College of Health Science

Department of Obstetrics and Gynecology

Knowledge and Practice of Neonatal Resuscitation and its Associated Factors Among Midwifes Working at Selected Health Centers of Addis Ababa.

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Research report attesting page

Student declaration

I, Dr. Arebu Hassen hereby declare that this thesis entitled "Knowledge and Practice of Neonatal Resuscitation and its Associated Factors Among Midwifes Working at Selected Health Centers of Addis Ababa " was fully undertaken by me under the guidance of my advisor and that I have to the best of my knowledge and effort, I have cited all various sources of information used in this thesis, and I am also declaring that this thesis has not been submitted to any other institution for the award of any degree, certificate, masters or diploma.

Arebu Hassen(MD) Signature _____ Date _____

SUPERVISOR DECLARATION

I hereby certify that I have read and evaluated this research thesis relating to entitled "Knowledge and Practice of Neonatal Resuscitation and its Associated Factors Among Midwifes Working at Selected Health Centers of Addis Ababa" under my guidance from its inception up to in its current format and that it can be submitted for final approval in partial fulfillment to the Degree of Specialty in Obstetrics and Gynecology. I also certify that the above declaration made by the investigator is correct to the best of my knowledge as an advisor.

Advisors:

1. Dr.Eskindir Kebede (consultant Obstetrician and Gynecologist, REI sub spcecialist)

Signature _____ Date _____

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Abbreviation and acronym

LMICS low- and middle-income countries

NR Neonatal resuscitation

ENC Essential newborn care

BMV Bag and mask ventilation

SD Standard deviation

AOR Adjusted Odd Ratio

Abstract

Background: Resuscitation of newborn is a more difficult technique that requires a high level of skill and undergoes rapid changes just after delivery. The newborn goes through significant physiological changes in the first few minutes to hours after delivery as they switch from placental gas exchange in a liquid-filled intrauterine environment to spontaneous air breathing. It might be difficult to be knowledgeable about and perform resuscitation, especially in situations where medical professionals attend few deliveries and don't often rescue infants.

Objective: The aim of this study is to assess the knowledge and practice of neonatal resuscitation and its associated factors among midwifes working at selected health centers of Addis Ababa.

Methods: A cross-sectional facility based study design was carried out. The response rate of 94.6% was achieved using 212 study samples throughout the course of study period. Data were collected via a pretested, semi-structured and self-administered questionnaire. After being cleaned and coded, the data was taken to SPSS version 25 for data administration and further statistical analysis. Descriptive statistics, bi-variate and multivariate logistic regression analysis were conducted to assess midwives' knowledge, practice and associated factors of newborn resuscitation. 95% confidence intervals and p-values of less than 0.05 were used to establish a correlation between the independent and outcome variables.

Result: In this study, 212 midwives were participated, and the good knowledge and practice on neonatal resuscitation were 30% and 45% respectively. The master's degree (AOR=13.4, 95%CI=2.27, 79.27), receiving neonatal resuscitation training (AOR=12.2, 95% CI=4.50 -33.11), and participant supportive supervision (AOR=16.6, 95% CI=6.29, 43.87)) were the determinant factors for knowledge on newborn resuscitation. The key factors influencing neonatal resuscitation practice were serving more than 20 neonates per month (AOR=0.21, 95% CI=0.08-0.52) and having professional experience of at least 8 years (AOR=0.34 , 95%CI=0.13-0.91).

Conclusion: The knowledge and practice of the study participants on neonatal resuscitation were low. The determinant factors for knowledge on newborn resuscitation were educational level, training and supportive supervision. The key factors influencing neonatal resuscitation practice were serving more than 20 neonates per month and having professional experience of at least 8 years.Key word: -knowledge, practice, resuscitation, health provider.

1.Introduction

1.1 Background

A growing percentage of under-five mortality is attributed to low- and middle-income nations, where the majority of the three million newborn fatalities documented worldwide occurred (1). Research conducted globally indicates a rise in infant fatalities caused by asphyxia or hypoxia during childbirth (2). Reducing birth asphyxia-related deaths and morbidities requires effective neonatal resuscitation (3). In low- and middle-income countries (LMICs), where over 95% of neonatal deaths occur, poor basic resuscitation or a delay in the resuscitation response are primarily responsible for the burden of newborn mortality and morbidity (4).

Recommendations relate mainly to newborns going through the transition from intrauterine to extrauterine life, but they also apply to neonates who have finished the perinatal phase and need resuscitation in the initial weeks or months after delivery. These recommendations should be taken into consideration by medical professionals who perform resuscitation on newborns or at any point during the first hospital stay. The terms "newborn" and "neonate" refer to any infant who is admitted for the first time for the purposes of these guidelines (5). About 10% of babies need some assistance in order to start breathing at delivery. Fewer than 1% need prolonged resuscitation (6, 7).

Just after delivery, the resuscitation of a newborn demands a higher level of skill and is a more complex procedure that varies quickly. The newborn goes through significant physiological changes in the first few minutes to hours after delivery as they switch from placental gas exchange in a liquid-filled intrauterine environment to spontaneous air breathing (8).

It is estimated that between 1% and 10% of babies require assistance breathing, and that between 5% and 10% of the population require active resuscitation at birth, which includes drying and encouraging breathing(9).

Asphyxia, which is refers to the inability to start & maintain breathing, was a major contributing factor in the high incidence of infant mortality and morbidity (10–12). Asphyxia was cited as the cause of about 700,000 newborn deaths in WHO studies from 2016. Adequate resuscitation practices, however, could avert the majority of asphyxia-related deaths, which would ultimately

result in a decrease in the total neonatal mortality rate (13). As such, newborn resuscitation performed by a trained professional is necessary to significantly reduce infant asphyxia-related mortality (14).

Among the measures advised to lower the number of deaths brought on by intrapartum-related events are comprehensive emergency obstetric care and neonatal resuscitation (NR). In summary, health care practitioners' understanding of NR is critical. The only medical professionals qualified to undertake newborn resuscitation in places with limited resources are nurses and midwives (15–17). Neonatal resuscitation is defined as the process of bringing a newborn back to life (18).

To start and stabilize the neonate's cardiopulmonary functioning, specific knowledge and competence must be used, and constant practice is necessary to keep the provider competent (19). Competency in newborn resuscitation and, consequently, neonatal outcome are influenced by a variety of factors, including provider qualities such as educational background, experience, and specialization, as well as institutional characteristics such as training, the availability of guidelines, and equipment (20, 21).

1.2 Statement of the problem

Worldwide, newborn mortality and morbidity continue to be major public health concerns. The majority of deaths took place in underdeveloped nations. Sub-Saharan Africa has the highest death rate among developing nations (22). Ethiopia continues to rank among the nations with the worst rates of newborn mortality worldwide, despite numerous attempts by the government to lower the rate. Although a few decades of declines, neonatal mortality has recently somewhat increased, rising from 29 per 1000 live births to 30 per 1000 live births (23). The majority of it was caused by avoidable factors. Intrapartum complications, including as delivery hypoxia, hypothermia, hypoglycemia, post-partum infection, and preterm complications, were the most frequent cause of death (24)

It can be difficult to know how to perform resuscitation, especially in situations where medical professionals attend few deliveries and don't often resuscitate infants (25, 26). It is estimated by current trends that between 2019 and 2030, over 26 million babies would pass away.These deaths can be avoided with the support of postnatal care for mothers and babies, expert treatment at birth, therapy for small and sick newborns, and excellent prenatal care (27). Growing evidence suggests that early newborn care methods may influence neonatal morbidity and death.

Practicing essential newborn care (ENC) procedures can lessen the burden of infant death and morbidity (28)

An essential first step toward enhancing newborn care and decreasing infant mortality in nations with lower and moderate incomes is evaluating the available resources for neonatal healthcare, involving the community, and increasing government support for healthcare services. This will make it possible to determine which areas of healthcare policy and public involvement need to be improved in order to increase neonatal survival (29)

Understanding infant resuscitation properly can help avoid the effects of prenatal asphyxia. Sufficient knowledge of resuscitation techniques for neonates is crucial for accurate, timely diagnosis, appropriate care, and a decrease in problems for neonates with life-threatening illnesses (30, 31).

Prioritizing training and policy-related initiatives begins with assessing the knowledge and proficiency of healthcare workers in newborn resuscitation. However, little is currently known

about Ethiopian health care workers' understanding of and use of newborn resuscitation. Even though some studies have been done on neonatal resuscitation, key medical personnel who assist with newborn care and attend births have not been included. Therefore, everyone working in the field of newborn care is the target audience for this study. Thus, this study's main objective is to evaluate the knowledge & practice of midwifes in neonatal resuscitation as well as the variables associated with these competences.

1.3 Significance of study

It is expected of health care providers to be adequately informed, to have the right mindset, and to know how to do neonatal resuscitation in order to reduce asphyxia-related death and morbidity. Given the high prevalence of hypoxia, health care workers must be skilled and knowledgeable in performing successful neonatal resuscitations. Understanding healthcare professionals' attitudes, knowledge, and practices around neonatal resuscitation is crucial since these things change as new research becomes available.

As a result, it's critical to regularly and continuously analyze knowledge and skills to ensure that they reflect the state of knowledge and practice. The data gathered from this research will: First, assist decision-makers, hospital administrators, and other interested parties in developing, carrying out, and assessing different approaches pertaining to the morbidity and death of newborns.
Second, contribute to the creation of policies and procedures that improve medical professionals' understanding of and proficiency with neonatal resuscitation.
Thirdly, useful for organizing preventive actions and offering proficient, effective newborn resuscitation to preserve the neonate's life.

2. The Review of Literature

2.1. Overview of neonatal resuscitation.

High-risk neonates such as premature and low-birth-weight babies are mostly dependent on early baby stabilization in the initial minutes of life and the quality of neonatal resuscitation (NR) for reducing neonatal morbidity and death (32). The first step in NR is a quick assessment of the newborn, which is followed by stimulation, suctioning, , bag and mask ventilation (BMV), chest compression, medicine delivery, and the use of volume expanders (33)

When a newborn is first brought into the world, its requirements might not appear as important as those of its mother. This kind of thinking could slightly influence a birth attendant's choice to put off resuscitation of the baby in order to minister to the mother's demands. Nonetheless, the data that is now available demonstrates that even brief pauses in resuscitation can have a major effect on a newborn's prognosis (30).

Worldwide studies also show that the chance of a baby dying increases by 16% for every 30 seconds that elapse between the beginning of ventilation and the conclusion of six minutes, and by 6% for each minute that passes between the application of the mask and bag ventilation (34)

Millions of newborn deaths are caused by improper NR actions or poor resuscitation; about 99% of these deaths take place in nations with limited resources (35). Many of these impacted neonates go on to experience long-term consequences like cognitive decline and cerebral disability. Research indicates that the effective use of suitable and sufficient newborn resuscitation by qualified medical professionals probably reduces the perinatal death of about two million babies each year from hypoxia due to the delivery process (36).

An observational study carried out in Kenya revealed a substantial correlation between ensuring the baby's survival, taking off the damp towel once stimulation has probably increased three times, and providing warmth once stimulation has increased more than three times (37) According to a mixed-method study done in Boston, out of 155 deliveries, one third (32.5%) of the babies were born without breathing. The majority of the asphyxiated patients, 45 (88.2%), underwent successful resuscitation: 11.8% through stimulation and drying, 19.6% through stimulation and

clearing the airway, 39.2% through a combination of these techniques, and 17.6 percent using bag-mask ventilation with or without chest compression. Out of the total,6 babies (11.8%) died .The average required time for evaluating the baby after each delivery was 16 seconds, and the average time for beginning bag-mask ventilation was 3.2 minutes (30).

2.2. Health care professional's knowledge towards neonatal resuscitation.

The knowledge of healthcare providers in resuscitation is essential in influencing the rates of newborn asphyxia-related death and morbidity. However, a number of studies found that there is a significant knowledge gap among medical professionals about all aspects of newborn care and resuscitation (38–41). On the other hand, other research has shown that medical personnel have sufficient expertise of neonatal resuscitation (42).

According to an Afghan cross-sectional survey, doctors' and midwives' average knowledge scores were 71% and 66%, respectively. The low knowledge score (less than 85%) of healthcare professionals required for effective newborn resuscitation was the reason for this (38). A related study of nurses working in Nepali maternity wards found that the mean knowledge score was 66% and that 93% of respondents knew insufficiently about infant resuscitation (score <85%) (39). Nearly all of the participants in a different cross-sectional survey of midwives in Ghana (Tamale) (98.1%) lacked adequate understanding of newborn resuscitation (43).

Even though just 25 of the healthcare professionals in Kenya had formal training, the majority of them (85.4%) had heard of newborn resuscitation. Three hours was the average length of time for newborn instruction, and half of the participants did not receive any practical experience. Merely 68 (or one-third) of them achieved scores greater than 85% on the resuscitation technique questions. The majority of them more than 70% thought that their understanding of newborn resuscitation was insufficient and blamed medical education programs for their potential shortcomings (40).

Health workers from North West Ethiopia, including nurses, midwives, and pediatric and obstetric residents, took part in a cross-sectional survey. The study discovered overall mean knowledge score of 19.9 (SD=3.1) was lower than the score of 42.6%, which was inadequate (<80%). Both nurses and midwives had mean scores of 42.8% and 43.9% (41) for knowledge, with average scores of 20.2 (SD=2.94) & 19.7 (SD=3.03), respectively. In contrast, the mean knowledge score of obstetrics & gynecology and pediatric residents was 43% and 42.8%, respectively, with mean differences of 19.6 (SD=3.3) and 19.7 (SD=4.4). In a related study carried out in Ethiopia, medical

professionals' overall knowledge scores on 37 items varied from 12 to 24, with a mean of 18.4 (±5.47) and a mean score of 49% in relation to newborn resuscitation (44)

Conversely, a study on nurses in Western Nigeria found that the majority of participants (78.8%) knew enough about newborn resuscitation. In particular, 95.5% of respondents were sufficiently knowledgeable about the evaluation of meconium-stained liquor, the supplies needed for neonatal resuscitation, and the warning signals of newborn newborns (42)

2.3. The practice of neonatal resuscitation

According to a research done among nurses in Nepal, 90.7% of participants did not know enough about neonatal resuscitation (less than 85%)(34). An additional investigation carried out in Afghanistan demonstrated that over three-quarters of midwives and three-quarters of doctors were competent in performing neonatal resuscitation (38). Comparable direct observational research from 138 NR in Kenya reveals that overall quality of service scores were high (86%) In contrast, less than half of the participants functioned successfully when there was meconium present (45) and 83% when airway clearance was required.

More than half (55%) of the midwives who participated in the other trial, which was carried out in Ghana, lacked competence in doing newborn resuscitation. Out of these, only 45 percent practice neonatal resuscitation (43).

According to a research done among physicians in a Gujarati town in India, over two thirds of the participants knew how to perform chest compression and effective bag and mask ventilation (BMV). About one-third of those who utilized room air for BMV during resuscitation and 18.3% of those who reported knowing about and using continuous positive airway pressure (CPAP) in the delivery room.Additionally, the study showed that only 46 (36.5%) doctors wrapped babies with extremely low birth weights with plastic or thermal wraps. Likewise, of the pediatricians, only 48 (38.1%) performed the suggested action of chopping off the umbilical chord after waiting one minute. In cases when the liquor has been stained with meconium, 78 out of the 95 embraced the current guidelines, which call for endotracheal suctioning of the non-vigorous neonate. On the other hand, 35 (or 14% of them) underwent oral cavity suctioning prior to shoulder delivery (46).

In a research conducted in Northwest Ethiopia, medical practitioners' overall neonatal resuscitation skills score was 6.8 (SD=3.9), or 56.5%. The average skill level of the participants was low. Out of a total of 12 skill questions (41) the mean scores for the skills of nurses and midwives were 59%

(±39%) and 55.8% (±31.2%), respectively. Obstetrics and gynecology residents scored 55% (±33%), and pediatric residents scored 47.5% (±=34.75%).

2.4. Factors affecting knowledge and practice towards neonatal resuscitation.

Years of experience in a maternity hospital were positively correlated with good drying/stimulation by 1.86 units for every unit increase in work experience, according to an observational study done in Kenya. In a similar fashion, for every unit rise in experience year, it also dramatically increased by a hange almost 1.9 times with airway maintenance. When it came to the first bag and mask ventilation practice, nurses performed worse than doctors ($p = -2.338$, $p= 0.05$, CI = −4.732–0.056).

Maternity nurses in Nepal participated in a cross-sectional study that revealed a significant correlation between their resuscitation training (39), their overall work experience, and their work experience in maternity wards ($p=0.028$). Additionally, a statistically significant positive association ($p<0.0018$) was seen between the knowledge and ability scores of respondents about newborn resuscitation. Nevertheless, the research findings indicated that there was no noteworthy correlation between the participants' ability ratings and their age, year of service, or previous workplace (39)

Another study, conducted in South Sudan, discovered that although participants had improved their knowledge ,abilities and proficiency three months following training, there had been a noticeable drop a year later. The study also demonstrates that knowledge increased from 42.5% on the pretest to 97% on the posttest, but then decreased to 84.5% three months and 69.4% a year after training.Skills increased following the lesson, going from 26.1% on the pretest to 94.4% on the posttest, maintaining that level for three months before declining to 77.0% after a year.

The Afghanistan study also demonstrates that increased knowledge and clinical abilities were substantially correlated with training (39). Poor resuscitation performance was frequently caused by a lack of concern, poor equipment preparation, anxiety, and dread stemming from the stress of ventilating a non-breathing newborn, according to another qualitative study done among midwives in Tanzania (48). A study carried out in Ghana also reveals a relationship between midwives' knowledge of newborn resuscitation and their training ($p=0.013$), educational attainment ($p=0.021$), and workplace ($p=0.021$). However, no meaningful correlation was found between their

degree of neonatal resuscitation experience and their educational background, site of employment, and number of years worked as a midwife, in addition to their knowledge assessments and professional background (43).

A study among pediatricians in India also reveals that, when it comes to meconium-stained liquor, participants in the neonatal resuscitation program (NRP) were more likely to be following the right procedures than those who received no training (80% versus 53.1%, $P < 0.002$). In contrast, there was no appreciable difference in the use of plastic/thermal wraps for babies with extremely low birth weights (43.6% versus 34.9%, $p = 0.33$) or the use of bags and masks with room air (84.4% versus 82.4%, $p = 0.49$) between those who received training and those not received training

According to a study done in Ethiopia, there was a substantial difference in the participants' sex, but not in the participants' age, career, year of service, qualification, or previous workplace when it came to the knowledge score. According to the same study, there was no discernible variation in the participants' ability scores according to their sex, age, profession, year of service, qualification, or former employer (41).

2.5 Conceptual framework

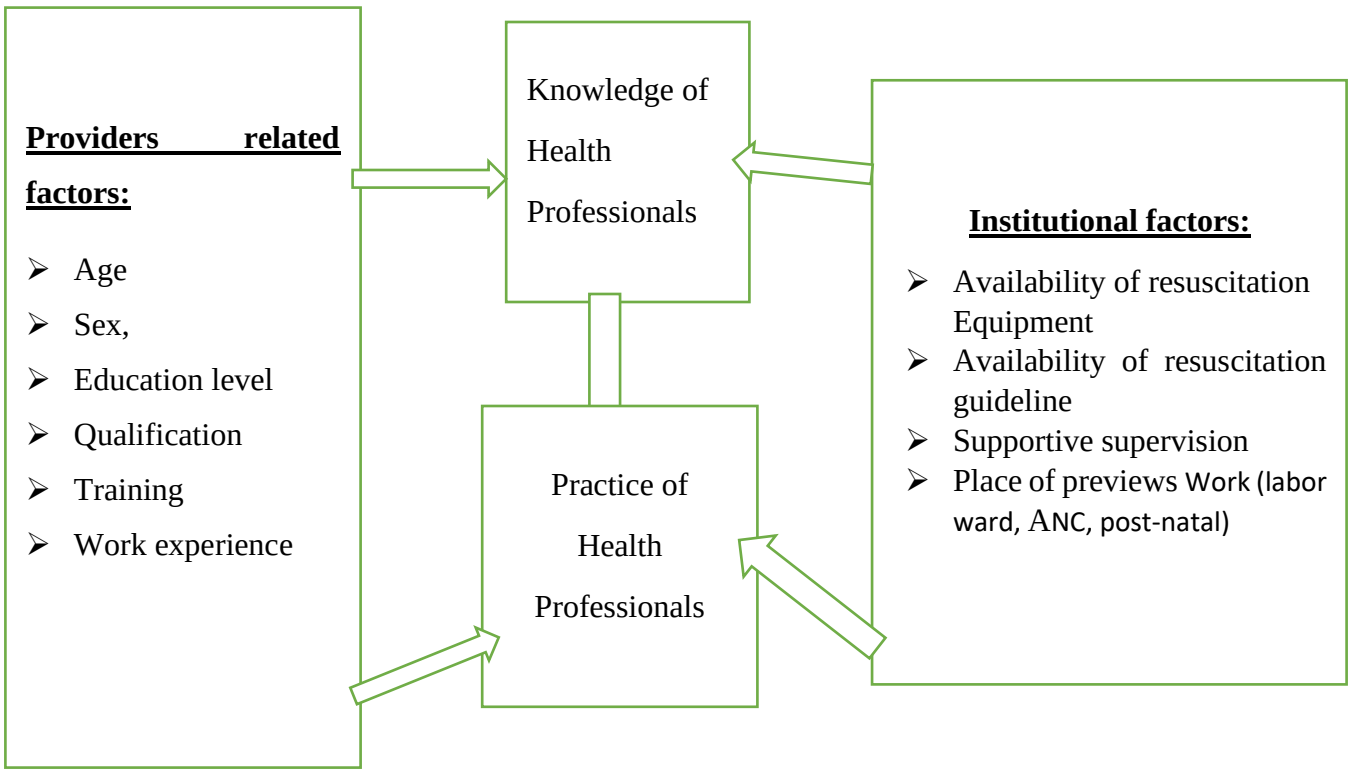

Figure 1. Conceptual frame work for knowledge and practice of neonatal resuscitation among midwifes in selected health centers of Addis Ababa, 2023.

3. Objective

3.1 General objective

- Assessment of knowledge and practice of midwifes towards neonatal resuscitation in selected health centers, Addis Ababa.

3.2 Specific objective

- To determine the level of Knowledge of neonatal resuscitation among midwifes working in selected health centers of Addis Ababa, Ethiopia
- To explore the practice of neonatal resuscitation among midwifes working in selected health centers of Addis Ababa, Ethiopia
- To identify the determinant factor of knowledge and practice of neonatal resuscitation among midwifes working in selected health centers of Addis Ababa, Ethiopia

4.Methods

4.1 Study Area and Period

This research was done in Addis Ababa , capital city of Ethiopia, which has a population of 3,384,569 and a 2.7% annual growth rate (49). It is anticipated that in the near future, the city's population would surpass 6.5 million inhabitants, with a current anticipated yearly growth rate of 3.8%. Its estimated 527 km2 size is located between 2,200 and 3,000 meters above mean sea level. The city experiences 16.3°C average temperature and 1143 mm (50) of rainfall on average. There are 11 sub cities including 100 health centers in the city, all of which offer maternity care services.

4.1 The study period

This research was carried out from April 1st, 2024, to May 30th, 2024.

4.2 Study Design

A cross-sectional study including a facility assessment was conducted in a few Addis Ababa, Ethiopia health centers.

4.3 Source Population

All midwives working in Addis Abeba's health centers.

4.4 Study Population

Midwives working in labor ward of selected health centers of Addis Ababa

4.5 Inclusion and Exclusion Criteria

4.5.1 Inclusion criteria

All midwives working in labor ward of the selected health centers of Addis Ababa from April 1/2024 to May 30/2024

4.5.2 Exclusion criteria

- ✓ Midwives working only other units like ANC, post natal & maternity unit will be excluded
- ✓ Midwives who were unavailable for contact throughout the time of data collection(sick leave , maternity leave,..)
- ✓ Unwillingness to participate

4.6 Sample Size Determination

The sample size was determined using a single population percentage formula with the following assumptions.This study, which examined health professionals' knowledge and practice in infant resuscitation, was conducted in North West Ethiopia, assuming a 42.8% knowledge level and a 59.2% practice level. (41]

Sample sizes were computed using the next two formulas. The significance level is set at 5% (α = 0.05), the confidence level is at 95% (Z α/2 = 1.96), and the absolute precision or margin of error is set at 5% (d = 0.05).

$$n = \frac{Z_{\frac{\alpha}{2}}^{2} P (1 - P)}{d^{2}}$$

nf >>>>>>>>>> n / ((1+ n)/ N)

n= sample size prior to applying correction formula,

nf= sample size following correction formula

N= total population in a study area which is 446

The sample sizes for knowledge and practice were 376 and 371, respectively, based on this formula. It is consequently believed that the higher sample size (376) among knowledge and practice is appropriate. The correction factor (formula 2) was introduced along with a 10% non-response rate because the source populations were tiny (<10,000). In this investigation, 224 samples in total were used.

4.7 Sampling technique

Three of the eleven sub-cities were chosen by lottery. Specifically, Bole, Arada, and Kolfe Sub Cities. This study covers a total of twenty-two health centers. Each health center received a proportionate share of the sample size, and data was gathered using a sequential sampling procedure until the necessary sample size was reached.

4.8 Study Variables

4.8.1 Dependent Variable

- Knowledge toward neonatal resuscitation and Practice toward neonatal resuscitation

4.8.2 Independent Variables

- Providers related factors:
  - Sex,
  - Age
  - Level of education
  - Qualification
  - Training
  - Work experiences
- Institutional factors:
  - Presence of resuscitation materials
  - Presence of guideline for resuscitation
  - Providing supportive supervision
  - Prior work place (labor ward , post-natal , ANC …)

4.9 Data Collection method

The investigator assembled a structured English questionnaire for this study using prior comparable literature, Ethiopian Pediatric Association Guidelines (53), Help Babies Breath (HBB) 2nd edition knowledge assessments, 2015 American Heart Association guidelines (52), and WHO guidelines (51).

The instrument is a structured self-administered questionnaire that asks about knowledge and practice of advanced CPR and basic infant resuscitation methods, as well as provider and institutional associated aspects. It also addresses sociodemographic related elements. Data collectors received a one-day training on the significance of the study, how to communicate with study participants, how to obtain consent, and how to respect that consent. Data was gathered between April 1, 2024, and May 30, 2024, G.C., from 8:00 AM to 4:00 PM, following the

department head's agreement and request that the labor ward head to call midwives in his or her office. Following the acquisition of verbal informed consent, the skilled data collector distributed the standard questionnaire to the study participants. Data was gathered via self-administering. A pretest for the questionnaire was conducted with five percent of the study population in the medical facilities that were excluded from the study. The amount of time needed to complete the self-administration questionnaire was modified based on how long the pretest took. The completed questionnaire was gathered in the allotted time for the pretest.

The separate facility assessment questions prepared to be filled after taking informed consent from department head of the labor ward (annex I). The facility assessment questions was filled by interviewing head of labor ward & directly observing by trained data collector

4.10 Data Quality Control Measures

Data was gathered by three data collectors , two supervisors, and the investigator. A one day training was offered for data collectors & supervisors about the whole procedure of data collection. The data collectors having at least one previous similar data collection experience at health facility level was recruited. The data collectors' recruitment was from the health centre but those working directly in the health facility included in the study was not recruited as data collectors in the same health facility

To check the questionnaire's phrasing, logic, and skip patterns, 5% of the study population participated in a pre-test. Every day, the supervisor and data collectors examined the completed questionnaires before letting the respondent leave the setting. In the data gathering phase, close supervision, open communication, and prompt decision-making were enforced by the primary investigator, who also oversaw the data collectors.

4.11 Data Processing and Analysis

Before the data was imported into EPI-info version 4.6.0.0, it was verified for accuracy, consistency, completeness, and missing variables. The data was transferred to SPSS version 25 for data administration and additional statistical analysis once it had been cleaned and coded.

Frequency counts were performed to assess the completeness of each variable. 95% confidence intervals were used to establish a correlation between the independent and outcome variables. For all two-sided tests, a p-value of less than 0.05 was used to signify statistical significance.

4.12 Operational Definitions

Full equipment for resuscitation: minimum of the following materials

Radiant warmer, bag with mask, suction machine & catheter, single/multi use suction bulb,

Stethoscope according to WHO 2016 Technical Specifications of Neonatal Resuscitation Devices (TSNRD)

Knowledge: Health workers' understanding or comprehension of neonatal resuscitation. A standardized questionnaire with 22 items was used to evaluate the participant's knowledge.

Good knowledge: - those study participants scored above 70% of the knowledge-based questions

Practice: Using interview questionnaires, healthcare practitioners really implement neonatal resuscitation. A 13-item self-reported questionnaire was used to evaluate the participant's newborn resuscitation practices.

Good practice: - those study participants scored above 70% of the practice-based questions

4.13 Ethical Considerations

After submitting the proposal to my advisors for assessment, I requested ethical approval from the department of obstetrics and gynecology and from Addis Ababa Health Bureau research and ethical review committee . Following ethical clearance, a letter of authorization was received. Additionally, consent was acquired for any observational questions pertaining to facility assessments from the labor ward head, department head, and medical director of each of the specific health centers that were chosen.After that, the participants in the study were informed of the significance of the research and asked if they would be willing to participate. A one-page consent letter was attached to the front page of each questionnaire in order to gain spoken informed consent.

Participants in the study were informed of the benefits and dangers of the research. Confidentiality and personal information were not required from participants, and participation was entirely

optional. The respondent's choice to decline participation in the interview or to withdraw was honored. The data gathered from the research participants was kept private and utilized exclusively for the patient's care and study.

4.14 Dissemination plan and use of findings

The study's findings were presented to the obstetrics and gynecology department at TASH. The Department of Obstetrics & Gynecology and Addis Ababa Health Bureau in Ethiopia will get the final report. Additionally, efforts will be made to publicize the study's findings through other journals and scholarly publications.

5. Result

5.1 Sociodemographic characteristics of the study participants

In this investigation, 212 study participants were involved, yielding a 94.6% response rate. 82.1% of the study participants were between the ages of 20 and 30, and nearly two thirds of the individuals were female. Of the survey participants, 61.3% were married and 66% were orthodox. Of the study participants, 69 percent held a degree, 55.3% had four to eight years of professional experience, and 25% had received training in newborn resuscitation.

Table 1. The sociodemographic characteristics of the study participants who work in selected health centers, Addis Ababa

variable	frequency	Percent
Sex		
Female	156	73.6
Male	56	26.4
Age in years		
20-30	174	82.1
31-40	38	17.9
Religion		
Muslim	31	14.6
orthodox	139	65.6
protestant	40	18.9
catholic	2	.9
Marital status		
married	130	61.3
single	81	38.2
divorced	1	.5
Level of education		
Diploma	31	14.6
Degree	147	69.3
Masters	34	16.0
Professional experience		
<4	63	29.7
4-8	117	55.2
≥9	32	15.1
Experience in neonatal care		
<4	63	29.7
4-8	117	55.2
≥9	32	15.1
Taken resuscitation or neonatal care training in the work place.		
yes	53	25
no	159	75

5.2 Institution related characteristics of the study participants

Among the research participats, 32% had prior experience working in an ANC, labor ward, maternity and Postnatal and 31.1% the study participants had supportive supervision at the health center and 73.1% of the study participants had serve <10 neonates in a month.

Table 2. Institution related characteristics of the study participants

variable	frequency	Percent
Area of working before		
ANC, Labor ward, maternity and Postnatal	68	32.1
ANC	71	33.5
ANC and LW	10	4.7
Labor ward	45	21.2
maternity	18	8.5
health centers provide you supportive supervision		
Yes	66	31.1
no	146	68.9
Number of neonates serve in a month		
<10	155	73.1
10-20	21	9.9
>20	36	17.0

5.2 knowledge related characteristic of the study participants on neonatal resuscitation

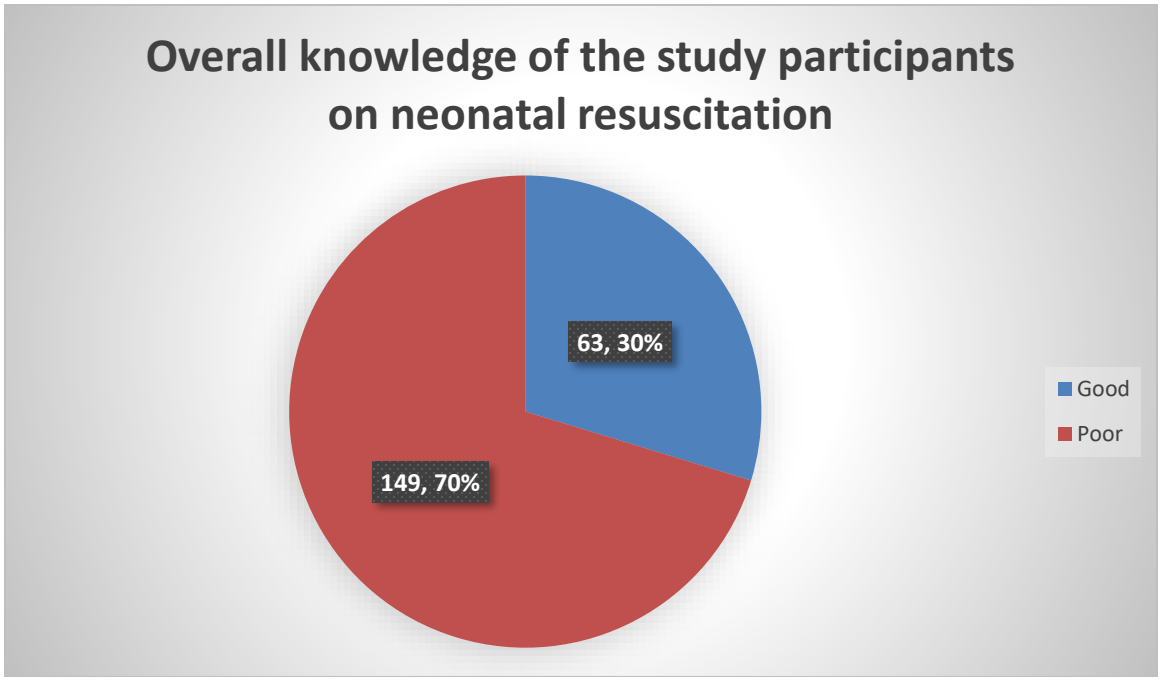

Figure 2.Overall knowledge of the study participants on neonatal resuscitation

Regarding to the specific knowledge assessment questions, 84.9% of the participants were know the time of preparing for new born resuscitation and 95.3% of the participants were list the immediate problem of the new born. From those 96.4% were listed Asphyxia as immediate newborn problem followed by hypothermia and infection. Sixty-eight percent of the participants were knowing the condition of new born which receive routine care and 49.5% of the participants know the correct method of stimulating the new born. Nearly 47% of research participants are aware of the first course of action in resuscitation when the baby stops breathing after birth.

Thirty-three percent of survey participants knew what to do if a baby was born with MSAF fluid, had low muscle tone, depressed breathing, or a heart rate of less than 100 beats per minute. Forty-four percent also knew the risks associated with inappropriate suctioning of a newborn. Of the study participants, 92 percent were aware of the proper positioning of the baby's neck for resuscitation, and 64.6% were aware of the need to cover the mask when doing resuscitation on a neonate.

According to the table below, 65.5% of research participants knew what to do with bag and mask ventilation when a baby's chest was not moving, and 68.4% knew the best sign of efficient bag and mask ventilation.

Table 3. knowledge related characteristics of the study participants on neonatal resuscitation.

Variable	Category	frequency	Percent
When should be prepared to resuscitate the newborn	*At every birth*	*180*	*84.9*
	when we are certain that resuscitation is required	24	11.3
	If there is anticipated risk only	8	3.8
Do you know the immediate problem of new born baby?	yes	202	95.3
	no	10	4.7
List of the immediate newborn problem (n=212)	Asphyxia	195	96.5
	hypothermia	178	84
	infection	95	47
	bleeding	1	0.5
Which babies can receive routine care after birth?	A baby who is not breathing.	59	27.8
	A baby who is breathing comfortably	145	68.4
	A newborn who is limp.	8	3.8
	Slapping/flicking the soles of the feet.	105	49.5

What is the correct methods of stimulating the new born?	Slapping the back.	53	25.0
	the rib cage being squeezed. .	25	11.8
	swaying and holding inverted	29	13.7
What would be the first thing to do if the baby will not breathing after full delivery?	Dry and stimulate after wiping or suctioning the mouth and nose.	105	49.5
	Dry, stimulate before wiping or suctioning the mouth and nose.	99	46.7
	Ventilation before suctioning the mouth and nose.	8	3.8
Wiping meconium from face and nostrils as soon as the head shows before delivery is important to avoid aspiration	true	183	86.3
	false	29	13.7
The correct action for a baby born through MSAF fluid, has depressed respirations, decreased muscle tone, and/or a heart rate below 100/min.	Dry, stimulate and reassess	127	59.9
	Suck with manual sucker and ventilation.	70	33.0
	Immediately start ventilation.	8	3.8
	Intubation and direct suctioning of the trachea soon and ventilation.	7	3.3
suctioning a baby unnecessarily or frequently can	Cause a newborn to stop breathing.	92	43.4
	Make a newborn start coughing and breathing.	58	27.4
	Stimulate a newborn to cry	38	17.9
	increase the newborn heart beat.	24	11.3
What is the correct position of baby's neck for resuscitation?	Slightly extended	195	92.0
	Hyper extended	14	6.6
	Flexed.	3	1.4
When using a bag and mask to resuscitate a neonate, the mask should cover	the mouth, nose, or tip of the chin but no eyes	137	64.6
	Part of chin, mouth, nose and eyes.	11	5.2
	Part of nose, mouth but not eyes and chin.	55	25.9
	Parts of mouth, nose & chin but not the eyes.	9	4.2
A baby's chest is not moving with bag and mask ventilation. What should you do?	Stop ventilation	58	27.4
	Reapply the mask to get a proper seal.	137	64.6
	Slap the newborn's back.	13	6.1
	Give medicine to the newborn	4	1.9
A baby who resuscitated	Needs continued observation with mother	140	66.0
	Cannot be fed	17	8.0
	Always requires advanced medical attention	49	23.1
	Should be given antibiotics as soon as possible	6	2.8
	Rising heart rate and audible breath sounds	42	19.8
	Rising oxygen saturation.	17	8.0
	Chest movements.	145	68.4

The most reliable way to measure effective bag and mask ventilation is	None of the above	8	3.8
What are the indications to start chest compressions during neonatal resuscitation	HR < 60 b/m following bag and mask ventilation	121	57.1
	After bag and mask ventilation, HR<100b/m	23	10.8
	prolonged cyanosis after initial resuscitation	15	7.1
	Apneic following initial resuscitation.	53	25.0
Which technique of chest compression is recommended during neonatal resuscitation	Use 2 thumps	114	53.8
	Two fingers	92	43.4
	One hand	5	2.4
	Two hands	1	.5
During chest compression how much pressure is recommended to use?	Depress the sternum to one-third of the chest's anterior posterior diameter	147	69.3
	depress the sternum to half the chest's AP diameter	52	24.5
	There is no hard rules	12	5.7
	Continue applying more pressure until you get no response	1	.5
The ratio of neonate chest compression to ventilation	3:1	171	80.7
	4:1	34	16.0
	5:1	7	3.3
For how long does cardio-pulmonary resuscitation (CPR) continued before reassessing hear beat	15 sec	93	43.9
	20 sec.	37	17.5
	30 sec.	44	20.8
	60 sec	38	17.9
What is preferred medication during resuscitation?	Epinephrine	185	87.3
	Naloxone	15	7.1
	Steroids	7	3.3
	adrenaline	5	2.4
When does volume expander indicated during neonatal resuscitation	If there is sign of shock.	65	30.7
	If there is history of blood loss.	29	13.7
	To all resuscitated babies	118	55.7
After how many seconds you assess for the effects of epinephrine	After 20seconds of epinephrine.	118	55.7
	After 30seconds of epinephrine.	60	28.3
	Following 40 seconds of adrenalin.	7	3.3
	following 60seconds of adrenalin	27	12.7

5.4 The determinant factor of study participants knowledge on neonatal resuscitation

This research revealed that, sex, age, education level, professional experience, Training on neonatal resuscitation and presence of supportive supervision were an association with knowledge of the study participants on neonatal resuscitation by bivariate logistic regression. The multivariate logistic regression revealed that study participant supportive supervision had 16.6 folds increase its knowledge on neonatal resuscitation compared to those of its opposite compartment (AOR=16.6, 95%CI=6.29, 43.87) and study participant whose education level of master's degree were 13.4 folds increase its knowledge on neonatal resuscitation compared to those of having an education level of diploma (AOR=13.4, 95%CI=2.27, 79.27). Study participant who was received neonatal resuscitation training had 12.2 folds increase its knowledge compared to those of its opposite compartment (AOR=12.2, 95%CI= 4.50-33.11).

Table 4. The binary logistic regression of association between knowledge on neonatal resuscitation and independent variable among midwifes working in selected health centers of Addis Ababa, 2024.

Variable	Knowledge on neonatal resuscitation		p-value	COR with 95%CI	P-value	AOR with 95%CI
	Good	Poor				
Sex						
Female	40	116	1		1	
male	23	33	0.032	2.1(1.06, 3.84)	0.463	0.65(0.20, 2.65)
age in years						
20-30	45	129	1		1	
31-40	18	20	0.010	2.6(1.25, 5.31)	0.065	2.9(0.94, 9.04)
Education level						
Diploma	5	26	1		1	
Degree	33	114	0.438	1.5(0.54, 4.23)	0.793	1.2(0.29, 4.92)
masters	25	9	0.000	14.4(4.25, 49.10)	0.004	**13.4(2.27, 79.27)**
Professional experience						
<4	28	35	1		1	
4-8	29	88	0.008	0.41(0.22, 0.79)	0.831	1.1(0.39, 3.28)
≥8	6	26	0.017	0.29(0.10, 0.79)	0.111	0.28(0.06, 1.34)
Received neonatal resuscitation training						
Yes	39	14	0.000	15.7(7.41, 33.15)	0.000	**12.2(4.50, 33.11)**
No	24	135	1		1	
Have supportive supervision in health center						
Yes	45	21	0.000	15.2(7.45, 31.16)	0.000	**16.6(6.29, 43.87)**
no	18	128	1		1	

5.5 Practice related characteristic of the study participants on neonatal resuscitation

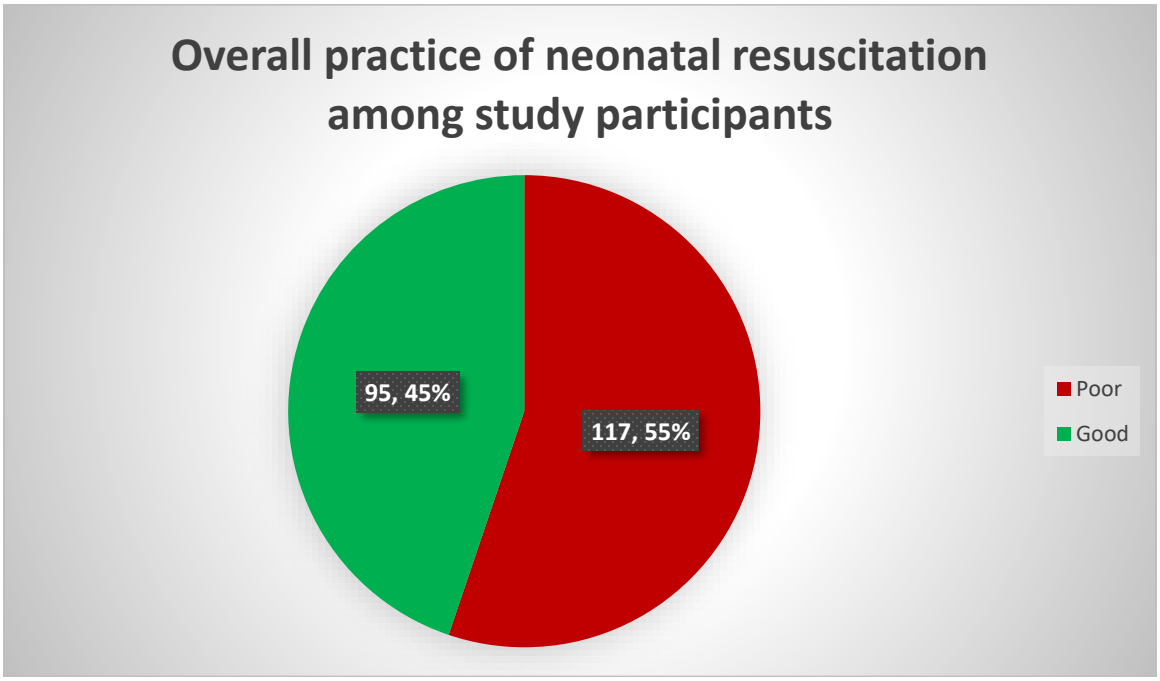

Figure 3.Overall practice of the study participants on neonatal resuscitation

Nearly 95% of research participants reported having practiced or engaged in neonatal resuscitation at some point. Of those who had, 70.3% had cleaned their hands, 74.1% had informed the mother of what needed to be done, and 67.5% had gathered the required supplies. Nearly 92% of research participants had their resuscitation supplies checked on a regular basis, and 78.8% of them had high-risk or unstable newborns that needed to be revived after birth in a designated infant area of the delivery room.

Seventy-seven percent of research participants began resuscitation by dry and stimulate initially for the newborn who is born with amniotic fluid tainted with meconium and exhibits deficient respiratory and muscular tone. Ninety-one percent of participants used a saturation monitor in the delivery room's resuscitation area. 35% of study participants used CPAP in the delivery room, and seventy-seven percent were referred to recommendations for neonatal resuscitation.

Table 5. practice related characteristics of the study participants on neonatal resuscitation.

variable	category	frequency	Percent
Have you ever engaged in or practiced newborn resuscitation?	yes	201	94.8
	no	11	5.2
The list of practice for neonatal resuscitation(n=201)	Hand washing	149	70.3
	Inform the mother what to be done	157	74.1
	assemble the required supplies	143	67.5
	Verify the equipment's functionality.	142	67
How often do you check the resuscitation equipment?	Every time	194	91.5
	Occasionally	13	6.1
	Not at all	5	2.4
Where do you go after birth to resuscitate an unstable or high-risk newborn?	In the newborn resuscitation corner in the delivery room.	167	78.8
	In a separate room near the delivery room.	20	9.4
	In the NICU or separate adjacent room	11	5.2
	Anywhere	14	6.6
How do you start resuscitation for a baby born through meconium-stained amniotic fluid and has poor muscle tone and inadequate breathing efforts	Initially dry and stimulate	164	77.4
	tracheal suction intubation	31	14.6
	placed beneath a radiant warmer, and if necessary, PPV should be turned on	17	8.0
During resuscitation, how do you start the neonate's ventilation using a bag and mask?	The oxygen mask and bag are connected, but there is no reservoir	85	40.1
	Oxygen connected to bag and mask with reservoir	80	37.7
	Just a mask and a bag, with no oxygen or reservoir.	47	22.2
Is a saturation monitor used in the delivery room's resuscitation area?	Yes	191	90.1
	No	21	9.9
In the delivery room, do you use CPAP?	Yes	75	35.4
	No	137	64.6
If use CPAP in the delivery room, the level of pressure do you use in the beginning (n=75)	4cm	45	60
	5cm	24	32
	6cm	4	5.3
	7cm	2	2.7
During newborn resuscitation, do you follow the guidelines?	Yes	164	77.4
	No	48	22.6
	while using intranasal oxygen.	119	56.1

How do you first resuscitate spontaneously breathing preterm newborns experiencing respiratory distress?	Bag and mask ventilation with 100% oxygen	70	33.0
	Initially, using CPAP instead of regular intubation to deliver PPV	13	6.1
	Intubate and clear the air way	10	4.7
For what duration does a newborn with a systole who is not improving on any measures need to be revived?	5 min	45	21.2
	10 min	15	7.1
	15 min	33	15.6
	20 min	111	52.4
	>20 min	8	3.8

5.6 The determinant factor of study participants practices on neonatal resuscitation

The finding of the bivariate study finding revealed that sex, professional experience and number of neonates serve in a month were an association of new born resuscitation by bivariate logistic regression. The multivariate logistic regression revealed that study participant professional experience of ≥8 years had 66% less likely of good practice compared to those of experience <4 years (AOR=0.34, 95%CI=0.13, 0.91) and study participant who were >20 neonate per month had 79% less likely of good practice compared to those of serve<10 neonate per month (AOR=0.21, AOR=0.08, 0.52)

Table 6. The binary logistic regression of association between practice on neonatal resuscitation and independent variable among midwifes working in selected health centers of Addis Ababa, 2024.

Variable	practice on neonatal resuscitation		p-value	COR with 95%CI	P-value	AOR with 95%CI
	Good	Poor				
Sex						
Female	63	93	1		1	
male	32	24	0.032	1.9(1.06, 3.65)	0.635	1.2(0.56, 2.57)
age in years						
20-30	74	1	1		1	
31-40	21	17	0.155	1.7(0.82, 3.38)	0.161	1.8(0.79, 4.24)
Education level						
Diploma	12	19	1		1	
Degree	62	85	0.722	1.2(0.52, 2.55)	0.488	1.3(0.58, 3.13)
masters	21	13	0.066	2.6(0.94, 6.96)	0.111	2.6(0.79, 8.75)
Professional experience						

<4	38	25	1		1	
4-8	45	72	0.005	0.41(0.22, 0.77)	0.059	0.49(0.23, 1.03)
>=8	12	20	0.037	0.39(0.16, 0.95)	0.032	**0.34(0.13, 0.91)**
Number of neonates serve per month						
<10	76	79	1		1	
10-20	12	9	0.487	1.4(0.55, 3.48)	0.439	1.5(0.55, 3.98)
>20	7	29	0.002	0.25(0.10, 0.61	0.001	**0.21(0.08, 0.52)**
Knowledge on neonatal resuscitation						
Good	63	86	1		1	
poor	32	31	0.236	1.4(0.78, 2.55)	0.526	0.49(0.38, 1.64)

6. Discussion

In this study the overall knowledge of the study participant on neonatal resuscitation were 30%. This result was in line with research from Ghana (1.9%), Kenya (30%), Nepal (34%), and Ghana (1.9%) (39, 40).The research findings were greater than those of studies conducted in Ghana (1.9%), North West Ethiopia (19.9%) (41, 43). This result was less than that of studies conducted in west Nigeria (78.8%) and Afghanistan (66%); (44, 48). This was may be due to the difference on ongoing training and professional development opportunities. Midwives who regularly participate in continuing education programs, workshops, and refresher courses are likely to have more up-to-date knowledge and skills in neonatal resuscitation. On the other hand, availability of resuscitation equipment and resources can influence a midwife's ability to perform and practice neonatal resuscitation. Difference in the presence of experienced mentors and supportive supervision can enhance a midwife's skills in neonatal resuscitation. Midwives who receive regular feedback and guidance are likely to perform better in critical situations. Differences in institutional policies and protocols regarding neonatal resuscitation can affect midwives' practices. Some institutions may have more comprehensive protocols and regular drills, which can improve midwives' preparedness and competence.

The study also showed that 45% of the study participants had good practice on neonatal resuscitation. The finding of the study was in line with the study done in Northwest Ethiopia (41). This finding, also higher than the study done in Nepal (90.7%), Ghana (45%) (34, 43). This was may be due to the work environment, including staffing levels, workload, and stress levels, can affect midwives' performance during neonatal resuscitation. High-stress environments or inadequate staffing may compromise their ability to adhere to best practices.

study participant whose education level of master's degree were 13.4 folds increase its knowledge on neonatal resuscitation compared to those of having an education level of diploma. This was may be due to the higher level of education equips midwives with a deeper understanding of the physiological principles underlying resuscitation and enhances their clinical decision-making abilities. Master's degree programs emphasize evidence-based practice, encouraging midwives to stay updated with the latest research and clinical guidelines in neonatal care, including resuscitation protocols. This ensures that their practices are aligned with current best practices and recommendations.

Study participant who was received neonatal resuscitation training had 12.2 folds increase its knowledge compared to those of its opposite compartment. This was may be due to training was used to updated the new findings, protocols and guidelines that was used as enhancing the level of knowledge.

study participant supportive supervision had 16.6 folds increase its knowledge on neonatal resuscitation compared to those of its opposite compartment. This was may be due to supportive supervision provides continuous opportunities for healthcare providers to refine and improve their skills in neonatal resuscitation through regular feedback and guidance. Supervisors help identify knowledge gaps and provide training to address them, ensuring that skills are kept up to date.

The study participant professional experience of ≥8 years had 66% less likely of good practice compared to those of experience <4 years (AOR=0.34, 95%CI=0.13, 0.91). midwives who have been practicing for a long time may be less likely to participate in ongoing education and training opportunities compared to their less experienced counterparts. This can result in outdated knowledge or practices regarding neonatal resuscitation.

study participant who was >20 neonate per month had 79% less likely of good practice compared to those of serve<10 neonate per month (AOR=0.21, AOR=0.08, 0.52). This was may be due to serve in busy or understaffed maternity units may face high workload pressures and stress. This can lead to fatigue and reduced ability to respond effectively during neonatal emergencies, including resuscitation.

7. Limitation of this study

The use of interview guides rather than observational checklists for practice assessment was a limitation of this study, as it was financially challenging to assign data collectors to each of the 22 health facilities for the duration of the data collection period.

Since the sample size is small further study may be needed for generalization

8. Conclusion

In this study the knowledge and practice of the study participants on neonatal resuscitation were low. The determinant factor for knowledge on neonatal resuscitation were participant supportive (AOR=16.6, 95%CI=6.29, 74.87), education level of master's degree (AOR=13.4, 95%CI=2.27, 79.27) and received neonatal resuscitation training (AOR=12.2, 95%CI= 6.29, 43.87). the determinant factor of practice on neonatal resuscitation were professional experience of ≥8 years (AOR=0.34, 95%CI=0.13, 0.91) and serve >20 neonate per month (AOR=0.21, AOR=0.08, 0.52).

9 Recommendation

The knowledge and practice of the study participants on neonate resuscitation were low. Therefore, the recommendation was by working on

- **Create structured Training Programs**: Implement comprehensive and structured training programs specifically focused on neonatal resuscitation techniques. These programs should cover both theoretical knowledge and practical skills.
- **Update the simulation-Based Training:** Use simulation exercises to create realistic scenarios for midwives to practice neonatal resuscitation. This hands-on approach helps improve confidence and decision-making in critical situations.
- **Regular Refreshers and Updates**: Offer regular refresher courses and updates on neonatal resuscitation guidelines and techniques. This ensures midwives stay current with best practices and advancements in the field.
- **Mentorship and Support:** Foster a culture of mentorship and peer support among midwives. Experienced practitioners can provide guidance and share practical insights with their colleagues.
- **Continuing Professional Development**: Encourage midwives to engage in continuing professional development activities related to neonatal resuscitation. This could include attending conferences, workshops, and participating in relevant research.

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ANNEXES

Annex I: Participants information sheet

Hi there, I'm _____.As a member of the research team led by Dr. Arebu Hassen, who is pursuing his obstetrics and gynecology specialty at Addis Ababa University's College of Health Science, we are assessing midwives' knowledge, practice, and related factors regarding neonatal resuscitation among health center staff in Addis Ababa 2023–04. I respectfully ask that you consider participating in the study by providing your attention.

The primary goal of this research is to contribute to the development of appropriate policies and programs that will enhance the quality of care provided by enhancing the skills and knowledge of healthcare providers in the area of newborn resuscitation.

Study procedure: If you consent to take part, you will be questioned about your familiarity with newborn resuscitation theory and practice as well as some basic sociodemographic data. It should take about 50 minutes to complete the survey. You must comprehend and sign the consent form found in Annex III if you are willing to take part in this experiment.

Confidentiality: The data gathered will be kept private and utilized exclusively for study. The information gathered will only be accessible to the members of the research team, and participant personal information—such as name and phone number—was not disclosed. The primary investigator alone will be able to view the password-protected soft copy of the data, while the hard copy will be stored in a locked cabinet. Nothing unique to any one participant will be reflected in the study's conclusions.

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

Risks of the study: The procedure does not bear any risk, but you may feel some discomfort in wasting your time (a maximum of 50 minutes).Furthermore, you will not be forced to respond to information you do not know.

Rights: Participation in this study is fully voluntary. You have the right to declare to participate or not in this study. If you decide to participate, you are given the right to with draw from the Study at any time and also, you have the right not to answer that you do not want to answer.

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

1. Yes _____

2. No _____

Thank you for your collaboration!

The primary investigator can be contacted with any questions you may have about the study or if you would like to be notified of the outcome after it is finished.

The chief investigator's address is:

Dr. Arebu Hassen

Phone Number : +251 922911513.

Annex I: facility head information sheet

Hello, my name is_____I am a member of research team working to assess Knowledge, practice and associated factors towards neonatal resuscitation among midwifes from health centers of Addis Ababa 2023/4, by Dr.Arebu Hassen who is studying for his specialty in obstetrics and gynecology at Addis Ababa University, Collage of Health Science. I kindly request you to give your attention about the study and be selected as the study participant

Purpose of the study: the main aim of this study is 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.

Study procedure: this study will assess the presence of necessary materials for neonatal resuscitation in this health facility.

Confidentiality: the collected information will be kept confidential and used only for research purposes. No one except the members of the research team will have access to the information of the health facility to be notified. The findings of the study will not reflect anything specific to each health facility.

Benefits of the study: no payment will be granted or has no any special privilege to the facility. But, participating in the study and giving the genuine information will provide great input to bring change in quality of health service to neonatal Resuscitation.

Risks of the study: The procedure does not bear any risk for the facility. Furthermore, gating of information will not be forced to respond to information.

Rights: It is entirely voluntary for you to be permitted to obtain the information in this study. You are free to say that you will not accept.

If you decide for us to observe the presence of necessary material of neonatal resuscitation,

1. Yes _____ Sign the consent form provided in Annex II
2. No _____ thank you

The primary investigator can be contacted with any questions you may have about the study or if you would like to be notified of the outcome after it is finished.

The chief investigator's address is:

Dr. Arebu Hassen

Phone Number: +251 922911513.

Annex II: Participants consent sheet

I have received written information about this study and have been fully informed about its purpose. I also understand that the result will be helpful to improve neonatal health. I understand that there are no risks by participating in this study. I agree to participate in this study. I understand that by participating I will not be entitled to any special services or be given payment or gifts. I was told that the information obtained will be confidential. I understand that any information that identifies me will be excluded from any report or publication. This authorization is only valid for this study.

Would you be open to taking part in the research? 1: Yes; 2: No

I'm grateful if the response is yes! Hold the interview. If it's not yes, then thank you!

Never use threats or coercion to get someone to complete the survey.

Annex III: Questionnaire

Section I; Sociodemographic, education, experience related questions

1. Your sex?

I. Male

II. Female

2. Your age in years? (put absolute number) _____

3. Your religion?

I. Islam

II. orthodox

III. protestant

IV. catholic

V. Other …….

4. Your marital status?

I. Single

II. marred

III. Divorced

IV. widowed

V. Other ……

5. What is your level of education?

I. Diploma

II. Degree

III. Masters

6. Tell me about your year of experience. Yearly total of experience. _____

7. For what length of time have you been providing care for newborns? _____

8. Have you received training in newborn care or resuscitation at your work place ?

I. Yes

II. No

9. If your answer is yes for question 8, when did you take the most resent neonatal resuscitation training? --------

Section II: Questions related to institutional characteristics

10. Name of Health center **……?**

11. Once you start working at this health center, which unit have you worked at before?

I. ANC

II. Labor ward maternity

III. Postnatal Other (specify……)

12. Does the health center have all the equipment needed for resuscitation? (At least the following supplies: *Radiant warmer, bag with mask in different size, suction machine & catheter, single/multi use suction bulb, stethoscope, pulse oximetry*, resuscitation corner oxygen cylinder, neonatal resuscitation guidelines).

I. Yes

II. No

13. If the answer for Q 12 is no, which of the resuscitation material are missing?

List them ---

14. Do your health centers provide you supportive supervision?

I. Yes

II. No

15. How many neonates (newborns) do you serve on average per month? ---

Section III: knowledge questions related to neonatal resuscitation

16. When should you be ready to give resuscitation to the newborn?

a) At every birth.

b) If we are certain that resuscitation needed

c) If there is anticipated risk only.

d) Others (specify) _____

17. Are you familiar with the immediate problem of new born baby?

I. Yes

II. No

18. If yes, what are the problems? (More than one answer is possible)

I. Hypothermia

II. Asphyxia

III. Infection

IV. other specify_____

19. Which newborns are eligible for routine care?

I. A newborn who is not breathing.

II. A newborn who is gasping.

III. A newborn who is crying and/or breathing well.

IV. A newborn who is limp.

20. What is the correct methods of stimulating the new born?

I. Slapping/flicking the soles of the feet.

II. Slapping the back.

III. Squeezing the rib cage.

IV. Holding upside down and shaking

21. What would be the first course of action if the infant was not breathing after full delivery?

I. Mouth and nose should be wiped or suctioned before drying and stimulating.

II. Dry, stimulate before suction the mouth and nose.

III. Ventilation before suctioning the mouth and nose.

22. In order to avoid aspiration, wipe meconium from the face and nostrils as soon as the head shows before delivery.

I. True

II. False

23. What should be done to help a baby breathe if they are born with meconium-stained amniotic fluid, poor respiratory function, weakened muscles, and/or a heart rate under 100 beats per minute?

I. Dry, stimulate and reassess.

II. Suck with manual sucker and ventilation.

III. Immediately start ventilation.

IV. Intubation and direct suctioning of the trachea soon and ventilation.

24. suctioning a baby unnecessarily or frequently can:

I. Cause a baby to stop breathing.

II. Make a baby start coughing and breathing.

III. Stimulate a baby to cry.

IV. Increase the baby's heart rate.

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

I. Slightly extended

II. Hyper extended

III. Flexed.

IV. Others

26. During resuscitation of the neonate by bag and mask, the mask should cover?

I. Mouth, nose and tip of chin but not the eyes.

II. Part of chin, mouth, nose and eyes.

III. Part of nose, mouth but not eyes and chin.

IV. Parts of mouth, nose & chin but not the eyes.

27. A baby's chest is not moving with bag and mask ventilation. What should you do?

I. Stop ventilation.

II. Reapply the mask to get a better seal.

III. Slap the baby's back.

IV. Give medicine to the baby.

28. A baby who received ventilation:

I. Needs continued observation with mother.

II. Cannot be fed

III. Always needs advanced care

IV. Should immediately receive antibiotics.

29. The best indicator of effective bag and mask ventilation is

I. Rising heart rate and audible breath sounds.

II. Rising oxygen saturation.

III. Chest movements.

IV. None of the above

30. When should chest compressions be initiated during neonatal resuscitation?

I.HR< 60b/m following mask and bag ventilation.

II. HR<100b/m subsequent to mask and bag ventilation.

III. After first resuscitation, persistent cyanosis.

IV. Apneic following first resuscitation.

31. Which technique of chest compression is recommended during neonatal resuscitation?

I. Two thumps

II. Two fingers

III. One hand

IV. Two hands

32. What is the appropriate pressure to apply when performing a chest compression?

I. Lower the sternum to one-third of the chest's anterior posterior diameter.

II. Lower the sternum to half the chest's AP diameter.

III. There are no hard rules.

IV. Keep applying pressure until you have no reaction.

33. What is the neonatal chest compression to ventilation ratio?

I. 3:1

II. 4:1

III. 2:15

IV. 5:1

34. How long does cardiopulmonary resuscitation (CPR) last before the heartbeat is evaluated again?

I. 15 sec.

II. 20 sec.

III. 30 sec.

IV. 60 sec

35. What is preferred medication during resuscitation?

I. Epinephrine
II. Naloxone
III. Steroids
IV. Other (Specify)_____

36. When is the use of a volume expander during newborn resuscitation recommended? Multiple responses are possible.

I. If shock is evident in any way.
II. If blood loss has occurred in the past.
III. To every baby that was resuscitated

Other (specify) _____

37. After how many seconds do you evaluate the adrenaline's effects?

I. After 20 seconds of adrenaline
II. Following 30 seconds of adrenaline.
III. After 40 adrenaline-infused seconds.
IV. Following 60 seconds of adrenaline

Section IV: practice questions related to neonatal resuscitation

38. Have you ever practiced or participated in the neonatal resuscitation?

i. Yes
ii. No

39. If your answer is yes, proceed to the below questions (Please put a tick mark on the space provided if you perform on the procedure during resuscitations.

I. Wash hands -----
II. Tell the mother what is going to be done --------
III. Collect the necessary materials ------
IV. Check functionality of the equipment ------
V. Others (Specify) _____

40. How frequently you check equipment required for resuscitation?

I. Every time

II. Occasionally

III. Not at all

41. Where do you resuscitate high risk/unstable neonate after delivery?

I. In the dedicated newborn corner in the delivery room.

II. In a separate room near the delivery room.

III. In the NICU or separate adjacent room.

IV. Anywhere

42. How do you begin resuscitation for a baby born through meconium-stained amniotic fluid and presents with poor muscle tone and inadequate breathing efforts?

I. Dry and stimulate initially.

II. Intubation for tracheal suction.

III. Placed under a radiant warmer and PPV should be initiated if needed.

43. How do you start the neonate's ventilation using a bag and mask during resuscitation?

I. Oxygen with mask and bag attached, but no reservoir.

II. Oxygen connected to bag and mask with reservoir.

III. Just a bag and mask without any reservoir or oxygen.

44. Do you use a saturation monitor in the resuscitation area of delivery room?

I. Yes

II. No

45. Do you use CPAP in the delivery room?

I. Yes

II. No

46. If you use CPAP in the delivery room, what level of pressure do you use in the beginning?

I. 4 cm

II. 5 cm

III. 6 cm

IV. 7 cm

47. Do you refer guidelines during neonatal resuscitation?

I. Yes

II. No

48. If your answer is No, why?

I. No guidelines.
II. No supervision.
III. Guidelines not in front.
IV. No need to use it.

49. How do you resuscitate spontaneously breathing preterm infants with respiratory distress initially?

I. With intranasal oxygen.
II. Bag and mask ventilation with 100% oxygen.
III. With CPAP initially rather than routine intubation for administering PPV.
IV. Intubation and air way clearance.

50. How long do you resuscitate a neonate who has a systole and not improving with all measures?

I. 5 minutes
II. 10 minutes
III. 15 minutes
IV. 20 minutes
V. >20 minutes
VI. Other(specify)