

ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCES

DEPARTMENT OF GYNECOLOGY AND OBSTETRICS



**KNOWLEDGE, ATTITUDE AND PRACTICE OF HEALTH
PROFESSIONALS TOWARDS NEONATAL RESUSCITATION
IN THREE TEACHING HOSPITALS, ADDIS ABABA ETHIOPIA**

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List of abbreviations:

AAU - Addis Ababa University

CHS - College of Health Science

EDHS - Ethiopian Demographic Health Survey

HCP - Health Care Professionals

LMIC - Low- and Middle-Income Countries

KAP - Knowledge, Attitude and Practice

NICU - Neonatal Intensive Care Unit

NR - Neonatal Resuscitation

NRP - Neonatal Resuscitation Program

OBGYN - Obstetrics and Gynecology

SD - Standard Deviation

SSA - Sub-Saharan Africa

UNICEF - United Nations International Children's Emergency Fund

UNIGME - United Nations Inter-Agency Group for Child Mortality Estimation

WHO - World Health Organization

Abstract

Background: Neonatal mortality is the issue of local, regional, national, continental and global. For example, it is observed in both middle- and low-income countries, especially sub-Saharan Africa including Ethiopia. Neonatal death is multi factorial, but the most important single causes of neonatal deaths were accounted for preterm birth, birth asphyxia, and sepsis. Effective resuscitation, if done timely, can drastically reduce neonatal deaths.

Objective: To assess the knowledge, attitude and practice toward neonatal resuscitation among midwives, NICU nurses, Addis Ababa university pediatrics and OBGYN residents in Tikur Anbesa Specialized, Zewditu Memorial and Gandhi Memorial Hospital, Addis Ababa, Ethiopia.

Methods: A Cross-Sectional research design was conducted from March – June 2021 and the respondents were selected by using simple random sampling techniques, 204 have returned the questionnaire filled complete (response rate of 98.07%). The data collection tool was closed ended questionnaires. Data was verified, coded, and entered to Epi Data Software version 3.1 and was exported into SPSS version 25 Software for analysis. The degree of association between variables was assessed using logistic regression. Finally, p-value less than 0.05 were considered statistically significant.

Results: The good knowledge level among midwives, nurses, pediatrics residents and OBGYN residents were 30.9%, 28.2%, 42.4% and 42.9% respectively. Neonatal resuscitation training and the time training was given, was found to be the only predictor of knowledge score of respondents (AOR = 3.1, 95 % CI: 1.2 - 4.8, P value = 0.003) and (AOR =5.6, 95 % CI: 1.19 - 6.72, P value = 0.044) respectively. The majority 58.80% of the participants had good attitude towards neonatal resuscitation. Whereas the good practice score among midwives, nurses, pediatrics residents and OBGYN residents were 59.8%, 33.3%, 59.6% and 39.4% respectively. The only determining factor associated with poor practice score was lack of availability of resuscitation guideline (AOR=2.55, 95% CI: 1.90-8.28, p=0.004). Having good knowledge were found to be the only predictor to have good attitude level (AOR=0.357, 95% CI: 0.18-0.67, p=0.001).

Conclusion and recommendations: Knowledge, attitude and practice of nurses and midwives toward neonatal resuscitation were inadequate. Training and the time training given were found

to be predictor for knowledge while presence of guideline was predictors for practice. Continuous and regular training for health professionals should be strengthen.

Keywords: knowledge, attitude, practice and neonatal resuscitation

1. INTRODUCTION:

1.1 Background:

Neonatal period is the first 28 days of life. Initiation of breathing is critical in the physiologic transition from intra-uterine to extra-uterine life. Approximately 10% of newborns require some assistance to begin breathing at birth. Less than 1% requires extensive resuscitation measures, such as cardiac compressions and medications [4]. Because of the large total number of births, a significant number will require some degree of resuscitation although most newly born infants successfully transition from intrauterine to extra uterine life without special help [3].

Of 136 million births annually, an estimated 10 million will require some level of intervention [1]. Some non-breathing babies with primary apnea will respond to simple stimulation alone, such as drying and rubbing (Figure 1).

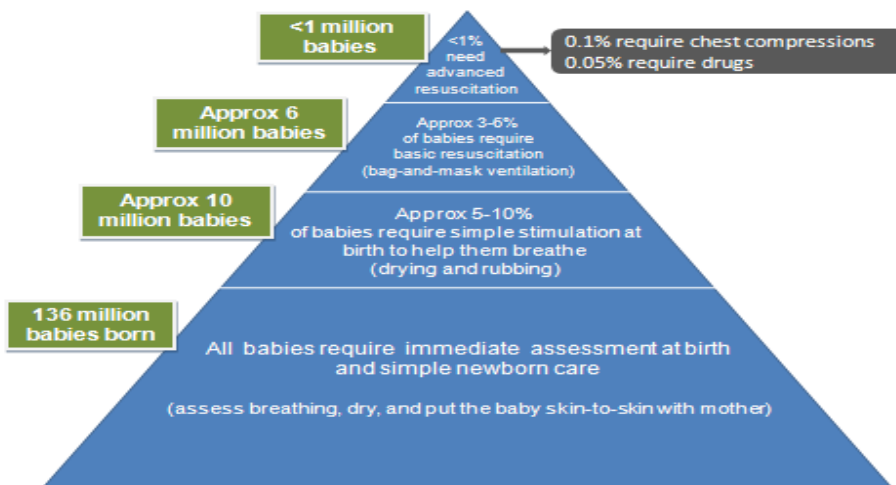


Figure 1: Estimate of annual number of all newborns who require assistance to breathe at birth and varying levels of neonatal resuscitation. Legend: Adapted from [1] using data from [2, 6].

Neonatal death is referred to as the number of infants who die during the first 28 days of life [7]. This period is noted as the time of highest risk for the newborn. Neonatal deaths can be subdivided into early and late neonatal deaths. Early neonatal death occurs from birth to seven days and late neonatal death occurs from 7 days to 28 days [8].

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. The global under-five mortality rate witnessed a significant decline from 12.7 million to six million deaths a

year between 1990 and 2015 [9]. 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 accounted for approximately one quarter of all the deaths [3]. Neonatal deaths are the major obstacles for the improvement of survival of under-five children in developing countries. Despite a global reduction in under-five mortality in the last decade, neonatal mortality has not decreased to the same extent particularly in LMICs [10].

Every year in sub-Saharan Africa 1.16 million babies die in the first month of life, and another million babies are stillborn. So far there has been limited progress in reducing deaths in the first month and especially the first week of life in Africa. Up to half a million African babies die on the day they are born. Two thirds of newborn deaths in Africa could be avoided – 800,000 lives saved each year – if essential interventions already in policy reached 90 percent of African mothers and newborns [10].

Neonatal asphyxia, as defined by WHO failure to initiate and sustain breathing at birth, contributed significantly to the high burden of neonatal mortality and morbidity [11-14].

Globally, about one-quarter of all newborn deaths are caused by birth asphyxia [67]. Asphyxia is the second most common cause of neonatal mortality in SSA accounted for 24% of neonatal mortality [15]. Asphyxia is the second most common cause of neonatal mortality in Ethiopia (25%) [16].

Prenatal asphyxia, due to lack of adequate fetal-neonatal oxygenation in per partum, at birth, and in the first minutes of life, is a sensitive measure of the quality of care provided in the prenatal period, both to the pregnant woman and the newborn, with high potential for prevention of death through early diagnosis and treatment [17]. Every newborn should be considered at a high risk of birth asphyxia since most cases of asphyxia cannot be predicted [18]. Although neonatal death is multi factorial, the most important single causes of neonatal deaths were preterm birth, birth asphyxia, sepsis and pneumonia [19–21].

Research has shown that effective resuscitation can prevent asphyxia. Resuscitation, if done in a timely and effective manner, can drastically reduce deaths, neurological damage, and subsequent disabilities in the newborn who fails to initiate and sustain breathing at birth [22]. Anticipation and preparation for resuscitation before every birth is therefore essential, with immediate corrective action. Evidence around the world also show that the risk of death increases by 16% for every 30 s delay in initiating ventilation up to six minutes and by 6% for every minute of

delay of applied bag and mask ventilation [23]. Therefore, it is clear that the first minutes after birth are critical to reducing neonatal mortality. Evidence suggests that successful neonatal resuscitation by well – trained HCPs to provide appropriate and adequate resuscitation has the potential to prevent prenatal mortality caused by intra partum related asphyxia for almost two million babies annually [24].

Neonatal resuscitation is defined as the set of interventions at the time of birth to support the establishment of breathing and circulation [6]. Neonatal resuscitation (NR) is a simple, inexpensive intervention that has been shown to reduce neonatal mortality [25]. 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 [26]. Different factors including provider’s characteristics like educational level, experience, specialization; and institutional characteristics like training, availability of guidelines, and availability of equipment affect competency of neonatal resuscitation and thereby neonatal outcome [27, 28].

1.2. Statement of the problem

Worldwide, 2.6 million newborns were died by 2016 (7,000 deaths every day), contributing nearly 47% of all deaths of children under five years of age [29, 9]. Almost all deaths of newborns are in developing countries, with the highest number in South Asia and sub-Saharan Africa [30]. Five countries from LMICs; India, Pakistan, Nigeria, Democratic Republic of Congo and Ethiopia accounted for half of all the global new born deaths [9, 31]. Five SSA countries; Nigeria, DR Congo, Ethiopia, Tanzania and Uganda accounted for 50% of the total African new born deaths [15].

Asphyxia is one of a major cause of global neonatal mortality and morbidity [12, 29, 32]. According to WHO 2015 report, it is responsible for 23% of neonatal mortality and 11% of all under-five mortality [11, 14]. Studies done in Columbia, Nigeria, and southwest Ethiopia indicated that the prevalence of birth asphyxia were about 41%, 21%, and 12.5%, respectively [33-35]. Approximately three – quarters of all neonatal deaths occur during the first week of life, with a million babies dying on the day they are born [24]. Conspicuously, over half of these neonatal deaths occur within the first 24 h afterbirth [36, 23]. However, morbidity and mortality from birth asphyxia is mostly preventable and treatable [37]. Effective resuscitation at birth can prevent a large proportion– approximately 30% - of these deaths [38].

The vast majority of these neonatal deaths (98%) occurred in the middle- and low-income countries where asphyxia accounted for approximately one quarter of all the deaths [3]. 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 [12, 13]. Early neonatal depression is common, it is difficult to predict prior to birth, and the need for resuscitation may be anticipated in only 50% of cases [5]. Therefore, the universal presence of personnel adequately prepared to perform resuscitation is an important first step in newborn resuscitation.

The effect of birth asphyxia is not limited only to death but also has a short- and long-term neurodevelopment sequel, including cognitive and motor disabilities which are almost untreatable. Survivors of asphyxia may also develop hypoxic-ischemic encephalopathy, posttraumatic stress disorders, neurologic disability, low cognitive functions, and neurological sequel [39-41].

In sub-Saharan Africa recent health services assessments found only 15% of hospitals equipped to provide basic neonatal resuscitation [42]. Studies 2012 showed in Ethiopia there are 27,347 health care workers which are trained with NRP but still only 10% of deliveries are conducted in health care facilities [43, 45]. Moreover, over a period of 16 years Under-five mortality declined from 166 deaths per 1,000 live births in 2000 to 67 deaths per 1,000 live births in 2016. This represents a 60% decrease in under-5 mortality over a period of 16 years. Neonatal mortality declined from 49 deaths per 1,000 live births in 2000 to 29 deaths per 1,000 births in 2016, a reduction of 41% over the past 16 years from 2016 EDHS [44].

An important step to improving neonatal care and reducing neonatal mortality in low-income and middle-income nations is assessment of neonatal healthcare resources, community engagement and improved government funding of health services. This will allow identification of areas of healthcare policy and public participation needing modification to enhance survival of newborns [46].

Proper knowledge of newborn resuscitation can prevent the consequences of prenatal asphyxia. Adequate knowledge of resuscitative procedures in the newborn plays an important role in proper, early diagnoses, suitable management, and reducing the number of complications in newborns with life threatening conditions [6, 47, 48]. However, there is limited information on healthcare professionals' knowledge and practice about neonatal resuscitation. Therefore, this

study aimed to understand the knowledge, attitude and practice of healthcare professionals about neonatal resuscitation. Moreover, it will have greater input to program managers and policymakers in design, proper implementation, and evaluation of programs on the reduction of under-five children mortality and improvement of children healthcare.

The reason why the researcher is initiated to conduct this study is for the following reasons. In the first place, there have been very few studies on neonatal resuscitation in our country. The other reason is that there haven't been studies on knowledge, attitudes and practices of health service providers towards neonatal resuscitation which was done in Tikur Anbessa, Zewditu and Gandhi hospitals. The other reason, is also what the researcher can understand from the previously done studies, can be the knowledge and practice level of health care professionals is not adequate. Eg. a cross sectional study conducted in Ethiopia had suggested that the overall knowledge of nurses and midwives was an average which was 50%; poor for those nurses (48.2%) and average for midwives (51.8%). From a total of 22 knowledge items, midwives scored an average. With regard to global studies, study in Canada also agrees with this claim and stresses that there is a possibility that knowledge can be lost; hence, regular refresher courses will be instrumental in retaining knowledge gap [62]. Furthermore, A 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. The studies described above highlights that much has to be done to empower nurses and midwives with the necessary skill and knowledge capacity in order to enable them to carry out their work in accordance with the standard. Whatever health service providers have the necessary knowledge and skills, they can't discharge their duties without good attitude. Therefore, the aim of this study is to examine the present knowledge, attitude and practice of health service providers in Tikur Anbessa, Zewditu and Gandhi hospitals.

1.3. Significance of the study

The continuity of generation is highly depends on health service providers' knowledge, attitude and practices on neonatal care. If failure is happened, the lives of newborns will be endangered. In other words, the more the health providers have the necessary knowledge, positive attitudes and adequate experiences on neonatal care, the safer the lives of the newborn babies will be. Therefore, the result of the study will help the following person (/persons) institutions or organizations. First, it will identify gaps on KAP of NICU nurses, midwives, OBGYN residents

and pediatrics residents about neonatal resuscitation that has contribution to decrease a large proportion neonatal morbidity and mortality. Second, hospitals can update and upgrade health service providers' knowledge, attitude and practice. Third, Ministry of Health can expand the result the study to other hospitals found in Addis Ababa in particular and other regions in general. Fourth, hospitals offering in-service training to health service providers can incorporate neonatal resuscitation in their curriculum so that they will be able to give emphasis. Finally, other researchers who wish to conduct in depth study on a similar topic may use it as a stepping stone.

2. Literature Review

Neonatal resuscitation is defined as the set of interventions at the time of birth to support the establishment of breathing and circulation [49]. Of about 136 million births annually, approximately 10 million of them will require some level of intervention to initiate their first breath. It is established that resuscitation with a bag-and-mask is required for nearly 6 million of these babies each year. This basic skill is sufficient to resuscitate most neonates with secondary apnea, as the bradycardia primarily experienced results from hypoxemia and respiratory failure. Newborns who need advanced measures, that include endotracheal intubation, chest compressions and medications, are less than 1% of births [49].

NR begins immediately with newborn assessment and proceeds with stimulation, suctioning, BMV, chest compression and administration of medication and volume expander accordingly [50]. Skillful 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 [1, 5, 25].

2.1 Effective Neonatal Resuscitation

Effective neonatal resuscitation is possible with basic equipment and skills in low-resource settings [52]. Case studies from China and India reveal that 90% of newborns with asphyxia require only drying, warming, and stimulation for complete revival [53, 54]. Such techniques coupled with ensuring a patent airway, suctioning, ventilation, administering oxygen, and chest compressions are part of the Neonatal Resuscitation Program (NRP) [6], an educational

intervention based on the consensus of science and resuscitation guidelines of the International Liaison Committee on Resuscitation and published by the American Academy of Pediatrics and the American Heart Association.

2.2 The Knowledge of Neonatal Resuscitation

2.2.1 The Knowledge of Neonatal Resuscitation in the World

A cross-sectional study in Pakistan showed that among 49 midwives, 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 midwives had better knowledge in the area of preparation, and correct sequences of suctioning respectively [65].

It should be noted that an increase in knowledge goes with practical experience. This is reflected in the descriptive study which was done in California to describe nurses and physicians' readiness for neonatal resuscitation in hospitals [57]. The study sample consisted of 165 nurses and 59 physicians. The results revealed that the average Neonatal Resuscitation Index knowledge score was low. Nurses reported lower levels of comfort with skills needed for full resuscitation of newborns. However, the relation between the frequency of skill performance and comfort was higher for nurses than physicians. Nurses who were current neonatal resuscitation program providers had significantly higher average levels of comfort, knowledge, and experience with resuscitation skills [57].

However, despite the HCPs' pre – service and in – service training, guidelines and job aids with adequate equipment in NR, practices of HCPs with regard to NR are still reported to be poor [58–60]. Ineffective or wrong resuscitation practices are linked to the persistently high neonatal deaths from birth asphyxia in the first 1–24 h [61].

Another study done in Canada also agrees with this claim and stresses that there is a possibility that knowledge can be lost, hence, regular refresher courses will be instrumental in retaining knowledge [62]. The aim of the study was to evaluate the impact of a neonatal resuscitation course on the theoretical knowledge and practical skills of birthing room personnel and to evaluate the performance of skills at different times after the session [62]. A course in neonatal resuscitation was presented to the identified samples. A cohort of 108 (15%) participants received testing before and after the class; the theoretical knowledge and practical performance of 62 of these participants were retested after six and twelve months. The study findings revealed

that significant improvement in both theoretical knowledge and practical skills was seen immediately after the course. The researchers concluded that neonatal resuscitation should be an integral part of continuing education. Practical skills appear to decline faster than theoretical knowledge. Therefore, in-service instruction is required, at least, every six months [62].

A cross-sectional study on knowledge towards neonatal resuscitation conducted in India, where 93 nurses were participated. The Results shows 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. The disappointing performance of the nurses in this essential skill and inconsistency in awareness of different steps of basic neonatal resuscitation underscores the urgent need for intensive training [64].

2.2.2 The Knowledge of Neonatal Resuscitation in Africa

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 [55]. Another cross-sectional study conducted in Nigeria involving One hundred and ten participants shows that Majority 88.2% had poor knowledge of neonatal resuscitation. There is a significant relationship between those without previous training and poor knowledge of resuscitation [66].

In Tanzania, nurses who were competent in neonatal resuscitation reduced the incidence in the mortality rate of newborns from birth asphyxia [23]. Similarly, a study conducted in Kenya, found that adequate knowledge and basic resuscitation training for midwives in Kenya reduced neonatal mortality rates from 11.5 deaths to 6.8 deaths per 1,000 live births [56]. Additionally, a UNICEF reports that skilled staff with access to basic equipment are purported to reduce neonatal mortality by 50% [68].

A systematic review and meta-analysis of newborn resuscitation practices concluded that effective resuscitation is possible with basic equipment, adequate knowledge and a skill of health professionals including midwives [25]. Surprisingly, this trend of lack of expert knowledge, and support for neonatal resuscitation runs through most African countries. This is reflected in the study, on the resuscitation capacity of newborns in six African countries [1]. The study showed that only 2 to 12% of health personnel, conducting deliveries mainly in health facilities, are equipped with the requisite training in neonatal resuscitation. The study also shockingly revealed

that only 8 to 22% of all these health facilities are well-furnished with resuscitation equipment that can help newborns with respiratory issues. Another study in about 124 birth centers in Africa and Asia also concluded similar findings on the lack of equipment for newborn resuscitation [69].

2.2.3 The Knowledge of Neonatal Resuscitation in Ethiopia

A cross sectional study conducted in Ethiopia had suggested that the overall knowledge of nurses and midwives was an average which was 50%; poor for those nurses (48.2%) and average for midwives (51.8%). From a total of 22 knowledge items, midwives scored an average of 11.4 items and nurses scored 10.4 items. Only two midwives and none of the nurses were able to answer all 22 knowledge questions [70].

Another cross-sectional study conducted at a university teaching hospital in Northwest Ethiopia, one hundred and thirty-five of 150 participants were included in this study with a response rate of 90.0%. The mean knowledge scores of midwives, nurses, pediatric residents and OBGYN residents were 42.8%, 43.9%, 42.8% and 42.6% respectively. The finding of this study had implied that the knowledge and skills of midwives, nurses and residents about neonatal resuscitation was sub standardized. So, training of neonatal resuscitation for midwives, nurses and residents should be emphasized [71].

A study on healthcare professionals' knowledge of neonatal resuscitation in Ethiopia from analysis of 2016 national emergency obstetric and newborn care survey shows that the overall knowledge score of the healthcare providers about neonatal resuscitation was 49%. The findings showed that providers trained on neonatal resuscitation, facilities that had guideline of neonatal resuscitation, and availability of essential equipment were significantly associated with sufficient knowledge of neonatal resuscitation in Ethiopia [72].

Another cross-sectional study conducted at South Wollo Governmental Hospitals in North East Ethiopia, one hundred and forty-three participants were included with a response rate of 100%. The mean knowledge scores of midwives and nurses were 68.68% and 64.69% respectively. Lack of training, absence of guide-line and lack of supportive supervision were significantly associated with poor knowledge score, whereas Specializations with neonatology were associated with higher performance of neonatal resuscitation [73].

A cross sectional study conducted on assessment of the setup of delivery room for neonatal resuscitation at Tikur Anbessa Hospital Ethiopia involving 20 total health care providers, 7 (35%) were doctors and 3 (15%) and 10 (50%) were nurses and midwives respectively. From the total health care provider working in delivery room 50% were trained and 50% were not trained [74]. From trained staffs 7 (35%) perform all level of NRP and 65% perform only the first three steps. All the respondents reported that birth corner lacks basic instrument to give standardized care at that set up. The Finding of this study indicated that there is gap regarding to the WHO NR Guideline and it influence the set up in order to render a standard care. Lack of instrument in private birth corner, lacks ongoing training and continuity of NRP and the trained professional not updated to the new guideline of NRP are some of the gaps. To minimize this existing gap government and stockholders provide ongoing and continuous program, help to update themselves to the updated guideline of NRP and providing basic instruments needed for neonatal assistance [74].

2.3 The Attitudes of Neonatal Resuscitation

Attitude is an individual's positive or negative belief about performing a specific behavior [75]. This behavior depends on the individual's behavioral beliefs and outcome evaluation. Therefore, the individual's assessment of a particular behavior determines his/her attitude. The attitude is also reliant on the consequences of the behavior. Subjective norm involves normative beliefs and motivation to comply. This is how the individual acknowledges the societal pressures in enacting a particular behavior. Subjective norms show how beliefs about a phenomenon influence the required behavior as well as the individual's motivation [76]. Perceived behavioral control is the ability of the individual to exhibit the required behavior. It depends on the beliefs about that behavior and inner drive to appreciate the behavior which can be situational.

2.4 Practice towards neonatal resuscitation

From several studies it has been noted that nurses and midwives 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 [71, 63, 77]. A study in Kenya on skills of neonatal resuscitation had indicated that from different neonatal resuscitation steps, airway clearance will be the most commonly performed step (85%), drying and stimulation fairly performed (60%) while BMV will be the least (45%) performed step of neonatal resuscitation [78].

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 [65]. The finding from India had showed that nurses had poor mean score practice in the area of performances steps (32.66%), initial steps (41%), and chest compression (42.94%), PPV (46.1%) and medications administration (49.88%) [80]. 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% [64]. 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 [81]. 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 [79]. This finding had implied that the raise of neonatal mortality associated with asphyxia may be related with poor resuscitation practices.

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 will be found to be; 38% initial steps of resuscitation, 39% PPV, 20% intubation, 72% chest compression, 45 % medication and 29% for advanced resuscitation [77]. Study in Sri Lanka among nursing staffs showed that nurses have average incomplete practice in preparation of resuscitation material. 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 [63]. The studies described above highlights that much has to be done to empower nurses and midwives 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 done in Ethiopia among nurses and midwives had revealed that when asked what they do during neonatal resuscitations, three quarter mentioned placing the mask over the chin, mouth 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 [70]. Another

cross-sectional study conducted at a university teaching hospital of Northwest 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 [71].

Another cross-sectional study conducted at South Wollo Governmental Hospitals in North East Ethiopia. Whereas the mean practice score of midwives and nurses were 62.5% and 60.11% respectively. Absence of guidelines and lack of supportive supervision were significantly associated with the poor performance of the participants. Specializations with neonatology were associated with higher performance of neonatal resuscitation [73].

Another cross-sectional study conducted at a university teaching hospital in Northwest Ethiopia, the mean scores of skills of midwives, nurses, pediatric residents and obs-gyn residents were 59.2%, 55.8%, 47.5% and 55% respectively. So, training of neonatal resuscitation for midwives, nurses and residents should be emphasized [71].

According to information collected from pediatrics department head, in Tikur Anbessa specialized hospital, neonatal resuscitation training has been coordinated under pediatrics department and there is no regular scheduled program to deliver the training. For nurses working in the NICU, training has been given for 3 weeks but there is no refreshment program. For pediatrics residents, training has been given in the first year of residency while OBGYN residents usually get the training during their detachment to the neonatal ICU. Training has been given for the midwives in the response to the request of the OBGYN department.

2.5 Conceptual frame work

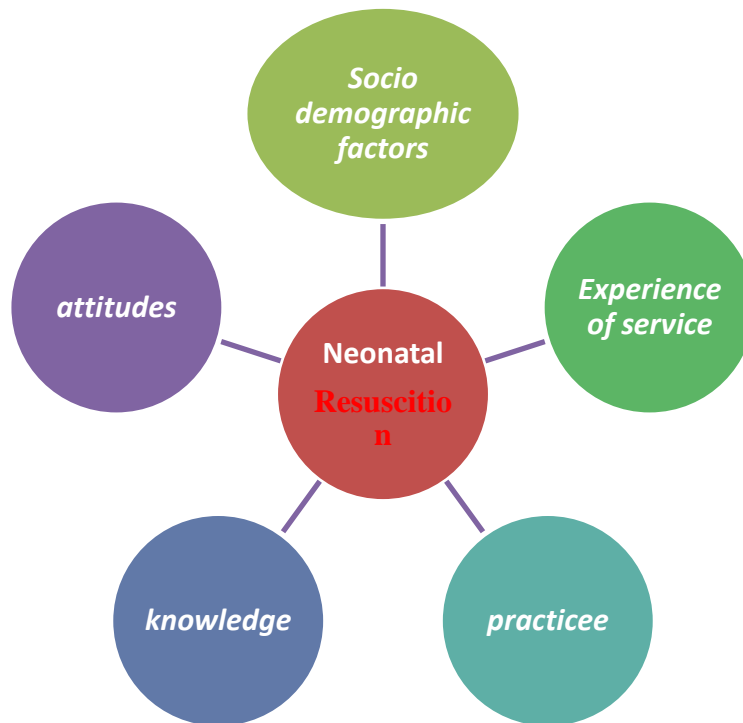


Figure 2: Conceptual frame work

- If the knowledge, attitudes and practices of the health service providers increase, neonatal resuscitation improves. Likewise, if there is increment of demographic factors (sex, age, level qualification, training and work experiences), knowledge, attitudes, and practice of the health service givers will progress. As result, there will be an effective neonatal resuscitation.

3. OBJECTIVES

3.1 General objective

To assess the knowledge, attitude and practice toward neonatal resuscitation among midwives, nurses. pediatrics residents and OBGYN residents in Tikur Anbessa Specialized, Zewditu Memorial and Gandhi Memorial Hospital, Addis Ababa, Ethiopia 2021.

3.2 Specific objective

1. To examine knowledge level among midwives, nurses, pediatrics residents and OBGYN residents toward neonatal resuscitation in in Tikur Anbessa Specialized, Zewditu Memorial and Gandhi Memorial Hospital
2. To examine attitude toward neonatal resuscitation among midwives, nurses, pediatrics residents and OBGYN residents in Tikur Anbessa Specialized, Zewditu Memorial and Gandhi Memorial Hospital
3. To determine practice level of midwives, nurses, pediatrics residents and OBGYN residents toward neonatal resuscitation in Tikur Anbessa Specialized, Zewditu Memorial and Gandhi Memorial Hospital
4. To investigate factors affecting knowledge, attitude and practices level of health providers toward neonatal resuscitation in Tikur Anbessa, Zewditu and Gandhi Hospital.

4. METHODS AND MATERIALS

4.1 Study Area

This study was conducted in three teaching hospitals, located in Addis Ababa, Ethiopia. Addis Ababa is the capital city of Ethiopia. It is also the largest city in the country. According to the 2020 United Nations population estimates and projection of major urban agglomerations, the total population of Addis Ababa is estimated to be 4,793,699. As of 2014, there were 52 hospitals in Addis Ababa out of which 12 of them run by state and more than 40 private hospitals. Below is the description of the hospitals under the study.

Tikur Anbessa Hospital is the most specialized hospital in Ethiopia having many specialists and highly experienced health service providers than the rest of hospitals in Ethiopia. It is also well equipped with different health facilities. Zewditu Memorial Hospital is a well-equipped hospital with health facilities, and specialists and others health services providers. It was constructed by Seven Days Adventists and bore the name Empress Zewditu who was the daughter of emperor Minilik. With regard to Gandhi Memorial Hospital; it was named by Mehatebe Gandhi, who was the beloved ruler of India before he was assassinated. It is well equipped with health facilities, specialists and experienced health service providers. It is specialized in mother and child care provision.

Sources: The hospitals under the study

4.2. Study Design

Research design is considered as the blue print and corner stone of any study since it facilitates various research operations. Research design helps the researcher to plan in advance of the methods to be adopted for collecting the relevant data and techniques, the nature and objective of the problem to be studied and the means of obtaining information [82]. The objective of this study was to assess knowledge, attitude and practice toward neonatal resuscitation among health service providers in three governmental hospitals: Tikur Anbessa, Zewditu and Gandhi. Therefore, the design of the study will be hospital based cross-sectional study.

4.3. Study Population

All Addis Ababa university pediatrics residents except year 1 resident, Addis Ababa university OBGYN residents except year 1 resident, midwives and nurses who work in three hospitals: Tikur Anbessa, Zewditu and Gandhi.

Table 1: Study Population

No.	Health services providers	Tikur Anbessa Hospital			Zewditu Hospital			Gandhi Hospital			Grand Total		
		M	F	T	M	F	T	M	F	T	M	F	T
1	Addis Ababa university OBGYN residents										49	15	64
2	Addis Ababa university Pediatric residents										36	24	60
3	Midwives	28	33	61	17	43	60	20	35	55	65	111	176
4	NICU nurses	0	33	33	3	19	22	1	22	23	4	74	78
	TOTAL										154	224	378

4.3.1 Sample populations

All Addis Ababa university pediatrics residents, Addis Ababa university OBGYN residents, midwives and nurses working from NICU and delivery units of each hospital selected while the hospitals were selected because the researcher studies in these hospitals. With regard to the

respondents, they were selected purposely because they are engaged directly in the neonatal resuscitation.

4.4 Eligibility criteria

4.4.1 Inclusion criteria

All Addis Ababa university pediatrics residents, Addis Ababa university OBGYN residents, midwives and nurses working in delivery and neonatal intensive care units of each hospital, and who were available and volunteer during data collection time were included.

4.4.2 Exclusion criteria

OBGYN residents, Pediatric residents, midwives and NICU nurses inaccessible during data collection due to illness and annual leave, and also who were not voluntary to participate were not included. Besides, year one OBGYN residents and Pediatric residents, and also midwives and NICU nurses who had less than one year work experiences were not included. The reason why the investigator didn't include them is that the investigator strongly believed that the investigator might not get accurate information for the study. As result, the study might not be valid and reliable.

4.5 Study Size

In order to determine the sample size single population proportion formula was used to estimate the sample size, the following sample size formula was used.

Level of significance 5% ($\alpha = 0.05$), 95 % confidence level ($Z_{\alpha/2} = 1.96$) and absolute precision or margin of error 5% ($d = 0.05$). Assuming the proportion of knowledge level 43% and practice level of 54.37% [71]

The following two formulas were used to calculate sample sizes.

$$n_0 = \frac{\left(\frac{Z\alpha}{2}\right)^2 * p(1-p)}{d^2}$$

Where: n_0 = sample size before using correction formula,

n_f = sample size after using correction formula and

N = total numbers of study population which is 378

Using this formula, the calculated sample size for knowledge and practice were 376 and 381 respectively. Therefore, the larger sample size among the knowledge and practice is taken as appropriate which is 381.

Since the population is less than 10,000, the researcher used adjusted nf

$$nf = \frac{no}{1 + \frac{no}{N}}$$

$$nf = \frac{381}{1 + (\frac{381}{378})} = 190$$

Since the population was small (<10,000) correction formula was used and adding 10% non-response rate a total of **208** sample was used for this study.

4.6 Sampling Method

The researcher used simple random sampling techniques which is lottery method because it gave equal chances for all the respondents. This was performed by a lottery method. This means from 378 total populations, 208 were selected.

4.7 Sampling procedure

All the three hospitals were included in the study. In addition, Samples were taken from NICU and delivery units of each respective hospital by using simple random sampling method. A list of Addis Ababa university OBGYN resident, Addis Ababa university pediatric residents, midwives and NICU nurses were obtained from NICU and delivery units of each hospital. 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 OBGYN resident, pediatric residents, midwives and NICU nurses 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.

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

The numbers of respondents were selected proportionally to the number of health service providers working in the three teaching hospitals. Therefore, **34 midwives from Tikur Anbessa, 33 from zewditu, and 30 from Gandhi. With regard to NICU nurses, 18 from Tikur Anbessa, 12 from Zewditu and 13 from Gandhi.** The case of **OBGYN resident, 35** respondents were taken and **33 pediatric residents** were also taken. The reason why OBGYN

resident and pediatric residents were taken proportionally to their numbers is that they work in the three hospitals by turn except there were no pediatrics residents working in the Zewditu Memorial Hospital.

4.8 Data collection and process

Data collection tool was prepared from similar literatures, WHO guidelines and Ethiopian Pediatric Association Guidelines. The tool consists of structured self-administered questionnaires addressing provider and institutional characteristics; structured questions addressing knowledge, attitudes and practices of OBGYN resident, Pediatric residents, midwives and NICU nurses guide addressing their practices. A total of 9 data collectors (5 Bsc midwives and 4 Bsc nurses), 3 from each hospital, were trained and oriented about how the questionnaires were filled carefully by the respondents.

4.9 Data quality control

To control the quality of the tool, a total of ten gynecologists and obstetricians, pediatricians and neonatologists 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 included the completeness of the data were checked on daily basis of the data collection period by the data collector himself/herself and the researcher acted as a supervisor. Prior to the actual data collection period, a pretest was done on 5% of the total sample size on none sampled hospital called Saint Paulo's Hospital for pretest, and some ambiguous questionnaires were modified for Clarity and consistency. The data collector's form each hospital was selected and administered to reduce information bias.

4.10 Data Analysis

Data were verified, coded and entered to Epi Data Software version 3.1 and then it was exported into SPSS version 25 Software for analysis. The results of the analysis were described using descriptive statistics like frequency, percentage and mean using tables, graphs and texts. To measure the possible association of factors with the knowledge, attitude and practice level of health professions binary logistic regression was computed. Since the variables were small in number, all variables regardless of the p-value in bivariate analysis was 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 ratio both crude and adjusted odds ratio (COR and AOR).

4.11 Operational Definitions

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

Neonatal resuscitation: Intervention after birth to 28 days 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 newborn resuscitation: Basic resuscitation plus chest compression and administrations of epinephrine and volume expander.

Resident: a medical graduate engaged in specialized practice under supervision in a hospital.

Midwife: a health professional who cares for mother and newborns around birth.

Attitude: Participants with score of greater than the mean score will be considered having good perception (correctly answer 3 out of 5 questions) and those who scored less than the mean score will be considered having poor perception toward neonatal resuscitation (do not correctly answer at least 3 out of 5 questions).

Knowledge: Appropriate response from midwives, nurses and residents about neonatal resuscitation through the structured knowledge questionnaires and those who scored above 80% (≥ 8 correct response from 10 knowledge questions) will be considered having sufficient knowledge and those below 80% (< 8 correct response from 10 knowledge questions) will be considered having insufficient knowledge [83].

Practice: Appropriate response from midwives, nurses and residents about neonatal resuscitation through questionnaires and those who scored above 80% (≥ 4 correct response from 5 practice questions) will be considered as having sufficient skill and those below 80% (< 4 correct response from 5 total questions) will be considered having insufficient skill [83].

4.12 Study variables

4.12.1 Dependent variables

- Knowledge toward neonatal resuscitation
- Attitudes toward neonatal resuscitation
- Practice toward neonatal resuscitation.

4.12.2 Independent variables

- Sex, Age
- Qualification
- Level of education
- Training
- Experience

4.13. Ethical consideration

Ethical clearance was obtained from school of obstetrics and gynecology, 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 Tikur Anbessa, Zewditu and Gandhi 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. 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 had 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 has access to the information and names or other identifiers were not recorded.

4.14 Dissemination of the result

The result of the study was submitted and presented to AAU, college of health sciences, department of Obstetrics and Gynecology of as partial fulfillment for the requirement of master's degree in pediatric and child health nursing. The final result of this thesis will be accessed to AAU, health science college library as the source for future learning. It will be also disseminated to Addis Regional Health Bureau and Tikur Anbessa, Zewditu and Gandhi which provided them basic information about the health professionals' knowledge attitudes and practices toward the

delivery of quality health services. Attempt will be made to offer the hard copy for each study hospital which was used as an input for health care professional training and development. Finally, attempts will be made to access the information through scientific publications for other researchers.

5. RESULT

5.1 Sociodemographic and institutional characteristics

Altogether 208 participants were from the OBGYN residents, Pediatric residents, midwives and NICU nurses who work in three hospitals. Out of 208 informed and consented who work in three hospitals, 204 have returned the questionnaire filled complete (response rate of 98.07%). Four participants refused to participate in the study. More than half (58.3 %) of the respondents were female. The maximum and minimum age of the participant was 48 and 21 years respectively. While the mean age of the participants was 29.3(SD=3.6). As seen in figure 3, two third (65.2%) of the participants reside between 26 to 30 years of age. Of the participants, 97 (47.5%), 39 (19.1%), 35 (17.2%), and 33 (16.2%) were midwives, nurses, OBGYN residents and Pediatric residents respectively.

Of the participant from midwives, 34 (35.05%), 33 (34.02%) and 30 (30.9%) were working in Tikur Anbessa specialized hospital, Zewditu memorial hospital and Gandhi memorial hospital respectively. From NICU nurses, 4 refused to participate, and of the 39 participants, 15 (38.4%), 11 (28.2%) and 13 (33.3%) were working in Tikur Anbessa specialized, Zewditu memorial and Gandhi memorial hospital respectively.

In the 204 participants, 15 (7.4%), 106 (51.9%), 15 (7.4%), 33 (16.1%), 22 (10.7%), and 13 (6.3%) were diploma holders, BSc holders, MSc holders, second year residents, third year residents and fourth year residents respectively. Of the participant, 107(52.5%) have taken neonatal resuscitation training in the work place. Almost one third (33.6%) of the participant took training before 2 years. More than half of participants had work experience with in one to two years (56.4).

Majority of the participant (37.7%) responded that there is no neonatal resuscitation guideline in the hospital. Around two third of participant (61.8%) stated there is no saturation monitor in the resuscitation area of the delivery room. Two third of the participants (61.3%) stated that there is

no an oxygen blender in the resuscitation area. Table 2 shows the Summary of the sociodemographic and institutional characteristics profile.

Figure 3: Age classification of respondents

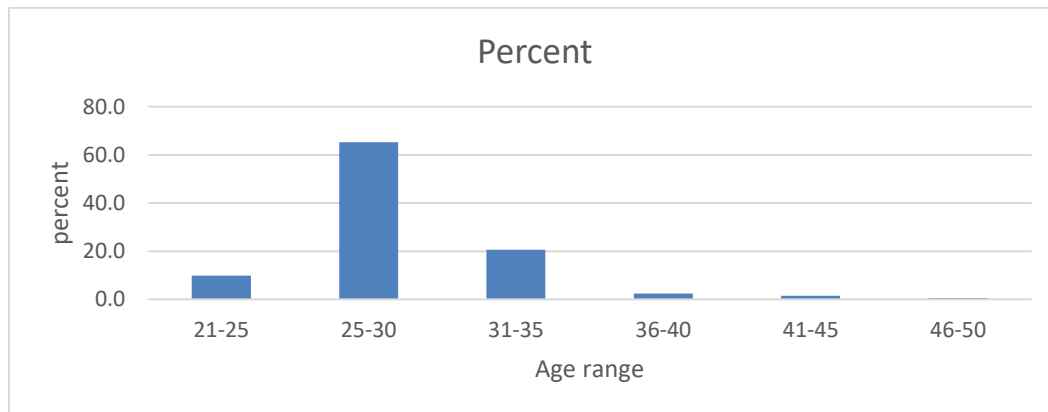


Table 2: Sociodemographic and institutional characteristics of the respondents'

Variables	Categories	Frequency(n)	Percent (%)
Sex	Male	85	41.7
	Female	119	58.3
Age of the participants	21-25	20	9.8
	26-30	133	65.2
	31-35	42	20.6
	36-40	5	2.5
	41-45	3	1.5
	45-50	1	0.5
Profession	Midwifery	97	47.5
	Nurse	39	19.1
	Pediatrics resident	33	16.2
	OBGYN resident	35	17.2
Level of education	Diploma	15	7.4
	Degree	106	51.9
	Masters	15	7.4
	Year 2 resident	33	16.1
	Year 3 resident	22	10.7
	Year 4 resident	13	6.3
Place of Work	TikurAnbessa specialized hospital	49	24
	Zewditu Memorial hospital	44	21.6
	Gandhi memorial hospital	43	21.1
	Addis Ababa university	68	33.3
Neonatal resuscitation training	Yes	107	52.5

	No	97	47.5
Period of resuscitation training	< 6 months	17	15.9
	Within 1 year	28	26.2
	Within 2 years	26	24.3
	More than 2 years	33	33.6
Work experience	1-2 years	115	56.4
	3-4 years	53	26
	>5 years	36	17.6
Neonatal resuscitation guideline	Yes	61	29.9
	No	37	37.7
	I don't know	66	32.4
Saturation monitor	Yes	57	27.9
	No	126	61.8
	I don't know	21	10.3
Oxygen blender	Yes	125	61.3
	No	49	24
	I don't know	30	14.7

5.2 Knowledge level of the participant towards neonatal resuscitation and associated factors

In this study, Majority (85.8%) of the participants knew that all new born require initial assessment. Majority of participant (86.3%) were aware that the correct position of baby's neck for resuscitation is slightly extended position. Almost three fourth of participants (78.9%) didn't knew that rising heart rate and audible breath sounds is the best indicator of effective bag and mask ventilation.

Most of the participants (83.3%) know that the mask should cover mouth, nose and tip of chin but not the eyes during resuscitation of the neonate by bag and mask. Two third (65.7%) of the participants recognized HR < 60b/m after bag & mask ventilation is the indications to start chest compressions during neonatal resuscitations. Majority of the participant (79.9%) stated that the recommended ratio of chest compression to ventilation is 3:1. Only 29.4% of the participant knew that the cardio-pulmonary resuscitation (CPR) should be continued for 60 seconds before reassessing heartbeat.

Most of the participant (80.9%) were aware of that heart rate <60 b/m after 30sec ventilation & 60sec coordinated chest compression & ventilation is the indications to start medications during neonatal resuscitations. Almost half of the participants (54.4%) stated that the recommended depth the chest compression required is 1/3 of anteroposterior diameter of chest. Two third of the

participants (64.7%) knew that resuscitate a neonate who has asystole and not improving with all measure continued for 10 minutes.

This study showed that more than half of the participants 134 (65.7%) had poor knowledge score towards neonatal resuscitations. The poor knowledge score among midwives, nurses, pediatrics residents and OBGYN residents are 67(69.1%), 28(71.8%), 19(57.6%) and 20(57.1%) respectively. Of the participants, the remaining 70 (34.3%) had good knowledge toward neonatal resuscitation. The good knowledge score among midwives, nurses, pediatrics residents and OBGYN residents are 30(30.9%), 11(28.2%), 14(42.4%) and 15(42.9%) respectively.

The overall mean knowledge score of the participants were 65.19% and among midwives, nurses, pediatrics residents and OBGYN residents were 63.19%, 55.89%, 72.12% and 74.14% respectively.

Figure 4: knowledge level of the participants

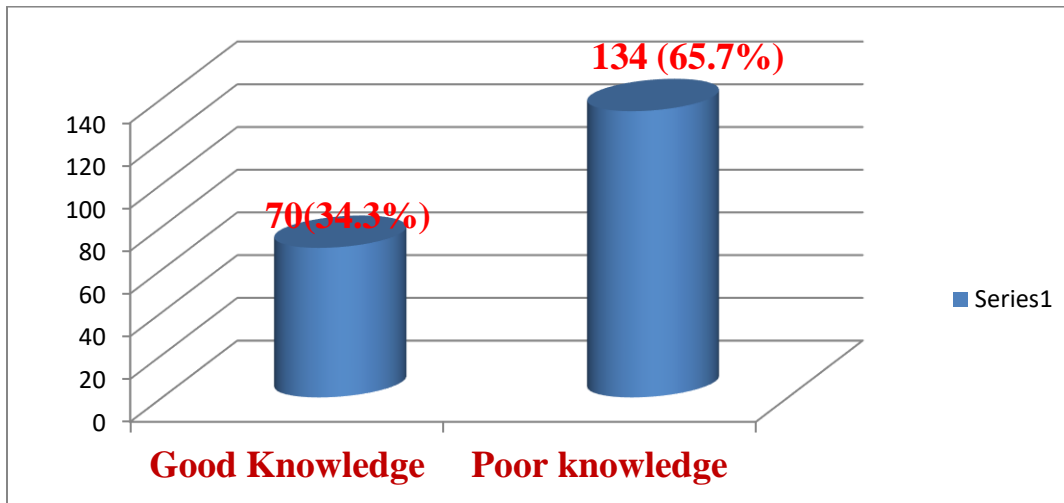


Table 3: Response of participants towards knowledge questions

Questions	YES (%)	NO (%)
All new born require initial assessment	175 (85.8)	72 (35.3)
The correct position of baby's neck for resuscitation is slightly extended position	176 (86.3)	28 (13.7)
Rising heart rate and audible breath sounds is the best indicator of effective bag and mask ventilation	43 (21.1)	161 (78.9)
The mask should cover mouth, nose and tip of chin but not the eyes during resuscitation of the neonate	171 (83.8)	33 (16.2)
HR< 60b/m after bag & mask ventilation is the indications to start chest compressions during neonatal resuscitations	134 (65.7)	70 (34.3)

the recommended ratio of chest compression to ventilation is 3:1	163 (79.9)	41 (20.1)
The cardio-pulmonary resuscitation (CPR) should be continued for 60 seconds before reassessing heartbeat	60 (29.4)	144 (70.6)
Heart rate <60 b/m after 30sec ventilation & 60sec coordinated chest compression & ventilation is the indications to start medications during neonatal resuscitations	165 (80.9)	39 (19.9)
The recommended depth the chest compression required is 1/3 of anteroposterior diameter of chest	111 (54.4)	93 (45.6)
Resuscitating a neonate who has asystole and not improving with all measure continued for 10 minutes.	132 (64.7)	72 (35.6)

Bivariate and multivariate logistic regression demonstrated that there was no significant association in the knowledge score of the participants in terms of sex, age, educational level, year of services, profession, place of work and presence of neonatal resuscitation guideline. However, there was significant association in the knowledge score of the participants in terms of neonatal resuscitation training and the time training was given (Table 4). Participants who have taken neonatal resuscitation training have 3.1 times more likely to have good knowledge (AOR = 3.1, 95 % CI: 1.2 - 4.8, P value = 0.003). Those who took the neonatal resuscitation training within 2 years have 5.6 times higher to have good knowledge (AOR =5.6, 95 % CI: 1.19 - 6.72, P value = 0.044).

Table 4: Predictor variables of level of knowledge of participants

Variables	Knowledge level		Crude OR [95%CI]	Adjusted OR [95% CI]	P Value
	GOOD n (%)	POOR n (%)			
Gender					
Male	33 (38.8)	52(61.2)	1.406(0.784-2.522)	1.621(0.405-6.488)	0.495
Female	37 (31.1)	82(68.9)	1	1	
Profession					
Midwifery	30(30.9)	67(69.1)	0.597(0.269-1.323)	0.489(0.118-2.019)	0.323
Nurse	11(28.2)	28(71.8)	0.524(0.199-1.377)	0.369(0.065-2.108)	0.262
Pediatrics resident	14(42.4)	19(57.6)	0.982(0.376-2.570)	0.564(0.112-2.839)	0.487
OBGYN resident	15(42.9)	20(57.1)	1	1	
Level of education					
Diploma	1(6.7)	14(93.3)	0.096(0.012-0.773)	0.104(0.002-4.4288)	0.237
Degree	34(31.8)	73(68.2)	0.626(0.334-1.176)	0.478(0.055-4.183)	0.505
Masters	6(42.9)	8(57.1)	1.009(0.315-3.225)	0.967(0.327-1.823)	0.430
Year 2 resident	13(39.4)	20(60.6)	0.744(0.143-1.487)	0.634(0.257-1.045)	0.673
Year 3 resident	10(45.4)	12(54.6)	0.546(0.245-0.875)	0.498(0.048-0.869)	0.480
Year 4 resident	6(46.2)	7(53.8)	1	1	
Place of Work					
Tikur Anbessa hospital	11(22.4)	38(77.6)	0.488(0.196-1.217)	0.340(0.077-1.504)	1.155

Zewditu hospital	14(31.8)	30(68.2)	0.787(0.325-1.910)	3.041(0.624-14.827)	1.169
Gandhi hospital	16(37.2)	27(62.8)	0.557(0.187-1.032)	0.452(0.182-0.826)	1.023
Addis Ababa university	29(42.6)	39(57.4)	1	1	
Neonatal resuscitation training					
YES	47(43.9)	60(56.1)	2.520(1.378-4.610)	3.102(1.267-4.870)	0.013
NO	23(23.7)	74(76.3)	1		
Period of resuscitation training					
Less than 2 years	37(52.1)	34(47.9)	2.829(1.191-6.722)	5.667(0.994-32.425)	0.044
More than 2 years	10(27.8)	26(72.2)	1	1	
Work experience					
1-2	36(31.3)	79(68.7)	0.806(0.367-1.769)	0.290(0.039-2.166)	0.228
3-4	21(39.6)	32(60.4)	1.161(0.484-2.785)	0.643(0.119-3.483)	0.609
>5 years	13(56.1)	23(63.9)	1	1	
Neonatal resuscitation guideline					
Yes	22(36.1)	39(63.9)	1.209(0.579-2.523)	0.611(0.127-2.952)	0.540
No	27(35.1)	50(64.9)	1.157(0.576-2.326)	0.688(0.142-3.333)	0.642
I don't know	21(31.8)	45(68.2)	1	1	

5.3 Attitude level of the participant towards neonatal resuscitation and associated factors

Among the participants, almost three-fourth (72.5%) thought it is necessary to regularly check for the equipment completeness of newborn resuscitation corner and half (54.9%) felt It is necessary to prepare for resuscitation irrespective of the presence or absence of risk factor. More than half (54.4%) of the respondents believed that they could not hesitate to use it whenever needed if they had good knowledge & practice toward resuscitation. Majority (73%) of the participants acknowledged that Delay in neonatal resuscitation can significantly increase neonatal morbidity and mortality. Almost one third (37.3%) believed that most of the newborn who survived with neonatal resuscitation have serous disability.

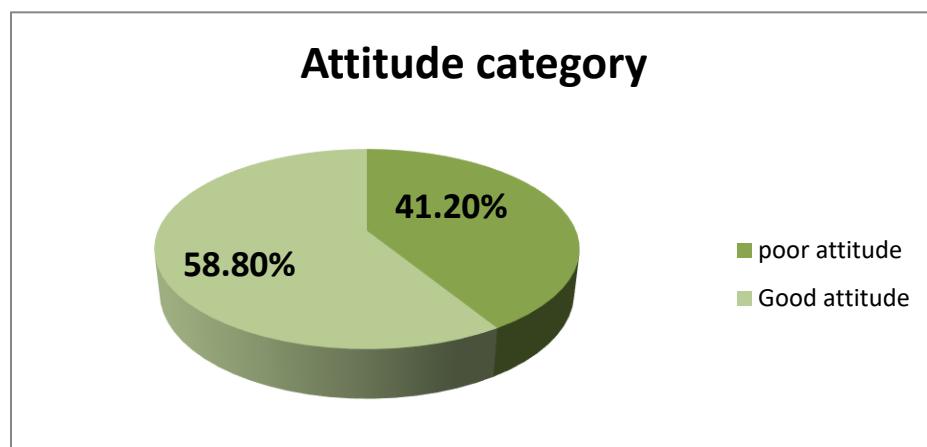
This study revealed that the majority 120 (58.80%) of the participants had good attitude towards neonatal resuscitation. The poor attitude score among midwives, nurses, pediatrics residents and OBGYN residents are 40(58.8%), 20(51.3%), 26(78.8%) and 34(97.1%) respectively. Of the participants, the remaining 84 (41.20%) had poor attitude toward neonatal resuscitation. The poor attitude score among midwives, nurses, pediatrics residents and OBGYN residents are 57(41.2%), 19(48.7%), 7(21.2%) and 1(2.9%) respectively. Table 4 reveals the response of participants to the attitude questions.

The overall mean attitude score of the participants were 81.92% and among midwives, nurses, pediatrics residents and OBGYN residents were 78.42%, 79.18%, 85.44% and 91.30 % respectively (Table 5).

Table 5: Participants response towards attitude questions

Items	Strongly Disagree (%)	n	Disagree n (%)	Neutral n (%)	Agree n (%)	Strongly Agree n (%)
it is necessary to regularly check for the equipment completeness of newborn resuscitation corner	4(2)		5(2.5)	4(2)	43(21.1)	148(72.5)
It is necessary to prepare for resuscitation irrespective of the presence or absence of risk factor	5(2.5)		9(4.4)	18(8.8)	60(29.4)	112(54.9)
they could not hesitate to use it whenever needed if they had good knowledge & practice toward resuscitation	7(3.4)		15(7.4)	21(10.3)	50(24.5)	111(54.4)
Delay in neonatal resuscitation can significantly increase neonatal morbidity and mortality	8(3.9)		4(2)	8(3.9)	35(17.2)	149(73)
most of the newborn who survived with neonatal resuscitation have serous disability	12(5.9)		64(31.4)	43(21.1)	53(26)	32(15.7)

Figure 5: Attitude category of the participants



This study showed that there was no significant association in the attitude of the participant in terms of sex, age, working unit, educational level, professions, neonatal resuscitation training and experience or year of services. Bivariate and multivariate logistic regression performed for the predictor variables didn't reveal significant association (Table 6).

Table 6: Predictor variables of level of attitude of participants

Variables	Attitude level		Crude OR [95%CI]	Adjusted OR [95%CI]	P Value	
	GOOD (%)	n				POOR (%)
Gender						
Male	61(71.8)		21(28.2)	2.585(1.428-4.678)	1.383(0.419-4.568)	0.595

Female	59(49.6)	60(50.4)	1	1	
Profession					
Midwifery	40(58.8)	57(41.2)	0.021(0.003-0.157)	0.683(0.191-2.440)	0.558
Nurse	20(51.3)	19(48.7)	0.031(0.004-0.249)	0.213(0.034-0.619)	0.342
Pediatrics resident	26(78.8)	7(21.2)	0.109(0.013-0.944)	0.823(0.491-1.513)	0.175
OBGYN resident	34(97.1)	1(2.9)	1	1	
Level of education					
Diploma	3(20)	12(80)	0.033(0.008-0.144)	0.697(0.028-17.250)	0.826
Degree	52(34.5)	55(65.5)	0.126(0.055-0.289)	3.697(0.541-24.668)	0.184
Masters	5(35.7)	9(64.3)	0.074(0.020-0.277)	0.167(0.027-1.345)	0.167
RII	30(90.9)	3(9.1)	0.027(0.003-0.267)	0.156(0.034-4.128)	0.122
RIII	19(86.3)	3(13.7)	0.167(0.028-0.423)	0.246(0.003-1.563)	0.321
RIV	11(84.6)	2(15.4)	1	1	
Place of Work					
Tikur Anbessa hospital	19(38.8)	30(61.2)	0.605(0.264-1.385)	0.881(0.260-2.986)	0.839
Zewditu hospital	19(43.2)	25(56.8)	0.725(0.312-1.688)	1.643(0.406-6.642)	0.486
Gandhi hospital	22(51.2)	21(48.8)	0.482(0.246-1.126)	1.301(0.372-3.219)	0.541
Addis Ababa university	60(88.2)	8(11.8)	1	1	
Neonatal resuscitation training					
YES	64(59.8)	43(40.2)	1.090(0.624-1.904)	1.213(0.329-2.783)	0.763
NO	56(57.7)	41(42.3)	1	1	
Period of resuscitation training					
Less than 2 years	46(35.2)	25(64.8)	1.840(0.815-4.156)	1.913(0.446-8.204)	0.383
More than 2 years	18(50)	18(50)	1	1	
Work experience					
1-2 years	67(58.3)	48(41.7)	0.997(0.467-2.130)	0.523(0.102-2.670)	0.436
3-4 years	32(60.4)	21(39.6)	1.088(0.460-2.576)	0.489(0.117-2.038)	0.326
>5 years	21(58.3)	15(41.7)	1	1	
Neonatal resuscitation guideline					
YES	36(59)	25(41)	0.720(0.350-1.843)	0.459(0.111-1.902)	0.283
NO	40(51.9)	37(48.1)	0.541(0.274-1.066)	0.760(0.191-3.021)	0.697
I don't know	44(66.7)	22(33.3)	1	1	

5.4 Practice of the participant toward neonatal resuscitation and associated factors

This study had revealed that majority 96.1% of the participants had done neonatal resuscitation while the remaining 3.9% of the participants was not involved in the resuscitation. Figure 3 shows the reason given by the participants for not practicing neonatal resuscitation. Three fourth of the participants mentioned that they do not get a chance to be involved as a reason for not practicing the neonatal resuscitation.

Half of the participant (55.1%) stated that they don't wash their hand before the procedure. Almost two third of the participants (64.3%) practiced that they tell the mother what is going to

be done during neonatal resuscitation. Majority of the participant (85.2%) stated that they collect the necessary equipment before performing the procedure. And once again, majority of the participants (85.7%) stated that they check the functionality of the equipment before use.

Almost forty percent (39.8%) of the participants had done neonatal resuscitation for less than 5 neonates per month while 18.4%, 7.7%, 25.5% had done for 6-10, 11-15 and > 15 neonate per months respectively. The commonest problem the participant face during neonatal resuscitation is lack of equipment (35.2%) followed by lack of trained assistant and oxygen (25%). Half of the participants (51%) stated that the hospital is not fully equipped with resuscitation material. Forty four percent of the participant mentioned that the dedicated newborn corner in the delivery room is the place for resuscitating high-risk/unstable infants after delivery. Table 7 reveals the response of participants to the practice questions

Figure 6: The reason given by the participants for not practicing neonatal resuscitation

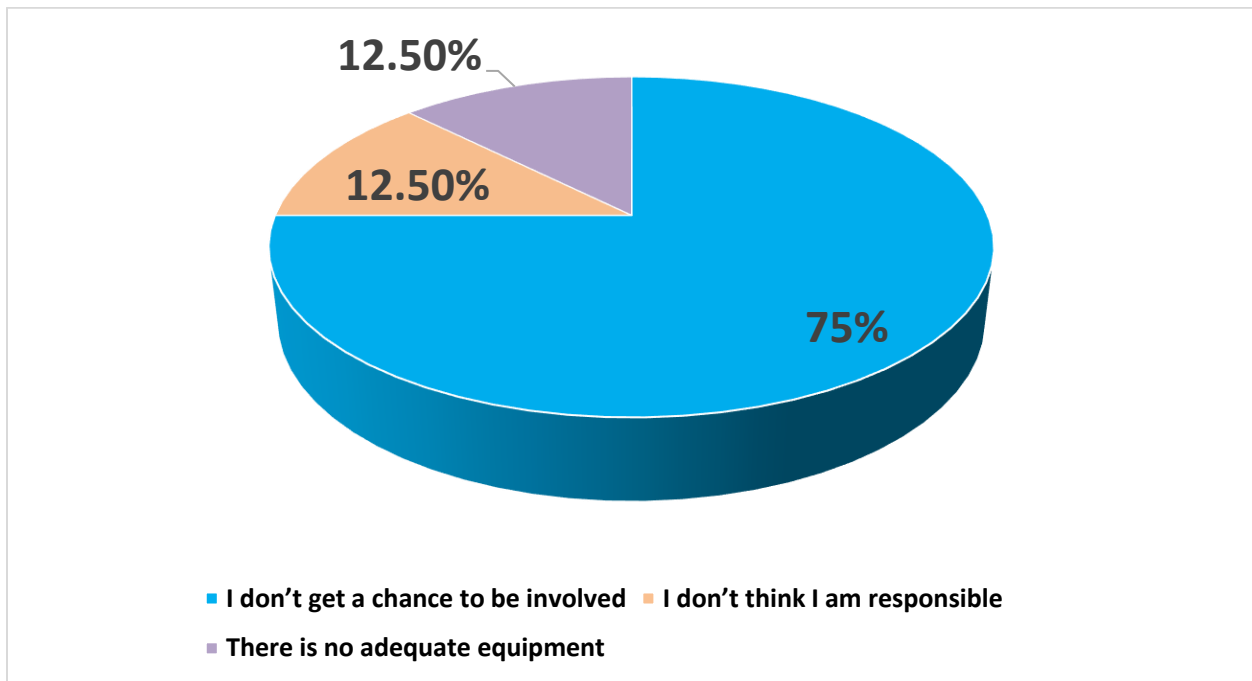


Table 7: The response of participants to the practice questions

Questions	YES (%)	N0 (%)
wash hand before the procedure	88(44.9)	108(55.1)
Tell the mother what is going to be done	126(64.3)	70(35.7)
Collect the necessary materials	167(85.2)	29(14.8)
Check functionality of the equipment	168(85.7)	28(14.3)
The dedicated newborn corner in the delivery room is the place for resuscitating high-risk/unstable infants after delivery.	86(43.9)	110(56.1)

This study revealed that the majority 100 (51.0%) of the participants had good practice towards neonatal resuscitation. The good practice score among midwives, nurses, pediatrics residents and OBGYN residents were 55(59.8%), 13(33.3%), 19(59.6%) and 13(39.4%) respectively. Of the participants, the remaining 96 (49.0%) had poor practice toward neonatal resuscitation. The poor practice score among midwives, nurses, pediatrics residents and OBGYN residents were 37(40.2%), 26(66.7%), 13(40.6%) and 20(60.6%) respectively. The overall mean practice level of the participants were 64.78% and among midwives, nurses, pediatrics residents and OBGYN residents were 64.34%, 61.02%, 72.50% and 63.02% respectively.

This study had showed that there was no significant association in the practice score of the participants in terms of sex, age, profession, working unit, educational level, neonatal resuscitation training and experience or year of services. But there was significant association in the practice score of the participants in terms of availability of resuscitation guideline (AOR=2.55, 95% CI: 1.90-8.28, p=0.004). Lack of neonatal resuscitation guideline was associated with low level of resuscitation practice. Participants who had resuscitation guidelines in the work place had 2.5 times more performance than those who had no guideline.

Table 8: Predictor variables of level of practice of participants

Variables	Practice level		Crude OR	Adjusted OR	P Value
	Good n (%)	POOR n (%)			
Gender					
Male	42(51.2)	40(48.8)	1.014(0.575-1.789)	1.300(0.307-5.509)	0.722
Female	58(50.9)	56(49.1)	1	1	
Profession					
Midwifery	55(59.8)	37(40.2)	2.287(1.014-5.157)	6.116(1.114-32.698)	0.061
Nurse	13(33.3)	26(66.7)	0.769(0.293-2.019)	2.318(0.389-6.495)	0.192
Pediatrics residents	19(59.6)	13(40.6)	2.249(0.833-6.069)	3.102(0.932-7.192)	0.329
OBGYN residents	13(39.4)	20(60.6)	1	1	
Level of education					
Diploma	6(42.9)	8(57.1)	0.773(0.241-2.479)	0.102(0.002-5.271)	0.257
Degree	53(51)	51(49)	1.072(0.577-1.992)	0.128(0.011-1.504)	0.102
Masters	9(69.2)	4(30.8)	2.320(0.649-8.297)	0.942(0.092-2.274)	0.262
R II	13(44.8)	16(55.2)	1.670(0.273-3.289)	1.010(0.006-7.291)	0.409
R III	11(47.8)	12(52.2)	2.083(0.197-5.123)	1.307(0.023-2.719)	0.201
R IV	6(46.2)	7(53.8)	1	1	
Place of Work					
TikurAnbessa hospital	18(37.5)	30(62.5)	0.425(0.181-0.997)	0.149(0.029-0.757)	0.257
Zewuditu hospital	26(61.9)	16(38.1)	1.151(0.478-2.774)	1.782(0.288-11.022)	0.102
Gandhi hospital	24(58.5)	17(41.5)	1.038(0.329-2.382)	1.319(0.281-3.192)	0.210

AAU	32(49.2)	33(50.8)	1	1	
Neonatal resuscitation training					
YES	53(50)	53(50)	0.915(0.521-1.605)	0.681(0.482-0.920)	0.745
NO	47(52.2)	43(47.8)	1	1	
Period of resuscitation training					
Less than 2 years	38(54.3)	32(45.7)	1.662(0.738-3.747)	7.688(1.058-56.107)	0.062
More than 2 years	15(41.7)	21(58.3)	1	1	
Work experience					
1-2	53(49.1)	55(50.9)	0.964(0.453-2.049)	0.246(0.027-2.230)	0.212
3-4	29(55.8)	23(44.2)	1.261(0.538-2.957)	0.511(0.085-3.079)	0.464
>5 years	18(50)	18(50)	1	1	
Neonatal resuscitation guideline					
YES	39(67.2)	19(32.8)	3.250(1.536-6.877)	2.552(1.908-8.289)	0.004
NO	37(48.7)	39(51.3)	1.502(0.760-2.967)	0.614(0.118-3.199)	0.044
I don't know	24(38.7)	38(61.3)	1	1	

6. Discussion

This study aimed at assessing knowledge, attitude and practice level of health professions (midwives, nurses, pediatrics residents and OBGYN residents) toward neonatal resuscitation in Tikur Anbessa Specialized, Zewditu Memorial and Gandhi Memorial Hospital, Addis Ababa, Ethiopia.

The first specific objective of the study which was investigated in this study was to examine knowledge level among midwives, nurses, pediatrics residents and OBGYN residents toward neonatal resuscitation in Tikur Anbessa Specialized, Zewditu Memorial and Gandhi Memorial Hospital. In order to investigate this objective, the researcher administered ten questions to the respondents to assess their knowledge level.

This study showed that adequate knowledge (score greater than 80%) toward neonatal resuscitation among the health professionals (midwives, nurses and residents) was only 34.3% and among midwives, nurses, pediatrics residents and OBGYN residents were 30.9%, 28.2%, 42.4% and 42.9% respectively. 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 study conducted at South Wollo Governmental Hospitals in North East Ethiopia (only 32.9% had good knowledge) [55, 64, 73].

From this study it was found that the mean knowledge score of health profession was insufficient (65.19%). This finding was comparable with the same study from India (57%) but higher than that of the study from Gondar teaching hospital, Ethiopia (43.02%) [80, 71]. This discrepancy could be due to the difference in coverage training on neonatal resuscitation and the guideline available for resuscitation.

This study showed significant association in the knowledge score of the participants in terms of neonatal resuscitation training and the time training was given. Participants who took neonatal resuscitation training had 3.1 times more likelihood to have good knowledge (AOR = 3.1, 95 % CI: 1.2 - 4.8, P value = 0.003). This finding was consistent with study conducted Nigeria [66].

The second statistically significant association was for those health professions who took training within 2 years which had 5.6 times higher likelihood to have good knowledge (AOR =5.6, 95 % CI: 1.19 - 6.72, P value = 0.044). This finding is consistent with study conducted in Canada which shows positive correlation between duration of the training and knowledge performance [62].

The second specific objective was to examine the attitude toward neonatal resuscitation. To examine the level of attitude, five questions were forwarded to the respondents and it was found that the majority or 58.80% of the participants had good attitude towards neonatal resuscitation.

This study shows that there was no significant association in the attitude of the participant in terms of sex, age, working unit, educational level, profession, neonatal resuscitation training or year of services. The only significant association found between dependent variable was among level of knowledge and attitude. Those participants having good knowledge were 65% more likely to have good attitude level (AOR=0.357, 95% CI: 0.18-0.67, p=0.001).

The Third examined specific objective was to determine the practice level of midwives, nurses, pediatrics residents and OBGYN residents toward neonatal resuscitation. The findings of the study revealed that the overall mean practice score of the participants was 64.3%. This finding was correspondent with the study done in Gondar teaching hospital 56.7% and study conducted at South Wollo Governmental Hospitals in North East Ethiopia which is 62.9% [71, 73]. This low level of neonatal resuscitation performance could be due to inadequate and regular refreshment training.

According to this study, presence of the guideline was the only predictor of practice score. Participants who had resuscitation guidelines in the work place had 2.5 times higher practice score towards neonatal resuscitation (AOR=2.55, 95% CI: 1.90-8.28, P value=0.004). This finding was consistent with study conducted in South Wollo Governmental Hospitals, Ethiopia [73].

7. Conclusions

This cross-sectional study demonstrated that there is a gap in knowledge, attitude and practice of health profession towards neonatal resuscitation and needs to be improved. The overall knowledge level of participants was 65.7% and 34.3% for poor and good knowledge level, respectively. Taking neonatal resuscitation training and the time training was given were found to be the predictor of knowledge score of respondents. Those who took training and duration of the training less than 2 years had higher odds of having good knowledge (AOR=3.10, 95% CI: 1.26-4.87) and (AOR = 5.66, 95 % CI: 0.99-32.42) respectively. The overall attitude level of the participants was 58.8% and 41.2% for good and poor attitude respectively. Having good knowledge were found to be the only predictor to have good attitude level (AOR=0.357, 95% CI: 0.18-0.67, p=0.001). About 49.0% and 51.0% of participants were found to have poor and good overall practice respectively. The only determining factor associated with practice level was the presence of the guideline in the work place. Having guideline had a higher odd of good practice (AOR=2.55, 95% CI: 1.90-8.28, p=0.004). Having good knowledge were found to be the only predictor to have good attitude level (AOR=0.357, 95% CI: 0.18-0.67, p=0.001). In this study, no other independent variables were associated with Knowledge, attitude and practice levels. Though it needs an in-depth study, there was no correlation observed between knowledge and practice level of participants.

8. Strength and Limitation of the Study

8.1 Strength of the study

The use of health personnel in data collection helps to make the measurement error minimum. The validity of the Questionnaire was done by Gynecologist and obstetrician, pediatrician and neonatologists. The reliability of the Questionnaires was assured before they were administered

to the respondents. In fact; they were commented by the researchers' advisors next; they were pretested for their reliability using non sampled respondents working in Paulo's hospital. Prior to data collection, the researcher gave adequate training to the data collectors training. As a result, the researcher was confident enough about the collected data.

8.2 Limitation of the Study

- Since the respondents were busy while the data were being collected, they might not give accurate information about the knowledge, attitude and practice of health professionals to wards neonatal resuscitation.
- It would be stronger if it had included interview and open-ended questions to triangulate the data which were obtained from questionnaires.
- Because the sample size is small, its findings can't be generalized to the rest of health professionals.

9. RECOMMENDATION

The hospitals administration should avail resuscitation guidelines and give persistently regular in-service training for health professionals on neonatal resuscitation to promote the knowledge and skills of health professionals so that neonatal mortality and morbidity will decrease. Furthermore, the health professionals should try to update and upgrade their knowledge and skills. In addition to the aforementioned points, the hospitals administrators should allocate enough budget for neonatal resuscitation and they should supervise the status of neonatal resuscitation in their respective hospitals in turn they will be able to alleviate problems related to neonatal resuscitation.

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11. Annex

Annex I: Participants consent form

I would like to introduce myself. My name is Selam Eshetu. I am a general medical practitioner. Now I am studying obstetrics and gynecology for specialization in Tikur Anbessa Specialized Hospital. Besides, I am conducting research entitled on assessment of knowledge, attitude and practice toward neonatal resuscitation among midwives, nurses, pediatrics residents and OBGYN residents in Tikur Anbessa Specialized, Zewditu Memorial and Gandhi Memorial Hospital, Addis Ababa, Ethiopia.

In this study data will be collected from midwives, NICU nurses, OBGYN and pediatrics residents 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 help in developing strategy to improve the quality-of-service delivery through improving health care provider's knowledge, attitude and skill toward neonatal resuscitations.

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

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

1. YES 2. NO

Annex II: Questionnaire

PART I: Provider's characteristics related questions

101. What is the name of the Institution you are working?

1. Tikur Anbessa specialized hospital
2. Zewditu memorial hospital
3. Gandhi memorial hospital

102. Gender 1. Male 2. Female

103. Age in years _____

104. Your field of study/profession?

1. Midwifery
2. Nurse
3. Pediatrics resident
4. OBGYN resident

105. Which unit are you working currently?

1. Labor ward 2. NICU 3. EOPD 4. Specify _____

106. What is your level of education?

1. Diploma 2. Degree 3. Masters

107. Have you ever taken resuscitation training in the workplace?

1. YES 2. NO

108. If the answer for question 7 is YES? When was that?

1. Within the last 6 months 2. Within 1 year 3. Within 2 years 4. More than 2 years

109. How long have you been providing neonatal resuscitation?

1. <1 years 2. 1-2 years 3. 3-4 years 4. >5 years

Part II: Questions related to institutional characteristics

202. Does your hospital have neonatal resuscitation guidelines?

1. Yes 2. No 3. I don't know

203. Do you have a saturation monitor in the resuscitation area of delivery room?

1. YES 2. NO

204. Do you have an oxygen blender in the resuscitation area of delivery room?

1. Yes 2. No

Part III: Questions addressing attitude and perceptions of participants

301. It is necessary to regularly check for the equipment completeness of newborn resuscitation corner?

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. 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

304. Delay in neonatal resuscitation can significantly increase neonatal morbidity and mortality.

1. Strongly agree 2. Agree 3. Neutral 4. Disagree 5. Strongly disagree

305. I think most of the newborn who survived with neonatal resuscitation have serious disability.

1. Strongly agree 2. Agree 3. Neutral 4. Disagree 5. Strongly disagree

Part IV: Questions addressing to assess knowledge

401. To which new born is initial assessment required?

1. All new born 2. Only those who had perinatal/Intrapartum risk factor
3. Preterm fetus only 4. Others (specify) _____

402. What is the correct position of baby's neck for resuscitation?

1. Slightly extended 2. Flexed 3. Hyper extended 4. Others _____

403. What is the best indicator of effective bag and mask ventilation?

1. Rising heart rate and audible breath sounds 2. Rise in oxygen saturation
3. Chest movements 4. None of the above

404. 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.

405. 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

406. What is the recommended ratio of chest compression to ventilation?

1. 3:1 2. 4:1 3. 3:2 4. 5:1

407. For how long does cardio-pulmonary resuscitation (CPR) continued before reassessing heartbeat?

1. 15 seconds
2. 20 seconds
3. 30 seconds
4. 60 seconds

408. 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) _____

409. What depth the chest compression you provide to produce the required pressure?

1. 1/3 of anteroposterior diameter of chest

2. 2/3 of anteroposterior diameter of chest

3. 1/4th of anteroposterior diameter of chest

4. 3/4th of anteroposterior diameter of chest

410. How long do you resuscitate a neonate who has asystole and not improving with all measure?

1. 5 minutes

2. 10 minutes

3. 15 minutes

4. 20 minutes

Part V: Questions to assess participant's practice;

501. Have you ever done neonatal resuscitation?

1. Yes

2. No

502. If your answer for question no 2 is no, what is the reason?

1. I don't get a chance to be involved

2. I don't think I am responsible to be participated

3. I don't know how to do it

4. There is no adequate equipment for resuscitation

5. Other

503. If your answer is yes, proceed to the below questions

504. Please put a tick mark on the space provided if you perform on the procedure during 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. Others (Specify) _____

505. On average, for how many neonates you serve per month?

1. 0-5 2. 6-10 3. 11-15 4. >15 5. No response

206. What problem did you face during resuscitation?

1. Lack of equipment 2. Lack of trained assistant
3. Lack of oxygen 4. Absence of guideline
5. Other _____

507. 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

508. Where do you resuscitate high-risk/unstable infants 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