performance steps (32.66%), initial steps (41%), chest compression (42.94%), PPV (46.1%) and medications administration (49.88%) [22]. Another study in India among 93 nurses had showed that their performance in the step of chest compression was very poor; only 15% of nurses scored above 85% [40]. More study in India among NICU nurses showed that 60% of nurses had average practice and the remaining 20% and another 20% had good and poor practice score respectively regarding to the selected aspects of neonatal resuscitation [41].

A study from Iran among 48 nursing and midwifery students based on Objective Structured Clinical Examinations (OSCE) had showed that 84.6% of students had poor skills in neonatal resuscitation with the mean score of 41% which is <50% the total score. Among the different steps of resuscitation, the correct performance of the students was found to be; 38% initial steps of resuscitation, 39% PPV, 20% intubation, 72% chest compression, 45 % medication and 29% for advanced resuscitation [37].

Study in Sri Lanka among nursing staffs showed that nurses have average incomplete practice in preparation of resuscitation material. In initial steps of resuscitation all participants have done something but most have done it incorrectly or incompletely. However, there was very poor performance in last 2 steps of positive pressure ventilation and chest compression. Most (79.3%) of them knew nothing about how to do PPV or chest compression and the rest knew it incorrectly; only one or two participants knew it perfectly. Moreover, it had got the impression that in the last 2 steps they have average knowledge from books but no practical experience in their working field [35]. The studies described above highlights that much has to be done to empower nurses and midwifes with the necessary skill and knowledge capacity in order to enable them to carry out their work in accordance with the standard.

A cross sectional study in Ethiopia among nurses and midwifes had revealed that when asked what they do during neonatal resuscitations, three quarter mentioned placing the mask over the chin, mouse and nose. But only 24.5% mentioned that assisted ventilation should be 40 times per minute for one minute, 81.6% mentioned the need to keep the new born warm [42]. Another cross-sectional study in Ethiopia showed that the mean skill scores of midwives and nurses were 59.2% and 55.8% respectively. The percentage of correct responses given by midwives was >50% for only 2 of 12 skill questions and <50% for 10 of the 12 skill questions. The percentage of correct responses given by nurses was > 50 % for 3 of 12 skill questions and <50% for 9 of the 12 skill questions [23].

2.4. Factors affecting knowledge and practice towards neonatal resuscitation.

2.4.1. Provider related factors.

Several studies had revealed that providers sociodemographic characteristics had no relation with the knowledge and practice of nurses and midwifes toward neonatal resuscitations [23, 36]. Study in Nigeria had suggested that none of providers related characteristic; age and sex were associated with nurses practice towards neonatal resuscitation [39]. Another study in Baghdad showed that there is no significant association between nurse's practices and their socio demographic characteristics [36]**.** Cross sectional study in Ethiopia had implied no significant difference in the knowledge and skill scores of the participants in terms of their sociodemographic variables. But, according to this study, the mean knowledge score was significantly different in terms of sex of the participants (male vs. female [23].

However, studies had revealed that providers educational and professional characteristics like educational level, qualification, training and year of experience were significantly associated with providers competency. There are also some contradicting ideas among different studies on to whether these factors related to providers competency. A meta-analysis of three facility-based studies (India, Bulgaria and Zambia) from LMICs suggests that training was associated with a 30% reduction in intrapartum-related mortality and 38% reduction in early neonatal mortality [34]. Studies in India, Nepal, Afghanistan, Tanzania and Kenya had suggested that keeping the other variables constant, training had a significant effect on providers knowledge and practice toward neonatal resuscitation [13, 43-45]. In contrast, another studies in Baghdad and Nigeria had indicated that there was no statistical significant association between nurses' practices and their number of training session [36, 39].

Other studies in Kenya, Afghanistan and Côte d'Ivoire had revealed that providers year of experience was associated with a higher performance of neonatal resuscitation [43, 44, 46]. However, study in Nigeria had suggested that year of service and educational level had no significant relationship with nurses' level of knowledge in the management of birth asphyxia, but specializations with paediatric nurse had associated with a greater knowledge of neonatal resuscitation.

According to this study, the rising incidence in birth asphyxia is an indication of missing links among the indicators of professional nursing practices. These indicators were identified to be years of experience, professional qualifications, attitude of nurses and professional practices. [39]. According to the study in Malawi, non-adherence to resuscitation guidelines coupled with shortage of staff and bad staff attitude towards neonatal resuscitation were the contributing factors for high neonatal mortality associated with birth asphyxia [14].

Studies in India and Afghanistan had identified that no significant difference in skill and knowledge of HCP in-terms of qualification [40, 44]. Moreover, another cross-sectional study in Ethiopia had identified that, there was no significant difference in the knowledge score of the participants in terms type of profession, qualification and year of service. Further, from this study, there was no significant difference in skill scores of the participants in terms of type of profession, year of service and providers qualification [23]. Another cross sectional study in Ethiopia had suggested that, after controlling the facility characteristics, key predictors of high knowledge score among providers were recent performance of resuscitation and geographic region, being nurse or midwife were not associated with the participants knowledge score [42].

2.4.2. Institutional related factors

Institutional factors are attributes to the health setup which may affect providers performance of neonatal resuscitation and thereby neonatal outcomes. These factors may include availability of supplies and equipment, availabilities of guidelines, working unit, duration of working hours, supportive supervisions and work load [14, 40, 44]. A successful neonatal resuscitation requires both adequate training and necessary equipment. Moreover, good quality, accessible, acceptable and affordable medical devices play a fundamental role in efficient neonatal resuscitation performance [47]. Hospitals should have new born corner for providing essential care and basic neonatal life support immediately after birth to avert neonatal death and prevent long term disabilities. The new born corner requires three elements: Trained personnel (at least two at each delivery), warm clean surface covered in soft clothes close to the water source and well light and essential new born resuscitation care equipment and supplies [11]. According to WHO 2016 technical specifications, neonatal resuscitation equipment and supplies include bag with mask, suction machine and catheter, suction bulb, stethoscope, weighting scale, syringe and drugs [47].

According to the study in India, there was no significant difference in the knowledge score of the participants in terms of the working unit [40]. Study in Malawi had indicated that inadequate availability resuscitation equipment and supplies contribute to the high neonatal mortality associated with poor resuscitation [14]. In contrast, study in Afghanistan suggested that Lack of equipment do not pose major barriers to poor neonatal resuscitation practice. Further, from this study it was identified that maintaining provider's competency is challenging in facilities with low caseloads and no supportive supervision [44]. A cross-sectional study in Ethiopia had revealed that among the institutional factors availability of equipment and guidelines were associated with providers performance of neonatal resuscitation. According to this study lack of supplies and equipment was the most frequent reason for non-performance of neonatal resuscitations [42]. Another cross sectional study in Ethiopia had suggested that training had significant effect to the improvement of providers competency [23].

2.5. Conceptual frame work.

Conceptual framework for this study was adapted from the literatures reviewed. As illustrated in the diagram below, knowledge and practice level of nurses and midwifes towards neonatal resuscitation can be affected by different provider and institutional factors.

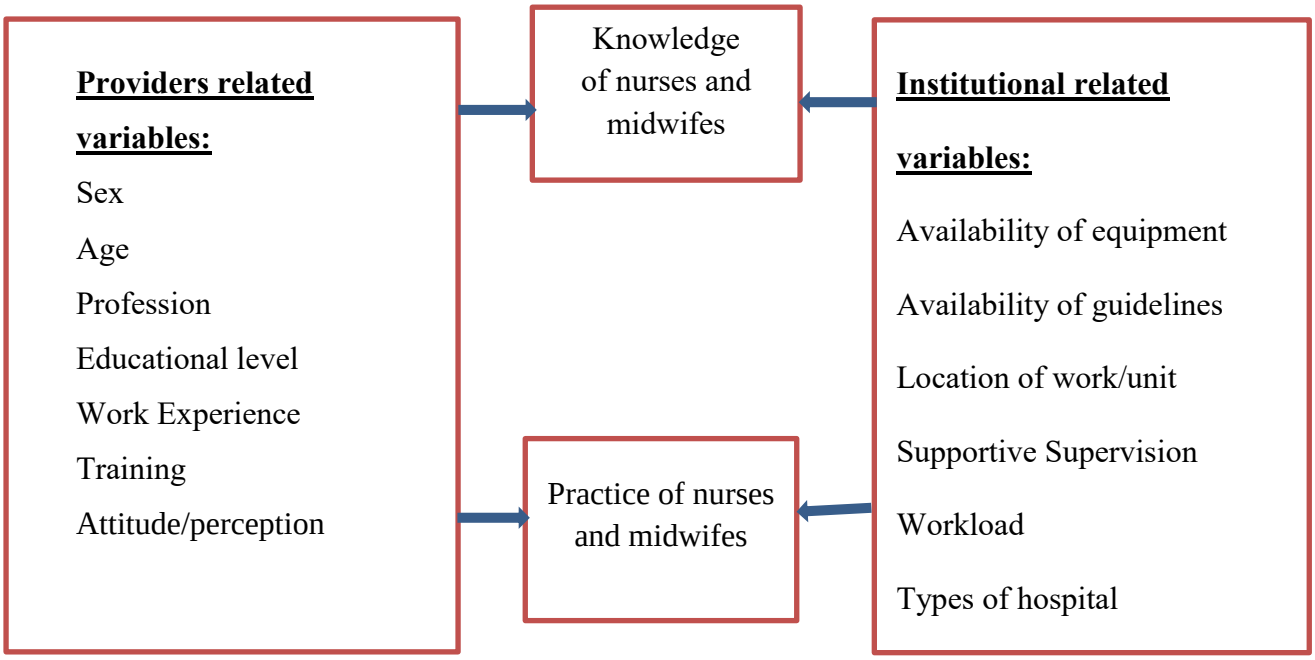


Figure 1: Schematic presentation of conceptual frame work for assessment of knowledge and practice towards neonatal resuscitation among nurses and midwifes in south Wollo governmental hospitals, June 2018.

3. OBJECTIVES

3.1. General objective

To assess knowledge, practice and associated factors toward neonatal resuscitation among nurses and midwifes in governmental hospital of South Wollo; northeast Ethiopia from February1 to March 30, 2018.

3.2. Specific objectives

1. To examine knowledge level of nurses and midwifes toward neonatal resuscitation in governmental hospital of south Wollo.
2. To determine practice level of nurses and midwifes toward neonatal resuscitation in governmental hospital of south Wollo.
3. To investigate association between knowledge and practice level of nurses and midwifes with the selected provider and institutional variables.

4. METHODS AND MATERIALS

4.1. Study area

This study was conducted in all governmental hospitals of south Wollo. South Wollo is one of the 11 zones of Amhara reginal state with a total area of 17,067.45 square kilometers. This zone is bordered on the south by Semien Shewa and the Oromia Region, on the west by Mirab Gojjam, on the northwest by Debub Gondar, on the north by Semien Wollo, on the northeast by Afar Region, and on the east by the Oromia Zone and Argobba special woreda.

According the 2007 Census conducted by Central Statistical Agency of Ethiopia (CSA), this Zone has a total population of 2,518,862; of these 70.89% are Muslims and the rest 28.8% are Ethiopian orthodox Christians. Its capital city; Dessie is located 401 km north of Addis Ababa, the capital city of Ethiopia, and 480 km from Bahir-dar, the capital city of Amhara Regional state with north latitude and east longitude of 11°8′and 39°38′ respectively.

This zone has a total of 125 health centers, 9 primary hospitals, 1 referral hospitals and 4 additional none governmental hospitals in dessie town. These health institutions serve for the communities of south Wollo, north Wollo, Oromia special administration, Afar region and Argobba special woreda.

4.2. Study period

This study was conducted from February1 to march 30, 2018.

4.3. Study design

Institutional based cross-sectional study design was employed.

4.4. Population

4.4.1. Source population

All nurses and midwifes in governmental hospitals of south Wollo.

4.4.2. Study populations

All nurses and midwifes working in delivery and neonatal intensive care units of each hospital.

4.4.3. Sample populations

All nurses and midwifes form NICU and delivery units of each hospital selected by simple random sampling method who fulfills the inclusion criteria.

4.5. Eligibility criteria

4.5.1. Inclusion criteria

All nurses and midwifes working in delivery and neonatal intensive care units of each hospital during data collection time.

4.5.2. Exclusion criteria

Nurses and midwifes inaccessible during data collection; sick and leave. Nurses and midwifes who had less than six months work experiences.

4.6. Sample size determination

Single population proportion formula was used to estimate the sample size and the following assumptions were made:

Since there was no study conducted in South Wollo area on knowledge and practice of midwives and nurses on neonatal resuscitation, a proportion of 50% were used.

Level of significance 5% (α= 0.05), 95 % confidence level ($Z\ \alpha/2 = 1.96$) and absolute precision or margin of error 5% (d = 0.05).

The following two formulas were used to calculate sample sizes.

$$no = \frac{\left(\frac{Za}{2}\right)^2 * p(1-p)}{d^2} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(1) ;}$$

$$nf = \frac{no}{1+\frac{no}{N}} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(2)}$$

Where: no= sample size before using correction formula,

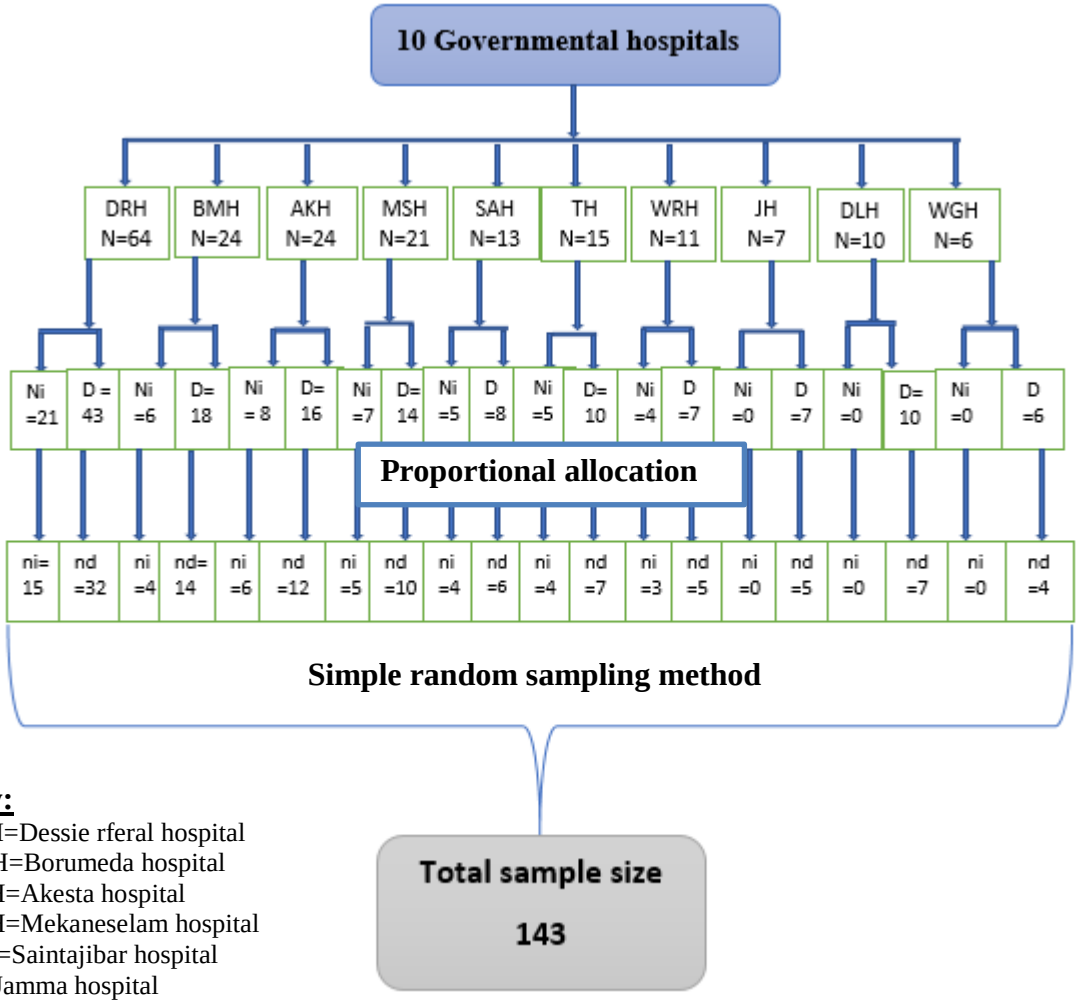
nf= sample size after using correction formula and

N= total numbers of study population which is 195.

Using this formula, the total sample size was 384. But, since the source population was small (<10,000) correction formula was used and adding 10% non-response rate a total of 143 sample was used for this study.

4.7. Sampling procedure

All governmental hospitals of south Wollo were included in the study purposely. Nine hospitals; Borumeda, Akesta, Mekaneselam, Saintajibar, Jamma, Woreilu, Tenta, Delanta and Wogidi are primary hospitals found in the 9 respective districts and one referral hospital; Dessie referral hospital is found in Dessie town. Samples were taken from NICU and delivery units of each respective hospitals by using simple random sampling method. A list of nurses and midwifes were obtained from NICU and delivery units of each hospitals. After calculating the total sample size, it was proportionally allocated to each hospital and then to NICU and delivery units of each hospital. Finally, estimated number of nurses and midwifes were selected from NICU and delivery units of each hospital by simple random sampling method based on the number of source population in each hospital and working units.



Key:
DRH=Dessie rferal hospital
BMH=Borumeda hospital
AKH=Akesta hospital
MSH=Mekaneselam hospital
SAS=Saintajibar hospital
JH=Jamma hospital
WRH=Woreilu hospital
TH=Tenta hospital
DLH=Delanta hospital
WG=Wogidi hospital
Ni=Neonatal intensive care unit
D=Delivery unit
ni=sample from Ni
nd=sample from delivery unit

Figure 2: Schematic presentation of sampling procedures for assessment of knowledge and practice toward neonatal resuscitation in south Wollo governmental hospitals.

- Samples were allocated proportionally to each hospital based on the following formula:

$$nx = \frac{Nx * nt}{N}$$

Where: nx =Sample size of each hospital,

Nx = source populations of each hospital,

nt = total sample size (143)

N= total source populations (195).

- Samples were allocated proportionally to NICU and delivery units based on the following formula:

$$ni = \frac{Ni*nx}{Nx} \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

$$nd = \frac{Nd*nx}{Nx} \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Where: Ni= source population from NICU.

ni= sample size from NICU.

nd= sample size from delivery unit.

Nd= source population from delivery unit.

4.8. Data collection instrument and procedure.

Data collection tool was prepared from similar literatures, WHO guidelines and Ethiopian Pediatric Association Guidelines and Training manual. The tool consists of structured self-administered questionnaires addressing provider and institutional characteristics; structured questions addressing knowledge of nurses and midwifes and interview guide addressing the practice level of nurses and midwifes.

A total of eleven trained data collectors: two BSc nurses, three BSc midwifes, two BSC pediatric nurses, BSC neonatal nurses, who had training on Basic Emergency Maternal Obstetric and New Born Care (BEMONC) and neonatal resuscitation were involved in the data collection process. Additionally, four MSc nurses in Pediatrics and child health were in supervision roll. Two days training were given for data collectors and supervisors regarding to the study purpose, methodology, on how to conduct the interview, administer self-administered questionnaire, how to take consent, keep confidentiality and respect the right of the participants.

4.9. Data quality control.

To control the quality of the tool, a total of seven expert clinicians, researcher professors, academicians were involved to review and determine its content validity. Based on the determination of the experts, the content validity index of the instrument was calculated which was 0.89(CVI=0.89). And also, important suggestions and recommendation from experts were included. The completeness of the data was checked on daily basis of the data collection period by the data collector itself, supervisor and principal investigators. Prior to the actual data collection period a pretest was done on 5% of the total sample size on separate hospital Ethio-general hospital. Based on the result of the pretest, some ambiguous questionnaire and interview guides were modified for clarity and consistency. The reliability of the tool was also determined based on the analysis result of the pretest which was 0.89 (Cronbach's alpha=0.89).

The data collectors for each hospital were selected from other hospitals to reduce social bias during interview for practice assessment. Participants were interviewed regarding to their performance before self-administered questionnaires for knowledge assessment is administered to reduce information bias.

4.10. Study variables

4.10.1. Dependent variables

- Knowledge toward neonatal resuscitation and
- Practice toward neonatal resuscitation.

4.10.2. Independent variables

Providers related factors:

- Sex, Age
- Qualification
- Level of education
- Training
- Work experiences and
- Attitude/ perception.

Institutional factors:

- Hospital level (primary vs referral)
- Working unit
- Availability of resuscitation equipment
- Availability of resuscitation guideline
- Supportive supervision and Work load.

4.11. Definition of terms

Resuscitation: Revive or restore life to a person with breathing and/or circulation difficulty.

Neonatal resuscitation: Intervention after birth to 28days of the baby to assist in breathing and circulation.

Initial steps of resuscitation: Immediate assessment, providing warmth, drying the baby and tactile stimulation.

Basic newborn resuscitation: Airway clearing (suctioning), head positioning and positive pressure ventilation via bag-and-mask.

Advanced new born Resuscitation: Basic resuscitation plus chest compression and administrations of epinephrine and volume expander.

4.12. Operational definitions.

Full equipment for resuscitation: Hospitals with the minimum of the following materials according WHO 2016 Technical Specifications of Neonatal Resuscitation Devices (TSNRD): Radiant warmer, bag with mask, suction machine & catheter, single/multi use suction bulb, stethoscope.

Work load: Nurses and midwifes who serve for more than 5 neonates/24 hours and/or who works for more than 8hours/24hours according to Ethiopian pediatric society.

Attitude: Participants with score of greater than the mean score was considered having good perception and those who scored less than the mean score was considered having poor perception toward neonatal resuscitation.

Knowledge: Appropriate response from nurses and midwifes about neonatal resuscitation through the structured knowledge questionnaires and those who scored above 80% (>=22 correct response from 27 knowledge questions) were considered having good knowledge and those below 80% (<22 correct response from 27 knowledge questions) were considered having poor knowledge (According to the 2018 AHA PALS accreditation criteria).

Practice: Appropriate response from nurses and midwifes about neonatal resuscitation through interview questionnaires and those who scored above 80% (>=24 correct response from 30 practice questions) were considered having good practice and those below 80%(<24 correct response from 30 total questions) were considered having poor practice (According to the 2018 AHA PALS accreditation criteria).

4.11. Data processing and analysis

Data was verified, coded and entered to Epi Data Software version 3.1 and then it was exported into SPSS version 20 Software for analysis. The results of the analysis were described using descriptive statistic's like frequency, percentage and mean using tables, graphs and texts. To measure the possible association of factors with the knowledge and practice level of nurses and midwifes binary logistic regression were computed. Since the variables were small in number, all variables regardless of the p-value in bivariate analysis were entered to multivariate analysis. Factors with p-values of less than 0.05 in multivariate analysis were declared having significant association with the dependent variables and strength of association were described using odds ration both crude and adjusted adds ratio (COR and AOR).

4.12. Ethical consideration

Ethical clearance was obtained from school of nursing and midwifery, Addis Ababa University health science college Institutional Research Ethical Review Board(IRERB). After ethical clearance, permission letter was obtained from school of nursing and midwifery to south Wollo governmental hospitals. Also, permission was obtained from each study hospitals and then heads of each respective ward. Study participants were asked for their willingness to participate in the study. All the reasons why the participants were chosen, possible risk and why the research was being conducted were explained verbally to the study subjects. The participants were fully explained that they have the right not to participate in the study, to stop at any time in between or not to answer any questions they were not willing to answer. Confidentiality was maintained; no unauthorized person had access to the information and names or other identifiers were not recorded.

4.13. Dissemination of the result

The result of the study was submitted and presented to AAU, college of health sciences, school of nursing and midwifery as partial fulfillment for the requirement of master's degree in pediatric and child health nursing. The final result of this thesis was accessed to AAU, health science college library as the source for future learning. It will also be disseminated to Amhara regional health bureau and south Wollo zonal health bureau which can provide basic information about the health professionals' knowledge and practice toward the delivery of quality health services. Attempt will be made to offer the hard copy for each study hospitals which will be used as an input for health care professional training and development. Finally, repeated attempts will be made to access the information through scientific publications for other researchers.

5. RESULT

5.1. Provider sociodemographic and institutional characteristics.

A total of 143 participants were included from delivery and neonatal intensive care units of one referral and 9 primary hospitals with a response rate of 100%. Majorities of the participants 96 (67.1%) were from primary hospitals and the rest 47(32.9%) were from referral hospital. In terms working unit 102(71.3%) were from delivery unit and the rest 41(28.7%) were from neonatal intensive care units. Regarding to educational level majorities of the participants 110(76.9%) were degree holders. The maximum and minimum age of the participant were 43 and 20 years respectively. While the mean age of the participants was 29.02(SD=5.44). Majorities of the participants 71(49.7%) were between the ages of 25 and 29 years **(Table 1).**

Table 1: Provider and institutional characteristics of the participant in south Wollo governmental hospitals northeast Ethiopia June 14, 2018.

Variables	Categories	Frequency(n)	Percent (%)
Sex	Male	78	55.3
	Female	63	44.1
Age of the participants	20-24	23	16.1
	25-29	71	49.7
	30-34	18	12.6
	35-39	22	15.4
	40-44	9	6.3
Work experiences	<5years	84	58.7
	6-10years	34	23.8
	11-15years	13	9.1
	16-20years	12	8.4
Resuscitation Training	No	78	54.5
	Yes	65	45.5
Full resuscitation Material	Absent	63	44.1
	Present	80	55.9
Resuscitation Guideline	Absent	69	48.3
	Present	77	53.8
Supportive supervision	Absent	68	47.6
	Present	75	52.4
Work load	No	65	45.5
	Yes	78	54.5
Attitude towards neonatal resuscitation	Poor	83	58.0
	Good	60	42.0
Field of study	BSC nurse	30	21
	Pediatric nurse	8	5.6
	Neonatal nurse	13	9.1
	Midwifery	92	64.3
Educational level	Diploma	33	23.1
	Degree	110	76.9

5.2. Knowledge level of the participant towards neonatal resuscitation.

This study had showed that more than half of the participants 96(67.1%) had poor knowledge score towards neonatal resuscitations. The minimum and maximum knowledge scores of the participants towards neonatal resuscitation were 8(29.63%) and 25(92.59%) respectively with interquartile range of 7(25.93%) **(Figure 3).**

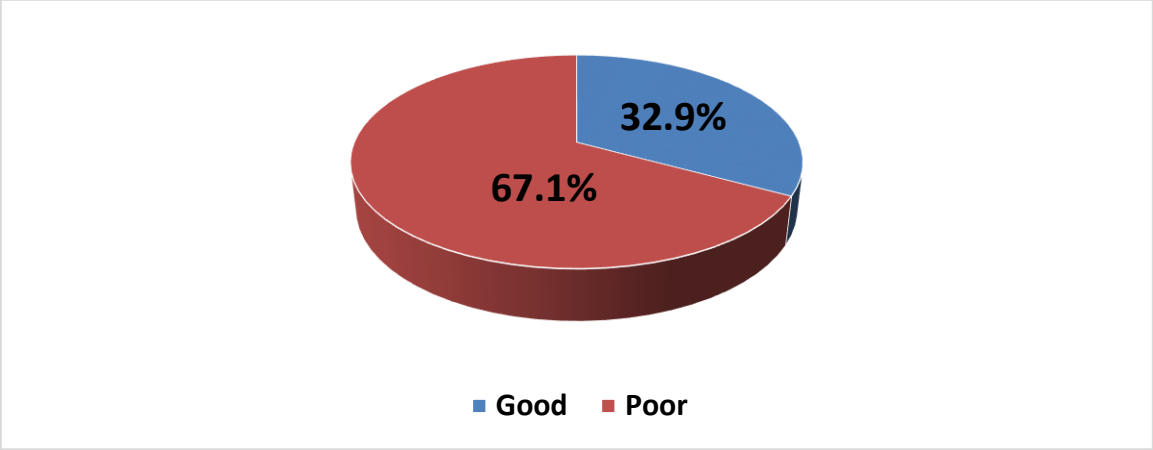


Figure 3: Knowledge level of the nurses and midwifes towards neonatal resuscitation in governmental hospitals of south Wollo north east Ethiopian June 2018.

5.2.1. Knowledge level in terms of provider characteristics.

In this study out of a total of 92 midwifes more than two third 69.6% had poor knowledge score towards neonatal resuscitation similarly from a total of 30 BSC nurses two third 66.7% had poor knowledge towards neonatal resuscitation. From a total of 13 neonatal nurses more than half 53.8% had poor knowledge similarly from a total of 8 paediatric nurses more than half 62.5% had poor knowledge toward neonatal resuscitation. In terms of educational status from a total of 110-degree holders more than two third 68.2% had poor knowledge score towards neonatal resuscitation. Regarding to the participants work experience among participants with the highest work experience (16-20yrs) two third had poor knowledge towards neonatal resuscitation. Among a total of 43 participants with poor attitude majority 86% had poor knowledge score towards neonatal resuscitation **(Table 3).**

5.2.2. Knowledge level of the participant among hospitals.

In this study majorities of the participants in all governmental hospitals had poor knowledge score towards neonatal resuscitation. The lowest knowledge score was observed in two governmental hospitals; Woreilu and Wogidi hospitals where 75% of the participants in these hospitals had poor knowledge score towards neonatal resuscitation **(Figure 4).**

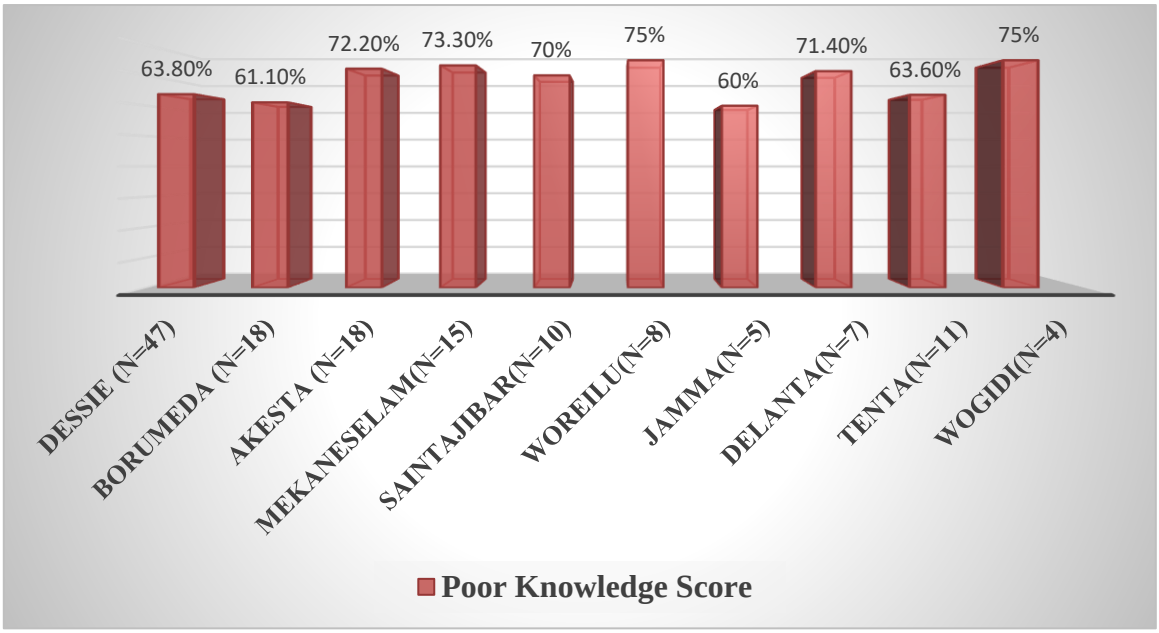


Figure 4: Knowledge level of the nurses and midwifery towards neonatal resuscitation among governmental hospitals of South Wollo northeast Ethiopia June 2018.

5.2.3. Knowledge level in terms of institutional characteristics.

In this study from a total of 96 participants who were working in primary hospital more than two third 68.8% had poor knowledge score similarly from a total of 47 participants who were working in referral hospital almost two third 63.8% had poor knowledge. Out of 102 participants who were working in delivery unit more than two third 68.6% had poor knowledge score towards neonatal resuscitation similarly from a total of 41 participants working in neonatal intensive care unit almost two third had poor knowledge. Out of 49 participants with no neonatal resuscitation guideline in the work place majority 81.2% had poor knowledge score while from a total of 68 participants with no supportive supervision most of the participants 79.4% had poor knowledge score towards neonatal resuscitation **(Table 3).**

5.2.4. Knowledge level of the participant in different steps of neonatal resuscitation.

Among the different steps of neonatal resuscitation, the correct responses given by the participants were more than 80% for only 6 of 27 knowledge. In this study 80(55.9%), 70(49%) and 38(26.6%) of the participants had better knowledge in the area of initial steps of resuscitation, BMV and chest compression respectively but none of the had good knowledge in medication administration. The most frequently answered knowledge questions were slightly extended neck for resuscitation 132 (92.3%), 0.9 NaCl is volume expander 128(89.5%), inadequate seal is the reason for failure of BMV 126(88.1%), epinephrine is the preferred medication for resuscitation 119(83.2%) and 3:1 is the ratio of compression to ventilation 118(82.5%) **(Table 2).**

Table 2: Responses given by the participants for selected knowledge questions toward neonatal resuscitation in south Wollo governmental hospitals northeast Ethiopia June 2018.

Questions	Response	
	Yes N (%)	No N (%)
Slapping/flicking the sole of the feet	101 (70.6)	42 (29.4)
Persistent cyanosis is indication for BMV	92 (64.3)	51(37.5)
Inadequate seal is the reason for failure of BMV	126 (88.1)	17 (11.9)
Slightly extended neck for resuscitation of the new born	132 (92.3)	11 (7.7)
Correct size of mask for term and preterm new born is 1&0 respectively	112 (78.3)	31 (21.7)
Mask covers mouth, nose and tip of chine during resuscitation	94 (65.7)	49 (34.3)
Two thump techniques for chest compression	72 (50.3)	71 (49.7)
The correct ratio of chest compression to ventilation is 3:1	118 (82.5)	25 (17.5)
Depth of chest compression is 2/3rd of the anteroposterior diameter	70 (49)	73 (51)
Epinephrine is the preferred medication for resuscitation	119 (83.2)	24 (16.8)

5.2.5. Mean knowledge score of the participant.

In this study the overall mean knowledge score of the participant toward neonatal resuscitation was 68.56 %(SD=16.37%). The overall mean knowledge scores for comprehensive nurses, pediatric nurses, neonatal nurses and midwifes were 64.69%(SD=17.22%), 70.83% (SD=16.61%), 75.21% (SD=14.05%) and 68.68%(SD= 16.72%) respectively. The mean knowledge scores of the participants in the initial steps of resuscitation, bag and mask ventilation, chest compression and medication administration were 69.37% (SD=26.2%), 75.5% (SD=20.9%), 61.42% (SD=20.2%) and 35% (SD=20.2%) respectively. The mean knowledge of BSC nurses, pediatric nurse neonatal nurses and midwifes was poor in all main steps of neonatal resuscitation **(Table 3).**

Table 3: Mean knowledge score of the participants in the main steps of neonatal resuscitation in south Wollo governmental hospitals northeast Ethiopia June 2018.

	Mean knowledge score (SD)			
Field of study	**Initial step of resuscitation**	**Bag and mask ventilation**	**Chest compression**	**Medication administration**
BSC nurse	56.66%(30.66%)	70.74%(21.53%)	62.77%(20.84%)	34.28%(19.76%)
Pediatric nurse	70%(30.23%)	79.16%(18.24%)	62.5% (21.36%)	48.21%(10.62%)
Neonatal nurse	76.92%(21.36%)	78.63%(22.88%)	67.94%(14.37%)	39.56%(16.65%)
Midwifery	72.39%(23.87%)	76.32%(20.72%)	59.96%(20.68%)	34.16%(20.63%)

5.2.6. Factors affecting knowledge of the participants.

This study showed that there was no significant association in the knowledge score of the participants in terms of sex, age, educational level, year of services, working units, level of working hospitals and attitude of the participants. But there was significant association in the knowledge score of the participants in terms of neonatal resuscitation training **(p=0.002),** availability of resuscitation guideline **(p=0.001)** and supportive supervision **(p=0.027).**

Untrained nurses and midwifes had 3 times less knowledge than trained nurses and midwifes. Nurses and midwifes who had no neonatal resuscitation guideline in the work place had almost 4 times less knowledge than those who had guideline. Participants with no supportive supervision had 2 times less knowledge than those who got supportive supervision **(Table 4).**

Table 4: Bivariate and multivariate analysis showing association of independent variables with the knowledge score of the participant in south Wollo governmental hospitals north east Ethiopia June 2018.

Variables		Knowledge level		COR (95% CI)	AOR (95% CI)
		Good n (%)	Poor n (%)		
Age	20-24	7 (30.4)	16 (69.6)	4.57(0.88-23.71)	2.2(0.3-16)
	25-29	20 (28.2)	51 (71.8)	**5.1(1.16-22.39)**	4.15(0.69-25)
	30-34	7 (38.9)	11 (61.1)	2.2(0.43-11.22)	1.34(0.17-10.32)
	35-39	7 (31.8)	15 (68.2)	**7.5(1.28-44.09)**	5.39(0.73-39.58)
	40-44	6 (66.7)	3 (33.3)	1	1
Sex					
	Male	28 (35.9)	50 (64.1)	0.77(0.38-1.57)	0.77(0.32-1.89)
	Female	19 (30.2	44 (69.8)	1	1
Experience					
	<5years	25 (29.8)	59 (70.2)	**4.72(1.3-17.11)**	0.29(0.016-5.43)
	6-10years	12 (35.3)	22 (64.7)	3.67(0.91-14.74)	0.3(0.015-6.28)
	11-15years	2 (15.4)	11 (84.6)	**11(1.6-15.5)**	3(0.21-42)
	16-20years	8 (66.7)	4 (33.3)	1	1
Training					
	No	16 (20.5)	62 (79.5)	**3.53(1.7-7.36)**	**3.44(1.54-7.68**)**
	Yes	31(47.7)	34 (52.3)	1	1
Guideline					
	No	13 (18.8)	36 (81.2)	**3.66(1.72-7.8)**	**3.8(1.68-8.58**)**
	Yes	34 (45.9)	40 (54.1)	1	1
Supervision					
	No	14 (20.6)	54 (79.4)	**3.03(1.44-6.38)**	**2.49(1.1-5.6*)**
	Yes	33 (44)	42 (56)	1	1
Attitude					
	Poor	6 (14)	37 (86)	**4.29(1.66-11.08)**	2.25(0.76-6.68)
	Good	41 (41)	59 (59)	1	1
Field of study					
	BSC nurse	10 (33.3)	20 (66.7)	0.88(0.36-2.1)	0.73(0.22-2.45)
	Pediatric nurse	3 (37.5)	5 (62.5)	0.73(0.16-3.26)	0.48(-0.06-3.73)
	Neonatal nurse	6 (46.2)	7 (53.8)	0.51(0.16-1.66)	0.33(0.73-1.51)
	Midwifery	28 (30.4)	64 (69.6)	1	1
Education					
	Diploma	12 (36.4)	21 (63.6)	0.82(-0.36-1.85)	0.58(0.19-1.76)
	Degree	35 (31.8)	75 (68.2)	1	1
Working unit					
	NICU	15 (36.6)	26 (63.4)	0.79(0.37-1.7)	0.83(0.14-4.8)
	Delivery	32 (31.4)	70 (68.6)	1	1
Hospital level					
	Primary	30 (31.2)	66 (68.8)	1.25(0.6-2.6)	1(0.34-3.05)
	Referral	17 (36.2)	30 (63.8)	1	1
Equipment					
	No	18 (28.6)	45 (71.4)	1.42(0.7-2.9)	0.6(0.22-1.67)
	Yes	29 (36.2)	51 (63.8)	1	1
Work load					
	Yes	23 (29.5)	55 (70.5)	1.4(0.7-2.82)	1.64(0.69-3.86)
	No	24 (36.9)	41 (63.1)	1	1

Key: * = Significant, ** = Highly significant, 1= reference, COR=Crude odds ratio, AOR=Adjusted odds ratio

5.3. Practice of the participant toward neonatal resuscitation.

This study had revealed that majority 75.5% of the participants had poor practice towards neonatal resuscitation and the rest 35(24.5%) had good practice toward neonatal resuscitation. The minimum and maximum practice score of the participants about neonatal resuscitation were 8(26.67%) and 27(90%) respectively with interquartile range of 7(23.33%) **(Figure 5).**

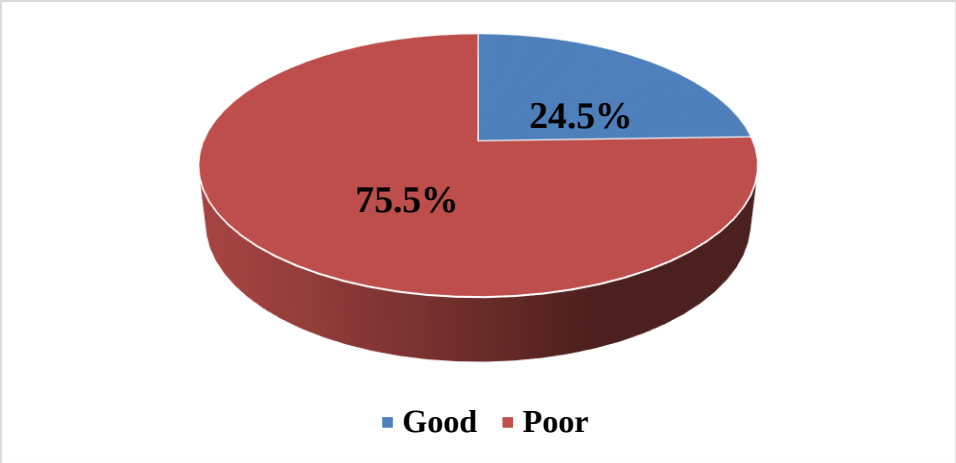


Figure 5: Practice level of the participant towards neonatal resuscitation in governmental hospitals of south Wollo northeast Ethiopia June 2018.

5.3.1. Practice of the participant in terms of providers characteristics.

In this study from a total of 92 midwife majority 81.5% had poor performance similarly from a total of 30 BSC nurses' majority 70% had poor performance towards neonatal resuscitation. From a total of 13 neonatal nurses almost half 53.8% had poor performance similarly from a total of 8 pediatric nurses two third 62.5% had poor performance toward neonatal resuscitation. Among 110-degree holders' majority 75.5% had poor performance toward neonatal resuscitation. Out of 43 participants who had poor attitude towards neonatal resuscitation majority 88.4% had poor performance towards neonatal resuscitation. In terms of neonatal resuscitation training out of a total of 78 participants with no neonatal resuscitation training majority 83.3% had poor performance toward neonatal resuscitation **(Table 7).**

5.3.2. Practice level of the participant in terms of different institutional characteristics.

In this study majorities of the participant in all governmental hospitals had poor performances towards neonatal resuscitation. About 80% or more of the participants from Woreilu, Jamma and mekaneselam hospitals had poor performance toward neonatal resuscitation. None of the participant from Wogidi hospital had good performance toward neonatal resuscitation **(Figure6).**

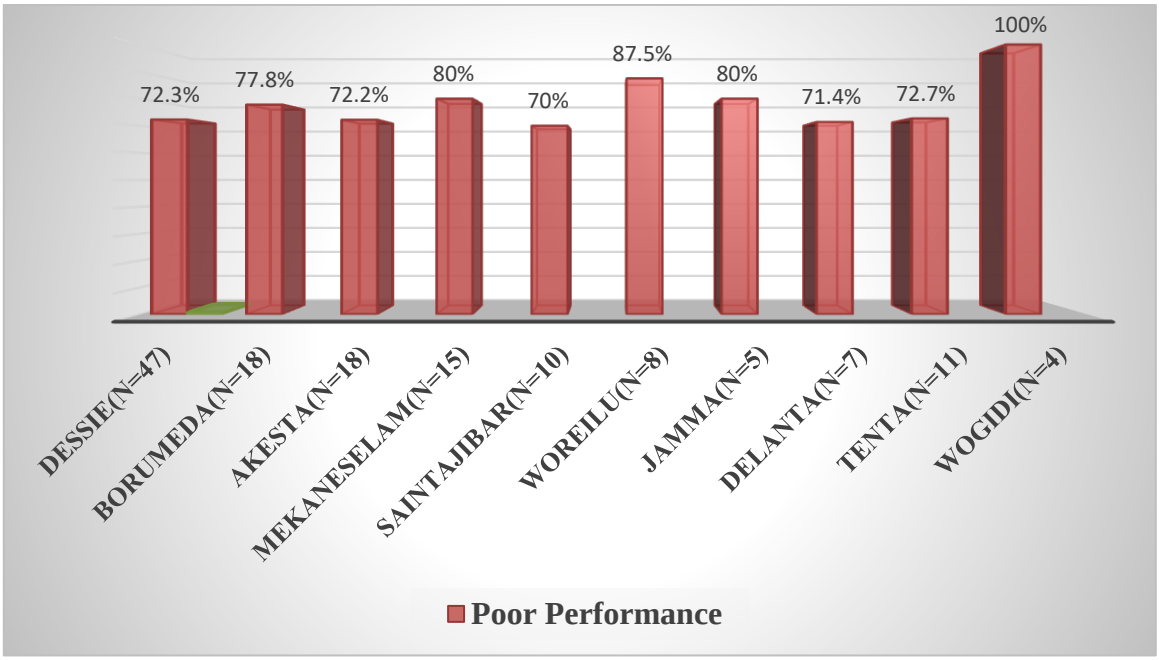


Figure 6: Practice level of nurses and midwifes toward neonatal resuscitation among governmental hospitals of South Wollo northeast Ethiopia June 2018.

5.3.3. Practice level of the participant in terms of institutional characteristics.

In this study from a total of 96 participants who were working in primary hospital majority 77.1% had poor performance towards neonatal resuscitation similarly from a total of 102 participants working in delivery unit majority 71.3% had poor performance towards neonatal resuscitation. Out of 68 participants who had no supportive supervision majority 89.7% had poor performance towards neonatal resuscitation similarly from a total of 49 participants who had no resuscitation guideline in the work place majority 85.5% had poor performances towards neonatal resuscitation **(Table 7).**

5.3.4. Practice level of the participant in different steps of resuscitation.

Among the different steps of neonatal resuscitation, the correct response given by the participants were more than 80% for only 10 of 30 practice questions. While the percentages of correct response for 20 practice questions were less than 80%. In this study 55(38.5%), 63(44.1%), 74(51.7%), 67(46.9%), 33(23.1%) and 35(24.5%) of the participants had better performance in the area of preparation step, assessment of the new born, initial steps of resuscitation, BMV, chest compression and medication administration. The most frequently answered practice questions were clear the new born's airway 142 (99.3%), ventilate the new born 40-60bpm 135 (94.4%) and assess the new born for color 131 (91.6%).

Table 5: Responses given by the participants for selected practice questions toward neonatal resuscitation in south Wollo governmental hospitals northeast Ethiopia June 2018.

Questions	Response	
	Yes N (%)	No N (%)
Assess the new born for color.	131(91.6)	12 (8.4)
Dry the new born.	133 (93)	10 (7)
Provide tactile stimulation.	106 (74.1)	37 (25.9)
Clear the air way.	142 (99.3)	1 (0.7)
Ventilate the new born from 40 to 60 beats per minute.	135 (94.4)	8 (5.6)
Apply chest compression with ventilation/CPR in 3:1 ratio.	120 (83.9)	23 (16.1)
Administer the correct dose of epinephrine (0.1-0.3ml/kg of 1: 10,000) to the new born.	115 (80.4)	28 (19.6)

5.3.5. Mean practice score of the participant.

In this study the overall mean practice score of the participant towards neonatal resuscitation was 62.96%(SD=15.89%). The overall mean practice scores for comprehensive nurses, pediatric nurses, neonatal nurses and midwifes were 60.11%(SD=16.62%), 67.5% (SD=13.77%), 70%(SD=13.81%) and 62.5%(SD= 15.96%) respectively. The mean practice scores of the participants in the preparation step, assessment of the new born, initial steps of resuscitation, bag and mask ventilation, chest compression and medication administration were 64.2% (SD=21.86%), 69.5% (SD=23.37%), 74.27% (SD=20.64%), 68.25% (SD=21.54%), 52.17% (SD=24.78%) and 49.65% (SD=28.27) respectively.

This showed that BSC nurses and midwifes had poor mean knowledge score in all steps of resuscitation. While, pediatric nurses and neonatal nurses had good knowledge in initial steps of resuscitation and BMV respectively but they had poor performance in other area of neonatal resuscitations **(Table 6).**

Table 6: Mean practice score of nurses and midwifes in the main steps of neonatal resuscitation in south Wollo governmental hospitals northeast Ethiopia June 2018.

Field of study	Mean Practice score(SD)					
	Preparation step	**Newborn assessment**	**Initial step resuscitation**	**Bag and mask ventilation**	**Chest compression**	**Medication administration**
BSC nurse	64% (21.9%)	66.67% (23.68%)	67.33% (21.3%)	66.67% (20.57%)	66.67% (20.57%)	48% (29.99)
Pediatric nurse	67.5% (14.88%)	67.5% (30.11%),	82.5% (16.69%)	65% (20.7%)	60% (21.38%)	67.5% (14.88)
Neonatal nurse	73.84% (15.02%)	75.38% (23.31)	78.46% (20.75%)	80% (18.26%)	56.92% (30.38%)	55.38% (23.32%)
Midwifery	62.6% (23%)	69.78% (21.28%)	75.22% (20.4%)	67.39% (22.13%)	51.17% (23.9%)	55.38% (23.31%)

5.3.6. Factors affecting practice level of the participant.

This study had showed that there was no significant association in the practice score of the participants in terms of sex, age, educational level, year of services, working units, level of working hospitals, work load, attitude and training of the participants. But there was significant association in the practice score of the participants in terms of availability of resuscitation guideline **(p=0.028)** and supportive supervision **(p=0.002)**.

Lack of neonatal resuscitation guideline and supportive supervision were associated with low level of resuscitation performance. Nurses and midwifes who had no resuscitation guidelines in the work place had almost 3 times less performance than nurses and midwifes who had guideline. Respondents with no supportive supervision had 5 times less performance than who got supportive supervision **(Table 7)**

Table 7: Bivariate and multivariate analysis result showing association of independent variables with the practice score of the participant in south Wollo governmental hospitals northeast Ethiopia June 2018.

Variables	Practice Level			
	Good n (%)	Poor n (%)	COR (95% CI)	AOR (95% CI)
Age				
20-24	5(21.7)	18(78.3)	2.88(0.56-14.94)	1.17(0.16-8.29)
25-29	17(23.9)	54(76.1)	2.54(0.61-10.55)	1.94(0.35-10.75)
30-34	5(27.8)	13(72.2)	2.08(0.39-11.06)	0.61(0.08-4.72)
35-39	4(18.2)	18(81.8)	3.6(0.66-19.78)	0.53(25.61)
40-44	4(44.4)	5(55.6)	1	1
Sex				
Male	22(28.2)	56(71.8)	0.66(0.3-1.45)	0.44(0.17-1.17)
Female	13(20.6)	50(79.4)	1	1
Experience				
<5years	19(22.6)	65(77.4)	2.44(0.7-8.58)	0.8(0.026-24.53)
6-10years	9(26.5)	25(73.5)	2(0.5-7.87)	0.35(0.012-10.6)
11-15years	2(15.4)	11(84.5)	3.93(0.59-26.1)	1.44(0.08-27.1)
16-20years	5(41.7)	7(58.3)	1	1
Training				
No	13(16.7)	65(83.3)	**2.56(1.17-5.62)**	2.42(0.92-6.04)
Yes	22(33.8)	43(66.2)	1	1
Guideline				
No	10(14.5)	39(85.5)	**3(1.32-6.87)**	**2.83(1.12-7.15*)**
Yes	25(33.8)	49(66.2)	1	1
Supervision				
No	7(10.3)	61(89.7)	**52(2.1-12.92)**	**5.28(1.86-14.96**)**
Yes	28(37.3)	47(62.7)	1	1
Attitude				
Poor	5(11.6)	38(88.4)	3.26(1.17-9.1)	1.83(0.51-6.56)
Good	30(30)	70(70)	1	1
Field of study				
BSC nurse	9(30)	21(70)	0.53(0.21-1.36	0.36(0.12-1.11)
Pediatric nurse	3(37.5)	5(62.5)	0.38(0.82-1.74)	0.57(0.1-3.31)
Neonatal nurse	6(46.2)	753.8)	**0.26(0.79-0.89)**	**0.19(0.047-0.8*)**
Midwifery	17(18.5)	75(81.5)	1	1
Education				
Diploma	7(21.2)	26(78.8)	1.27(0.5-3.24)	0.92(0.26-3.14)
Degree	28(25.5)	82(74.5)	1	1
Working unit				
NICU	14(34.1)	27(65.9)	0.5(0.22-1.12)	0.84(0.15-4.77)
Delivery	21(20.6)	81(79.4)	1	1
Hospital level				
Primary	22(22.9)	74(77.1)	1.29(0.58-2.85)	1.7(0.56-5.11)
Referral	13(27.7)	34(72.3)	1	1
Equipment				
No	21(26.2)	59(73.8)	1.25(057-2.7)	0.7(0.22-2.25)
Yes	14(22.2)	49(77.8)	1	1
Work load				
Yes	19(24.4)	59(75.6)	1.01(0.47-2.18)	1(0.37-2.74)
No	16(24.6)	49(75.4)	1	1

Key: * = Significant, 1= Reference, COR=Crude odds ratio, AOR=Adjusted odds ratio, CI=Confidence interval.

6. DISCUSSION

This study was intended to assess knowledge and practice level of nurses and midwifes toward neonatal resuscitation in south Wollo governmental hospitals, northeast Ethiopia. Skillful resuscitation is the single most important way to reduce asphyxia related neonatal mortality and morbidity. Knowledge and skill falloff as well as poor retention of knowledge and skill shortly after training complemented with other factors contributed significantly toward poor resuscitation which in turn contributes to asphyxia related neonatal mortality and morbidity [28, 29]. Therefore, investigating knowledge and practice with their determinants could provide an evidence for policy direction and basis for planning and implementing interventions.

This study showed that the overall knowledge and practice score of the participants was insufficient (<80%). This low level of knowledge may contribute towards poor resuscitation there by for asphyxia related mortality and morbidity. Thus, training for nurses and midwifes need to be strengthen. This finding is consistent with other similar studies from India and Ethiopia [22, 23]. This low level of knowledge score could be due to lack of continuous and regular training and supportive supervision to maintain knowledge of nurses and midwifes up to date. The overall mean knowledge score of the participants were 68.56%(SD=16.37%). This score was higher than that of the study from Ethiopia mean knowledge score of 50%[42]. The difference in the scores might be due to the difference in coverage of training given to nurses and midwifes.

This study showed that only 32.9% of the nurses and midwifes had adequate knowledge (score greater than 80%) toward neonatal resuscitation. This finding was in line with the study from Kenya (only 35.4% score greater than 85%), study from India (only 34% score greater than 85%) and other similar study from India (only 33.33% had good knowledge) [24, 40, 41]. This low level of knowledge could be due to lack of simulation-based training or lack supportive supervision and updating training.

From this study it was found that the mean knowledge score of nurses was insufficient (64.69%). This finding was in sharp comparable with the same study from India (57%) but higher than that of the study from Gondar teaching hospital (43.9%) [22, 23]. The discrepancy could be due to the difference in the quality of training on neonatal resuscitation and the guideline available for resuscitation. The mean knowledge score of midwifes was inadequate (68.68% (SD=16.72%)). This finding was higher than that of the study from Gondar teaching hospital (42.8%)[23]. The discrepancy could be due to the difference in the coverage and quality of resuscitation training.

The overall mean practice score of the nurses and midwifes were sub standardized which was 62.96 %. This low level of neonatal resuscitation performance might contribute towards poor resuscitation and there by asphyxia related mortality and morbidity. Thus, simulation-based training and periodic supportive supervision for nurses and midwifes should be given. This finding was in sharp comparable with the same study from Gondar teaching hospital 56.7% [23]. This low level of neonatal resuscitation performance could be due to inadequate training, lack of supportive supervision and refreshment training. This study showed that 75.5% of the nurses and midwifes had insufficient level of practice toward neonatal resuscitation. The finding was in sharp contrast to the result of a study from Iran in which 84.6% of nurses and midwifes had poor skills in neonatal resuscitation [37]. The discrepancy might be due to the difference in the quality of neonatal resuscitation training, adequate exposure to real resuscitation cases and hospital setup for resuscitation.

The mean practice score of nurses was insufficient (60.11%). This finding was comparable with that of the study from Gondar teaching hospital (55.8%) [23]. This low level of performance could be due to inadequate training, lack of supportive supervision and refreshment training. The mean practice score of midwifes was insufficient (62.5%). This finding was consistent with the study conducted in Gondar teaching hospital(59.2%) [23]. This low level of performance might be due to lack of simulation-based training, supportive supervision and guidelines for neonatal resuscitation. This study showed that 30% of the nurse had good practice toward neonatal resuscitation. This finding was inconsistent with that of the study from Nigeria only 10% of the nurses involved in the management of birth asphyxia adopted appropriate high level of practices [39]. This discrepancy might be due to the difference in the quality of the training, supportive supervision or refreshment training.

This study showed that resuscitation training (p=0.002) and supportive supervision (p=0.027) were associated with the knowledge level of nurses and midwifes. This was consistent with that of the study from Afghanistan in which training complemented with supportive supervision was significantly associated with a higher knowledge [44]. From this study it was found that lack of resuscitation guideline in the work place was significantly associated with low level of knowledge. This might be probably because lack of guidelines in delivery and neonatal intensive care unit impedes nurses and midwifes from updating their knowledge on neonatal resuscitations through continuous reading.

In this study lack of neonatal resuscitation guideline (p=0.028) and supportive supervision (p=0.002) were significantly associated with low level of resuscitation performance. This could be because if there is no resuscitation guideline in the work place, nurses and midwifes may not adhere to the resuscitation guideline while performing resuscitation which may resulted in poor neonatal resuscitation practice and if there were no supportive supervision, practice level of nurses and midwifes degenerate progressively through time and practice gap remained unidentified this may have contributed to poor neonatal resuscitation practice. In this study being neonatal nurse is associated with the higher performance (p=**0.024).** This might be neonatal nurses get adequate training on neonatal resuscitation during the undergraduate study than other fields of study.

7. LIMITATIONS OF THE STUDY

The major challenge of this study was assessment of practice using interview guide rather than observational checklist due to short study period and unpredictable asphyxia cases to be observed. Also, knowledge was assessed using self-administered questionnaires which may results in information bias. Very scattered hospital placement is the other limitation factor which makes transportation difficult for data collection and supervision. The sample size used might not be enough to detect the statistical difference between the explanatory variable and outcome variable.

8. CONCLUSION AND RECOMMENDATIONS

8.1. Conclusion

In conclusion, the overall mean knowledge and practice score of nurses and midwifes were inadequate. Only 32.9% and 24.5 % of the respondents had appropriate level of knowledge and practice toward neonatal resuscitation respectively. Lack resuscitation training, resuscitation guideline and supportive supervision were significantly associated with the poor knowledge score of the participants while lack of supportive supervision and resuscitation guideline were associated with the low performance of nurses and midwifes toward neonatal resuscitation.

8.2. Recommendation

Based on the finding from this study the following recommendations were made:

- Ministry of health should strengthen long-term training programs in neonatology and paediatric fields for nurses and midwifes. Because specialization in these fields can improve knowledge and practice towards neonatal resuscitation.
- Hospital managers and decision makers in collaboration with regional and zonal health bureau should strengthen continuous and regular training on neonatal resuscitation for midwives and nurses.
- Hospital managers and decision makers also need to provide periodic supportive supervision and refreshment training for updating knowledge and practice.
- Neonatal intensive care units and delivery units should fulfil all equipment and supplies which are important for neonatal resuscitation including resuscitation guidelines.
- Further observational study on knowledge and practice should be conducted to assess the quality of care and appropriateness of practice toward neonatal resuscitation.
- Nurses and midwifes should update their knowledge and practice toward resuscitation through continuous and regular reading and practicing on mock-up.

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10. ANNEX

Annex I: Participants information Sheet

Name of the investigator: Gebeyaw Biset (BSC).

Research title: knowledge, practice and associated factors towards neonatal resuscitation among nurses and midwifes in south Wollo governmental hospitals, Ethiopia 2018.

Purpose of the study: The aim of this study was to assess knowledge, practice and associated factors toward neonatal resuscitation among nurses and midwifes.

Study area and period: This study was conducted in governmental hospitals of south Wollo, Amhara regional state, Ethiopia from February 1 to March 30, 2018.

Study procedure: All governmental hospitals were included in the study purposely. Study subjects was selected from delivery and neonatal intensive care units of governmental hospitals using simple random sampling methods.

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

Benefits of the study: For the participation of the study subjects in the study no payment was granted or had no any special privilege to them. 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 did not bear any physical or psychological trauma. Furthermore, participants were not forced to respond to information they want not to do so.

Rights: Participation in this study was fully voluntary. participants were given the right to declare to participate or not in this study. if they decide to participate, they were given the right to with draw from the study at any time and also, they were told that they do not have to answer any question that they do not want to answer.

Annex II: Participants consent form

How are you! I am_____ from_____

I am here to collect data on the study of knowledge, practice and associated factors toward neonatal resuscitations among nurses and midwifes in south Wollo governmental hospitals; Dessie Referral Hospital, Borumeda hospital, Akesta hospital, Mekaneselam hospital, Saintajibar hospital, Woreilu hospital, Tenta hospital, Delanta, hospital having delivery and NICU services. In this study data will be collected from the nurses and midwives who are working in NICU and delivery room. You are an important stakeholder in this study and therefore I would appreciate if you could allot some valuable time to provide some information for the study. The information you provide will be kept confidential, no unauthorized person has access to the information. Your participation in the study is fully voluntary; You have the right to declare not participate at any time in between and also you don't have to answer any question you are not willing to answer. This study is expected to provide input for appropriate change in policy and program for improving the service delivery quality through improving providers skill and knowledge toward neonatal resuscitations.

Contact address: If you have any doubt regarding to the study; please contact and speak to the Principal investigator GEBEYAW BISET via phone number ***+251936910000***

Therefore, I declare my voluntary consent for participants in this study with my initials signature as indicated below.

Investigators Name_____ signature _____date__/__/2018

Data collector's Name_____ signature _____date __/__/2018

Having read the information stated above, would you like to participate in this study?

1. Yes ☐
2. No ☐

Annex III: Questionnaire.

Code_____ Date of data collection _____

Self-administered questions		
PART I: Questions related to Providers characteristics.		
101.	What is your sex?	1. Male 2. Female
102.	What is your age in years?	_____
103.	What is your field of study/profession?	1. Comprehensive Nurse. 3. Neonatal nurse 2. Midwifery. 4. Paediatric nurse. 5. Maternity 6. Others_____
104.	What is your level of education?	1. Diploma 2. Degree 3. Masters
105.	How many years have you provide neonatal resuscitation?	1. <5yrs. 2. 6-10yrs. 3. 11-15yrs. 4. 16 - 20yrs. 5. >20yrs
106.	Which unit are you working currently?	1. NICU 2. Labor ward. 3. No response
107.	Have you taken resuscitation training in the work place?	1. Yes 2. No 3. No response.
Part II: Questions related to institutional characteristics		
201.	What level of hospital you are working currently?	1. Primary hospital. 2. General hospital. 3. Referral hospital. 4. Others (Specify) __
202.	Does your hospital is fully equipped with resuscitation material? (A minimum of the following materials: Radiant warmer, bag with mask, suction machine & catheter, single/multi use suction bulb, stethoscope).	1. Yes 2. No 3. No response
203.	Does your hospital have neonatal resuscitation guidelines?	1. Yes 2. No 3. No response
204.	Does your hospital provide you supportive supervision?	1. Yes 2. No 3. No response
205.	On average, for how many neonates you serve per day?	1. 0– 5 2. >5 3. No response

206.	How many hours/days do you spend providing neonatal services?	1. <8hrs 2. 8– 16hrs. 3. 16 – 24hrs.
Part III: Questions addressing Attitude and perceptions of participants.		
301.	Delay to resuscitation may be related with perception of nurses & midwifes as having secondary role to doctors.	1. Strongly agree. 2. Agree 3. Neutral. 4. Disagree. 5. Strongly disagree.
302.	It is necessary to prepare for resuscitation irrespective of the presence or absence of risk factor.	1. Strongly agree. 2. Agree. 3. Neutral. 4. Disagree. 5. Strongly disagree.
303.	I support if hospitals have neonatal resuscitation team.	1. Strongly agree. 2. Agree. 3. Neutral 4. Disagree. 5. Strongly disagree.
304	I think providers motivation toward neonatal resuscitation may be related with incentives/benefits.	1. Strongly agree. 2. Agree. 3. Neutral 4. Disagree 5. Strongly disagree
305.	If I had good knowledge&practice toward resuscitation, I could not hesitate to use it whenever needed.	1. Strongly agree. 2. Agree. 3. Neutral. 4. Disagree. 5. Strongly disagree.
Part IV: Knowledge Assessing questions		
401.	When you should be prepared to resuscitate the new born?	1. At every birth. 2. If we are sure that resuscitation is needed. 3. If there is anticipated risk only. 4. Others (specify) _____
402.	To which new born does initial assessment is required?	1. All new born. 2. Only those who had perinatal/Intrapartum risk factor. 3. Preterm fetus only. 4. Others (specify) _____
403.	What is the correct methods of stimulating the new born?	1. Slapping/flicking the soles of the feet. 2. Slapping the back. 3. Squeezing the rib cage. 4. Holding upside down and shaking

404.	How much time is allotted for the initial steps of resuscitation?	1. 30 sec. 2. 40 sec. 3. 60 sec. 4. 90 sec.
405.	When do you stop the initial steps of resuscitation? (More than one answers is possible).	1. When baby is cried. 2. When breathing rate > 30beat/minute. 3. When the bay is gasping. 4. When Heart < 60beat/minute.
406.	When do you start Bag and mask ventilation? (More than one answers is possible).	1. Baby is not Breathing or is Gasping 2. Heart rate <100beat 3. Persistent cyanosis 4. Others_____
407.	What are the reasons for failure of bag & mask ventilation? (More than one answers is possible).	1. The seal is inadequate 2. The airway is blocked 3. Inadequate pressure 4. Inappropriate position
408.	What is the correct position of baby's neck for resuscitation?	1. Slightly extended. 2. Flexed. 3. Hyper extended. 4. Others _____
409.	Which mask size is appropriate for resuscitations of term & preterm babies respectively?	1. Size 1 &0. 2. Size 2 & 1. 3. Size 0 for both. 4. Size 1 for both.
410.	During resuscitation of the neonate by bag and mask, the mask should cover?	1. Mouth, nose and tip of chin but not the eyes. 2. Part of chin, mouth, nose and eyes. 3. Part of nose, mouth but not eyes and chin. 4. Parts of mouth, nose & chin but not the eyes.
411.	What are the indications to start chest compressions during neonatal resuscitations?	1. HR< 60b/m after bag & mask ventilation. 2. HR<100b/m after bag and mask ventilation. 3. Persistent cyanosis after initial resuscitation. 4. Apneic after initial resuscitation
412.	Which technique of chest compression is recommended during neonatal resuscitation?	1. Two thumps 2. Two fingers 3. One hand 4. Two hands
413.	What is the recommended ratio of chest compression to ventilation?	1. 3:1 2. 4:1 3. 3:2 4. 5:1

414.	For how long does cardio-pulmonary resuscitation (CPR) continued before reassessing heartbeat.	1. 15 sec. 2. 20 sec. 3. 30 sec. 4. 60 sec.
415.	What depth of chest compression you provide to produce the required pressure?	1. 1/3rd of anteroposterior diameter. 2. 2/3rd of anteroposterior diameter. 3. 1/4th of anteroposterior diameter. 4. 3/4th of anteroposterior diameter.
416.	What are the indications to start medications during neonatal resuscitations?	1. Heart rate <60 b/m after 30sec ventilation & 60sec coordinated chest compression & ventilation. 2. Heart rate <100 with adequate ventilation & chest compression. 3.To all new born immediately after birth appearing cyanosed. 4. Others (specify) _____
417.	What is preferred medication during resuscitation?	1. Epinephrine 2. Naloxone 3. Steroids 4. Other (Specify)_____
418.	When does volume expander indicated during neonatal resuscitation? (More than one answers is possible).	1. If there is sign of shock. 2. If there is history of blood loss. 3. To all resuscitated babies 4. Other (specify) _____
419.	What is the preferred volume expander during resuscitation? (More than one answers is possible).	1. 0.9% NaCl 2. Unmatched type O Rh- packed RBC 3. Ringer lactate 4. Others (specify) _____
420.	After how many seconds you assess for the effects of epinephrine?	1. After 20seconds of epinephrine. 2. After 30seconds of epinephrine. 3. After 40secconds of epinephrine. 4. After 60seconds of epinephrine.

Part V: Participants Skill Assessment Interview guide; please put sign (ˇ) on the space done if you perform the procedure and on not done if not performed.			Done	Not done
501.	In which way you prepare for resuscitations?	1. Wash hands		
		2. Tell the mother what is going to be done.		
		3. Collect the necessary materials.		
		4. Check functionality of the equipment.		
		5. Provide continual emotional support.		
		6. Others (Specify) _____		
502.	What do you do immediately after birth to determine the need for resuscitation?	1. Assess for gestational age.		
		2. Assess for colour.		
		3. Assess for muscle tone.		
		4. Assess breathing.		
		5. Assess for amniotic fluid.		
		6. Others (Specify) _____		
503.	What do you do initially if the new born is not breathing?	1. Dry the new born.		
		2. Position the new born		
		3. Maintain thermo-regulations.		
		4. Provide tactile stimulation.		
		5. Clear the air way.		
		6. Others (specify) _____		
504.	What do you do to provide bag and mask ventilation?	1. Assess the need for ventilations.		
		2. Place the baby faces up on flat surface with neck slightly extended.		
		3. Place the mask on the face so that it covers nose, mouth and tip of chin.		
		4. Check the rise of chest with 2-3 ventilation.		
		5. Ventilate 40-60breath/minute.		
		6. Others (Specify) _____		

505.	What do you do to provide chest compression?	1. Assess the need for chest compression		
		2. Select the correct site for chest compression.		
		3. Provides back support throughout.		
		4. Apply chest compression.		
		5. Assess the response of the new born.		
		6. Others (Specify) _____		
506.	What do you do to give medication or volume expander?	1. Calculate the correct dose of medications.		
		2. Choose the correct size of syringe.		
		3. Draw the correct dose of the drug.		
		4. Administer the correct dose of drug.		
		5. Check heart rate after 30 sec. and repeat as needed.		
		6. Others (Specify) _____		