

**DETERMINANTS OF NEONATAL NEAR MISS AMONG NEONATES
ADMITTED TO THE AMBO UNIVERSITY REFERRAL HOSPITAL AND
AMBO GENERAL HOSPITAL**

MSc. Research Thesis

Ephrem Yohannes

June 2019

Haramaya university, Harar

Determinants of Neonatal Near Miss Among Neonates Admitted to the Ambo University Referral Hospital and Ambo General Hospital: Un Matched Case-Control Study

A Thesis Submitted to School of Nursing and Midwifery

Post Graduate Program Directorate

**In Partial Fulfilment of the Requirements for the Degree of
MASTERS IN MATERNITY AND NEONATAL NURSING**

EPHREM YOHANNES (B.Sc.)

Major advisor: Nega Assefa (PhD, Associate Professor)

Co-advisor: Yadeta Dessie (PhD, Associate Professor)

June 2019

Haramaya University, Harar, Ethiopia

APPROVAL SHEET
HARAMAYA UNIVERSITY
POST GRADUATE PROGRAM DIRECTORATE

I hereby certify that I have read and evaluate this Thesis entitled “Determinants of Neonatal Near Miss Among Neonates Admitted to the Ambo University Referral Hospital and Ambo General Hospital: Un Matched Case-Control Study” prepared under my guidance by Ephrem Yohannes. I recommend that it be submitted as fulfilling the thesis requirement.

<u>Nega Assefa (PhD.)</u>	_____	_____
Major Advisor	Signature	Date

<u>Yadeta Dessie(PhD.)</u>	_____	_____
Co-Advisor	Signature	Date

As a member of the Board of Examiners of the MSc Thesis Open Defense Examination, I certify that I have read and evaluated the Thesis prepared by Ephrem Yohannes Roga and examined the candidate. I recommend that the thesis be accepted as fulfilling the Thesis requirement for the degree of Master of Science in Maternity and Neonatal Nursing.

_____	_____	_____
Chairperson	Signature	Date

_____	_____	_____
Internal Examiner	Signature	Date

_____	_____	_____
External Examiner	Signature	Date

Final approval and acceptance of the Thesis is contingent upon the submission of its final copy to the Council of Graduate Studies (CGS) through the candidate’s department or school graduate committee (DGC or SGC).

STATEMENT OF THE AUTHOR

By my signature below, I declare and affirm that this Thesis is my own work. I have followed all ethical and technical principles of scholarship in the preparation, data collection, data analysis and compilation of this Thesis. Any scholarly matter that is included in the Thesis has been given recognition through citation.

This Thesis is submitted in partial fulfillment of the requirements for a master degree at the Haramaya University. The Thesis is deposited in the Haramaya University Library and is made available to borrowers under the rules of the Library. I solemnly declare that this Thesis has not been submitted to any other institution anywhere for the award of an academic degree, diploma of the certificate.

Brief quotations from this Thesis may be made without special permission provided that accurate and complete acknowledgment of the source is made. Requests for permission for extended quotations from or reproduction of this Thesis in whole or in part may be granted by the Head of the School or Department when in his or her judgment the proposed use of the material is in the interest of scholarship. In all other instances, however, permission must be obtained from the author of the Thesis.

Name: Ephrem Yohannes Roga

Signature: _____

Date: _____

School/Department: Nursing and Midwifery

BIOGRAP HICAL SKETCH

My name is Ephrem Yohannes Roga. I was born in 1993 at Abuna Gendeberat Woreda, West Shewa Zone, and Western Ethiopia. I completed my elementary education at Gute Andode Primary School, from 2000-2007 and secondary education at Abuna Gendeberat Secondary School from 2008-2009 and my preparatory school at Gendeberat Preparatory school from 2010-2011. I joined to Wollo University in 2012 for tertiary education. I graduated in BSc midwifery after four years of education at Wollo University in 2015. Then, I joined as a graduate assistant II in Wollo University, Midwifery department. After two years of work experience, I joined to Haramaya University for the second-degree education in Maternity and Neonatal Nursing in 2018.

ACKNOWLEDGMENT

First of all, I just want to give my deepest and heartfelt gratitude about this golden opportunity to the savior of my life for leading me on and helping me in each step of my life.

Secondly, my unreserved thank goes to Wollo University, which found me a full sponsorship for my postgraduate education and also, my appreciation goes to Haramaya University, School of Graduate Studies, College of Health and Medical Sciences, School of Nursing and Midwifery for giving me this chance to prepare this research paper.

Thirdly, I would like to forward my deepest appreciation and thanks to my advisors Dr. Nega Assefa and Dr. Yadeta Dessie for their unreserved and constructive comments and guidance throughout the work starting from proposal development up to the end.

Fourthly, I would like to acknowledge the staffs of the Ambo University Referral Hospital and Ambo General, data collectors, supervisors and study respondents for their cooperativeness and providing all the necessary baseline information important for this study.

LIST OF ACRONYMS AND ABBREVIATIONS

AGH	Ambo General Hospital
ANC	Antenatal Care
APH	Ante Partum Hemorrhage
AURH	Ambo University Referral Hospital
CBCA	Criterion Based Clinical Audit
CDC	Center of Disease Control and Prevention
CHMS	College of Medical and Health Sciences
CI	Confidence Interval
CLAP	Centro Latino-Americano de Perinatology
CPAP	Continuous Positive Airways Pressure
CS	Caesarean Section
EDHS	Ethiopia Demographic Health Survey
ERB	Ethical Review Board
ETB	Ethiopian Birr
GA	Gestational Age
HDP	Hypertensive Disorders of Pregnancy
ICU	Intensive care unit
IHRERC	Institution Health Research Ethical Review Committee
IV	Intravenous
MDG	Millennium Development Goal
MNCH	Maternal, Newborn & Child Health
MNM	Maternal near misses
NMR	Neonatal Mortality Rate
NNM	Neonatal Near Miss
OR	Odds Ratio
PPH	Postpartum Hemorrhage
SPSS	Statistical Package for Social Science
SVD	Spontaneous Vaginal Delivery
WHO	World Health Organization

TABLE OF CONTENTS

APPROVAL SHEET	II
STATEMENT OF THE AUTHOR	III
BIOGRAPHICAL SKETCH	IV
ACKNOWLEDGMENT	V
LIST OF ACRONYMS AND ABBREVIATIONS	VI
TABLE OF CONTENTS	VII
LIST OF TABLES	IX
ABSTRACT	XI
1. INTRODUCTION	1
1.1. Back ground	1
1.2. Statement of the Problem	2
1.3. Significance of the Study	3
1.4. Objective	4
1.4.1 General Objective	4
2. LITERATURE REVIEW	5
2.1. Sociodemographic Characteristics of Mothers and Neonates	5
2.2. Obstetrics Related Factors	6
2.3. Maternal and Neonatal Factors	7
2.4. Conceptual Frame Work	10
3. METHODS	11
3.1. Study Area and Study Period	11
3.2. Study Design	11
3.3. Source Population	11
3.4. Study Population	11
3.5. Inclusion and Exclusion Criteria	12
3.5.1. Inclusion Criteria	12
3.5.2. Exclusion Criteria	12
3.6. Sample Size Determination	12
3.7. Sampling procedures	13
3.8.1. Data Collection Tool	14
3.8.2. Data Collection Producers	14
3.9. Variables	15
3.9.1. Dependent Variable	15
3.9.2. Independent Variables	15
3.10. Operational Definitions	15
3.11. Data Quality Controls	16
3.12. Methods of Data Analysis	17
3.13. Ethical Considerations	17
4. RESULT	18

4.1.	Sociodemographic factors	18
4.2.	Obstetrics Related Factors	19
4.3.	Neonatal related factors	20
4.4.	Determinants of Neonatal Near Miss	21
5.	DISCUSSION	23
6.	STRENGTHS AND LIMITATIONS	26
6.1.	Strengths	26
6.2.	Limitations	26
7.	CONCLUSION AND RECOMMENDATIONS	27
7.1.	Conclusion	27
7.2.	Recommendations	27
8.	REFERENCES	28
9.	ANNEXES	33
9.1.	Annex I: English Version Participant Information and Written Informed Voluntary Consent Sheet of Head of the Facility	33
9.2.	Annex II: English Version Participant Information Sheet and Written Voluntary Informed Consent Form	35
9.3.	Annex III: English Version Questionnaire	37
9.4.	Annex IV: Afaan Oromo Questionnaire	41
9.5.	Annex VI: Curriculum vitae of the investigators	48

LIST OF TABLES

Table	Page
Table 1: Sample size calculation to determine the determinants of Neonatal near miss among neonates admitted to Ambo University Referral Hospital and Ambo General Hospital 2018.	13
Table 2: Socio-demographic characteristics of mothers of neonates admitted (n=402) to the Ambo University Referral Hospital and Ambo General Hospital, 2019.	19
Table 3: Obstetrics characteristics of neonatal near miss among neonates admitted (n=402) to the Ambo University Referral Hospital and Ambo General Hospital 2019.	20
Table 4: Neonatal related characteristics of neonatal near miss among neonates admitted (n=402) to the Ambo University Referral Hospital and Ambo General Hospital, 2019.	21
Table 5: Determinants of neonatal near miss among neonates admitted (n=402) to the Ambo University Referral Hospital and Ambo General Hospital, 2019.	22

LIST OF FIGURES

Figure	Page
Figure 1: Structured Conceptual framework of the determinants of neonatal near miss among neonate admitted to the Ambo University Referral Hospital and Ambo General Hospital.	10

ABSTRACT

Background: Near-miss neonatal morbidity is defined as complications of neonates so severe as to be imminently life-threatening (i.e. the babies nearly died) but survived due to by chance or treatment. The number of neonates who survived morbidities were approximately 3 to 6 times greater than those died. There was little evidence about neonatal near miss in Ethiopia. Therefore, this study was attempted to identify the determinants of neonatal near miss among neonates admitted to Ambo University Referral Hospital and Ambo General Hospital.

Objective: This study was intended to identify the determinants of neonatal near miss among neonates admitted to Ambo University Referral Hospital and Ambo General Hospital from March 1 to 28, 2019.

Methods: Hospital-based quantitative unmatched case-control study was conducted at Ambo University Referral Hospital and Ambo General Hospital. This study was recruited 134 cases sequentially and 268 controls by simple random technique. Data were coded, entered and cleaned in EpiInfo version 7 and exported to SPSS for further analysis. Both Bivariable and multivariable logistic regression were computed at 95% CI and the final model was checked by Hosmer and Lemeshow goodness fit test. Multi collinearity and confounders were checked.

Result: Multivariate analysis showed that distance more than 15km away from health facilities [AOR=2.11, 95% CI: (1.09, 4.095)], Unwanted and unplanned current pregnancy [AOR=3.71, 95% CI: (1.28, 10.79)], less than four Antenatal care visit [AOR=6.55, 95% CI: (3.07, 13.98)], Term Neonates [AOR= 0.13, 95% CI: (0.05, 0.32)], Instrumental delivery [AOR= 4.62, 95% CI: (1.78, 11.98)] and Normal birth weight [AOR=0.09, 95% CI: (0.03, 0.28)] were positively or negatively associated with Neonatal Near Miss.

Conclusion and recommendations: Distance from health facilities, Antenatal care visit, current pregnancy type, birth weight, gestational age and mode of delivery were determinants of Neonatal Near Miss. Therefore, much work is needed to improve neonatal health by providing adequate Antenatal care services, health education, training and make collaboration with different stockholders.

Keywords: Neonatal near miss, Determinants, Ambo, Ethiopia

1. INTRODUCTION

1.1. Back ground

Neonatal near-miss refers to conditions when the newborns become nearly died between the age of 0-28 days after birth but survived either by chance or because of the good quality of care they received. The issues of neonatal near miss are the same with the issue of maternal near miss that both severely affected (Say L et al., 2009; Storeng KT et al., 2010; Pacagnella RC et al., 2012). There were a lot of neonatal near miss scoring system: Clinical Risk Index for Babies (CRIB) and SNAP (Score for Neonatal Acute Physiology) but the majority of the scoring system is difficult to apply in developing countries due to their complexity and requirement of laboratory-based information (Dorling JS et al., 2005). This condition was not well defined yet and hardly documented and there was no common standard definition that agreed upon internationally (Suchitra Surve et al., 2017; Say L, 2010).

However, the Latin American Centre for Perinatology (Centro Latino-Americano de Perinatology-CLAP) prepared a standardized definition of the NNM (Santos et al., 2015a). Based on the results of previous studies (Femhealth, n.d; Pileggi-Castro c et al., 2014; Suchitra Surve et al., 2017; Santos et al., 2015a) the CLAP defined NNM as any newborn infant who exhibited pragmatic and/or management criteria and survived the first 27 days of life.

Additionally, the concept of near miss was widely used in public health as a tool to evaluate the improvement of quality of care (Say L et al., 2004; Pattinson RC and Hall M, 2003; Cecatti et al., 2011) and also has been used in a different way in the few existing literature (Avenant T, 2009; Skinner JR et al., 2005).

WHO report indicated that the proportion of neonatal death in the last 25 years has been increased dramatically, this shows that it will be more difficult to achieve sustainable development goal target 3.2 which was planned to reduce neonatal mortality rate as low as 12/1000 live births in all countries by 2030 (http://www.who.int/gho/child_health/mortality/neonatal/en/).

One study in South Africa shows that dysfunction or organ failure parameters; respiratory, cardiac, central nervous system, hypovolemia, hematologic, endocrine, renal, immunologic, musculoskeletal, and/or hepatic/gastrointestinal abnormality were used to identify neonatal near miss case (Mukwevho MT et al., 2007).

1.2. Statement of the Problem

Even though Millennium Development Goal for child survival was put plan to reduce maternal and neonatal morbidity and mortality to under 30 per 1000 live births by 2015, only 41% under-5 mortality rate has been declining globally till 2011 (UNICEF et al., 2012). Global estimate of 2015 indicated that 2.7 million death of under-five child, from this almost one million death occur during the first week of the neonatal period (WHO, 2014). Almost all 99 percent of neonatal death, occur in developing countries, yet most scholars and other researcher's emphasis on the 1% of deaths in developed countries. The UN Agenda for Sustainable Development Goal from 2016 to 2030 is to end preventable deaths of newborns and indicated that the neonatal mortality should be less than 12/1000 LB at the end of 2030 (WHO, 2015).

The neonatal period is the most vulnerable time that constitutes 75% of infant deaths and 50 percent of the neonatal deaths(WHO, 2014). The highest amount of neonatal death was occurring in south-central Asian countries and sub-Saharan Africa (Lawn JE et al., 2005). This indicated that 43% of under-five death and 60% of infant death were accounted for the neonatal mortality, which accounts for 40% (UNICEF et al., 2012). Despite, the millennium development goal for maternal and child health planned to reduce neonatal morbidity and mortality, it was not improved yet (WHO, 2014).

Some studies show that the number of newborn babies who survived morbidities were approximately 3 to 6 times greater than those who already died (Say L, 2010; Avenant T, 2009; Silva AAM et al., 2014). Thus, to study about neonatal near miss may bring advantages in relation to neonatal mortality since severe morbidities that affect newborn babies to the extent of nearly death, but survive have visibility in the health statistics and also, regarding the quality of care in the area of maternal and child health (Say L, 2010; Cynthia Pileggi et al., 2010; Santos JP et al., 2015a).

Even though evidence from Ghana shows that it's difficult to identify what factors lead to illness and what factors enable neonatal survival (Moyer et al., 2016), many literatures in different studies identify factors associated with neonatal near miss like, the socioeconomic characteristics of mothers (Victoria CG and FC., 2001; S. Lansky et al., 2014; Gonçalves AC et al., 2015; Pileggi-Castro et al., 2014), bad obstetric history (Almeida MF et al., 2002; S. Lansky et al., 2014), number

of ANC visit, gestational age, presence of asphyxia, APGAR score <7/8, cesarean delivery, (Atnafu et al., 2018), age group ≥ 35 years, prim parity, hemorrhage, high blood pressure and maternal syphilis (Kale et al., 2017; Guilherme Alberto Silva et al., 2017), low birth weight, prematurity, ARDS, neonatal infection was factors associated with early neonatal morbidity and mortality (E.N. Emmanuel et al., 2016).

The study design of available studies was cross-sectional and cohort, there was a few case-control study designs. Not only this but also, only a few studies were conducted regarding this problem (Suchitra Surve et al., 2017) there is a limitation of data to compare between different countries and regions of the same countries (Guilherme Alberto Silva et al., 2017; Kale et al., 2017).

In Ethiopia, the neonatal mortality rate was 29/1,000 LB, and the post neonatal mortality rate was 19/ 1,000 LB (EDHS, 2016). A study done in Tigray region hospital indicated that the leading causes of NNM were neonatal sepsis (24%), hypothermia (17%), preterm/low birth weight (12%) and respiratory distress (11%) (Nugussie Feven et al., 2018). A study done at Addis Ababa St Paul's Hospital indicated that 23.1% were died in the neonatal ward after admitted but the remaining were discharged as their condition was improved (Atnafu et al., 2018). There was a scarcity of information and little evidence on neonatal near miss in Ethiopia and almost no evidence in Western Ethiopia, Ambo. Therefore, this study was aimed to identified the determinants of the neonatal near miss at the Ambo University Referral Hospital and Ambo General Hospital, Western Ethiopia. The output of the study was playing an important role in availing useful information in performances of averting neonatal death and strengthening the neonatal and maternal care.

1.3. Significance of the Study

The findings of this study primarily can generate information for health care providers who worked in neonatal, labor and delivery wards to treat and prevent neonatal near miss by identifying the determinants of neonatal near miss. And also, the finding could be valuable for Ambo General hospital and Ambo University Referral Hospitals, West Shewa zone office, stakeholders from government and nongovernmental organizations (NGOs) and local policymakers in planning appropriate strategies directed towards improving neonatal health. In addition to that, the findings of this study will be also served as a basic framework and a baseline information for other studies

with similar interest in the future since there is few study done in Ethiopia. Generally, this ultimately benefit the mothers to have a healthy baby since Neonatal Near Miss is a tool used for reducing neonatal morbidity and mortality.

1.4. Objective

1.4.1 General Objective

- To assess determinants of neonatal near miss among neonates admitted to the Ambo University Referral Hospital and Ambo General Hospital from March 1 to 28, 2019.

2. LITERATURE REVIEW

2.1. Sociodemographic Characteristics of Mothers and Neonates

Many kinds of literatures indicated that the determinants of neonatal mortality and neonatal near miss were almost similar in different settings. So that, they identify that advanced maternal age, occupation other than government employees, long distance from health facility (15km) (Victora CG and FC., 2001; S. Lansky et al., 2014; Gonçalves AC et al., 2015) low schooling level (less than 2ry school) and currently had no husband (Victora CG and FC., 2001; Leal MC et al., 2012) were associated with neonatal near miss.

WHO worldwide survey indicated that advanced maternal age was associated with preterm, small for gestational age, < 7 APGAR score at the 5th minutes (NNM) (Laopaiboon M et al., 2014). In another WHO survey and study done in Brazil, there was no association between advanced maternal age and neonatal near miss and mortality (S. Lansky et al., 2014; Guilherme Alberto Silva et al., 2017).

Infants born from older mothers increased the risk of a neonatal near miss by two folds than those mothers belong to 20-34 years old in Brazil (Kale et al., 2017; De Lima et al., 2018). But in another study conducted in Brazil residence, socioeconomic status and maternal education level were not statistically significant with a neonatal near miss (Antonio A.M et al., 2014). In India one study revealed that, socioeconomic determinants and community level factors explained a large proportion of neonatal morbidity and NNM and also low educational status of parents at OR 2.1, farmer at OR of 1.8 and villages with no health facility (>15 km) at OR about 1.5, villages were responsible for a major fraction of neonatal morbidity (RP UPADHYAY et al., 2012).

Evidence from Nigeria revealed single and divorced status, rural residence were significantly indicators of neonatal NNM and morbidity (E.N. Emmanuel et al., 2016). In the Uganda, study indicated that advanced maternal age, single and mothers have no formal education were significantly related to neonatal near miss (Annetee N et al., 2015). However, evidence from Morocco shows that no significant association was found in terms of the mother's ethnicity, mother's age (Loubna Doukkali et al., 2016).

Studies from Ghana and others indicated that social, cultural, a health system was some of the factors affecting neonatal health, but these factors may vary from country to country (Moyer CA et al., 2013a; Moyer CA et al., 2013b). Other studies determined that joblessness of the parents challenges improvement of a health care of neonates (Lecomte et al., 1996; Loubna Doukkali et al., 2016). A lot of women were troubled reaching health facility to get service due to long distance and expense and this leads to NNM and other health problems (Gayral-T et al., 2005).

In southern parts of Ethiopia mothers who live in a rural part of the country, the advanced age of marriage, and distance more than 1 hours were significantly associated with neonatal near miss and mortality (Hayelom G. M and Berhe W. Sahle, 2017; Weldearegawi B et al., 2015). Another study done in Ethiopia indicated that the mothers age < 18 years, no formal education had a higher risk of dying after survival was reassured and those who live in rural areas and single marital status were significantly associated with Neonatal morbidity and death (Yared M et al., 2013). A case-control study done in Tigray region hospital indicated that being under 18 years of age at first marriage was positively associated with NNM (Nugussie Feven et al., 2018).

2.2. Obstetrics Related Factors

A study done in Brazil revealed that there was an increased risk of neonatal near miss among those delivered in public health institution and by cesarean section and also this study shows that there was no association between NNM and ANC follow up (Guilherme Alberto Silva et al., 2017). However, a study from Eastern Brazil shows that fewer than 6 prenatal care visits remained significantly associated with increased risk of NNM (De Lima, 2018). But, another study indicated that prenatal care and the number of ANC visits did not increase the chance for near miss (Victoria CG and FC., 2001; Brasil, 2005; Kassar SB et al., 2013; Nascimento RM et al., 2012).

Prim parous mothers were highly associated with neonatal near miss In Brazil and Massachusetts Hospitals (Leal Mdo et al., 2004; Carrie K et al., 2006). Other studies done in Brazil stated that neonatal near miss rate was higher among babies delivered by cesarean section than in those delivered through vaginal birth (Antônio A et al., 2014). Inline to this study evidence from Southern part of Brazil indicated that cesarean section delivery was two times higher among NNM than vaginal delivery (Silva GA et al, 2017).

Unplanned pregnancy was significantly associated with NNM in Nigeria (E.N. Emmanuel et al., 2016), and neonates that were delivered by cesarean section had about 2.5 times increased risk of dying than those delivered without a cesarean section (Emmanuel O et al., 2016; Kale et al., 2017; De Lima et al., 2018). A study done in the Netherlands indicated no significant differences were found between planned and unplanned pregnancy (De Jonge A et al., 2009).

A study in Uganda stated that mothers who gave birth in a prolonged time of delivery were associated with NNM (Muwanguzi et al., n.d). Some study shows that poor prenatal care quality during the second stage of labor was significantly associated with neonatal morbidity (Berkowitz et al., 1993). However, evidence from Morocco shows that no significant association was found in terms of gravidity-parity, ANC follows up and mode of delivery (Loubna Doukkali et al., 2016).

In Ethiopia neonates who gave birth at the government hospital and health institutions by cesarean section had a higher risk of neonatal near miss and death than those who gave birth vaginally at home. This happened due to death of referring pregnancy complicated case from home or other health institutions (Yared M et al., 2013).

2.3. Maternal and Neonatal Factors

Evidence from Brazil indicated that factors like gestational age at birth < 30 weeks, very low birth weight, APGAR score at 5 minutes < 7 were found among 80 percent of those near-miss cases and those factors mentioned above can be used as criteria to enroll neonates with NNM (Cynthia Pileggi et al., 2010). Another evidence from Brazil shows that the greatest contributing factor for neonatal near miss was mechanical ventilation 55.4%, gestational age of less than 32 weeks, congenital malformation 18%, birth weight (Antônio A et al., 2014). In Brazil, studies show that very low birth weight, APGAR score at 5 minutes of life < 7) were as proxies for prematurity and birth asphyxia to identify neonatal near-miss cases (Cynthia Pileggi et al., 2010; Muwanguzi et al., n.d).

In urban India evidence indicated that Hyperbilirubinemia, sepsis, and respiratory distress were the main leading factors associated with neonatal morbidity (Garg P et al., 2005; NNFI, 2003; Ugwu GI, 2012). Again a lot of studies show that mechanical ventilation (48%), gestational age (32%), low birth weight (27.1%), were used as criteria to identify neonatal near miss-cases (Brasil, 2005; Silva AAM et al., 2014). Additionally, bad obstetric history (S. Lansky et al., 2014; Almeida

MF et al., 2002), lack of access and quality during labor and delivery (Gonçalves AC et al., 2015), premature pregnancy was significantly associated with neonatal near miss and mortality in different countries (Nascimento RM et al., 2012).

Newborns who are small for gestational age with low birth weight compared with a healthy baby (37.5% v 2.6%), APGAR score < 7 at 5 minutes (30.6% vs 1.3%), infection (45.7% vs 29.2%) and premature was significantly associated with NNM in Morocco (Loubna Doukkali et al., 2016). Most cases of NNM belongs to respiratory failure/dysfunction (63%), infections (11%) and others (21.2%), followed by central nervous system dysfunction (5.0%) (Avenant T, 2009).

Maternal and fetal hemorrhage, maternal hypertension during pregnancy (Foo L et al., 2015; Kale et al., 2017), syphilis, lack of prenatal care during labor and delivery were significantly associated with neonatal near miss and neonatal mortality (Kale et al., 2017; Barbosa IRC et al., 2015). Study in Massachusetts hospitals indicated that neonates whose mother had at least one labor complication were 1.4 times higher risk of neonatal morbidity than health mothers (Carrie K et al., 2006).

Study in Ethiopia conducted at Addis Ababa indicated that 75% of admitted neonates was dying and the major admission reason was asphyxia and prematurity (Atnafu et al., 2018). Another study done in Southern Ethiopia identified that Prematurity (34%), asphyxia (31%), and infections (12%), congenital malformation (7%) and others (16%) were the leading causes of neonatal deaths (Hayelom G. M and Berhe W. Sahle, 2017). In Tigray neonate of normal birth weight was 55% lesser hazards of death than low birth weight (Hayelom Gebrekirstos Mengesha et al., 2016).

The Latin American Centre for Perinatology (CLAP) was prepared the standardized definition of the NNM in 2015, that could be used to compare between same institution or different countries (Santos et al., 2015a; De Lima et al., 2018). Based on the results of previous studies (Femhealth, n.d; Pileggi-Castro c et al., 2014; Suchitra Surve et al., 2017; Santos et al., 2015a) the CLAP defined NNM as any newborn infant who exhibited pragmatic and/or management criteria and survived the first 27 days of life. The pragmatic criteria includes: birth weight < 1.7kg, APGAR score <7 at 5th minutes of life and GA < 33 weeks and management criteria includes: Parenteral antibiotic therapy, Nasal CPAP, Any intubation, Phototherapy within 24 hours of life, Cardiopulmonary resuscitation, use of vasoactive drugs, use of anticonvulsants, use of surfactant,

use of blood products, use of steroids, Surgery, identification of congenital malformation (Santos et al., 2015a; Santos JP et al., 2015b).

This study has used this concept as a foundation to identify the determinants of the neonatal near miss. However, this tool that was used to measure and categorize neonates as near miss has a limitation, Neonates who are re-admitted after discharge or after home delivery need a special form because we may not get information on the mother (Femhealth, n.d).

2.4. Conceptual Frame Work

The theoretical model for determinants of neonatal near miss is developed based on a model for neonatal death (Lima S et al., 2008) and neonatal near miss (Kale et al., 2017), with moderate modification of variables like type of pregnancy and distance from health facility as recommended from another study (Suchitra Surve et al., 2017). Factors are grouped in three major categories (Distal, Intermediate and proximal). Solid lines indicate direct relationship and broken lines indicate an indirect relationship between factors.

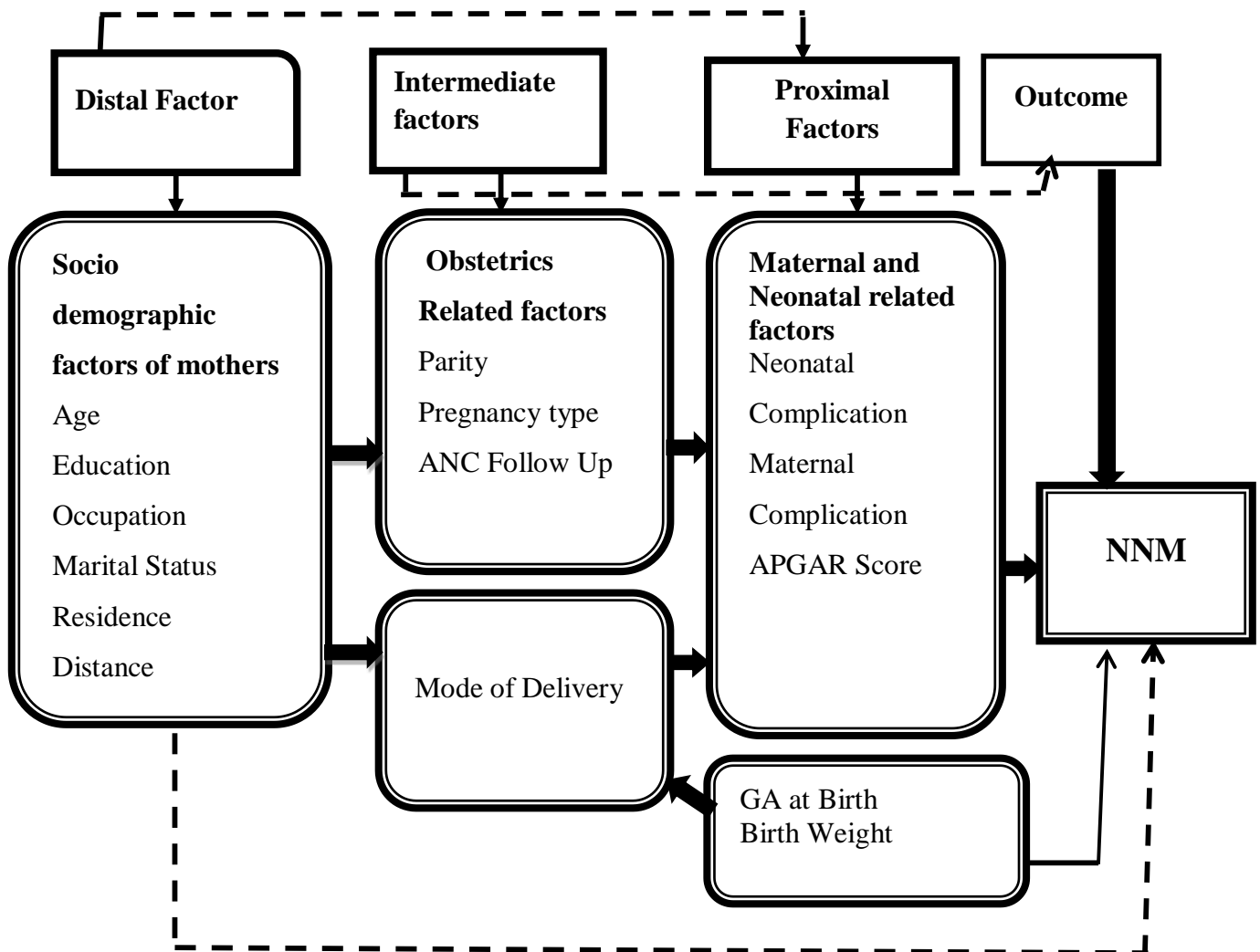


Figure 1: Structured Conceptual framework of the determinants of neonatal near miss among neonate admitted to the Ambo University Referral Hospital and Ambo General Hospital.

3. METHODS

3.1. Study Area and Study Period

The study was conducted in the Ambo University Referral Hospital and Ambo General hospital from March 1 to 28, 2019. Ambo is located in the West Shewa Zone of the Oromia Region, west of Addis Ababa, this town has a latitude and longitude of 8°59'N 37°51'E and an elevation of 2101 meters. In the town, there are three health centers and two Hospitals owned by the government and two private clinics. The total population of Ambo town was 94,342(Philip Briggs, 2002). According to the 2017/2018 G.C HMIS report, Ambo University Referral Hospital has an annual delivery of 3250 that means 271 per month while Ambo General Hospital has an annual delivery of 3120, therefore 260 per month. The characteristics of neonate gave birth in Ambo Teaching and Referral Hospital was Spontaneous vaginal delivery was 65%, Cesarean delivery was 15% and instrumental was 20%, normal birth weight was 86%, low birth weight 14%, appropriate for gestational age 95%, neonatal complication with different kind of disease was 25%. Generally, in 2017/2018 Neonatal Near Miss Rate was 23%, Antenatal natal care coverage was 75% and hospital delivery coverage was 79%.

3.2. Study Design

Hospital-based quantitative unmatched case-control study was conducted in the Ambo University Referral Hospital and Ambo General Hospital.

3.3. Source Population

The source population consisted of all neonates who were admitted to post-natal or neonatal wards within 28 days of birth in the Ambo University Referral Hospital and Ambo General Hospital.

3.4. Study Population

The study population consisted of neonates who were admitted to post-natal or neonatal wards within 28 days of birth in the Ambo University Referral Hospital and Ambo General Hospital during the study period.

3.5. Inclusion and Exclusion Criteria

3.5.1. Inclusion Criteria

Selecting Cases (Neonatal Near Miss): Neonates were admitted to the selected hospitals during the study period that was indicated from their medical records after diagnosed by Neonatologist or Pediatrician or Gynecologist or Residents were selected by data collectors according to CLAP definition of NNM, neonate with at least one of the near miss criteria who had a severe morbidity (organ dysfunction or failure) or exhibited pragmatic and/or management criteria but survived this condition within the first 27 days of life. The pragmatic criteria includes: birth weight < 1.7kg, APGAR score <7 at 5th minutes of life and GA < 33 weeks and management criteria includes: Parenteral antibiotic therapy, Nasal CPAP, Any intubation, Phototherapy within 24 hours of life, Cardiopulmonary resuscitation, Use of vasoactive drugs, Use of anticonvulsants, Use of surfactant, Use of blood products, Use of steroids, Surgery, Identification of severe congenital malformation, were recruited as NNM case (Santos et al., 2015a; Santos et al., 2015b; De Lima et al., 2018). Additionally, data from the record was retrieved to identify the cases and different exposures.

Selection of controls: Neonates who were admitted to post-natal or neonatal ward and identified by a pediatrician or neonatologist or gynecologist or resident as a healthy baby (have no complication indicated for selection of case) were enrolled as a control. For each near-miss case, two controls within the same day of the near-miss event were selected.

3.5.2. Exclusion Criteria

Those neonates who gave birth at home were excluded from this study because of unknown present birth histories like the birth of weight and Gestational age. Those neonates selected as control but unfortunately come back as a case during the study period were excluded from the control without replacement but they were recruited as a neonatal near miss case. Neonates who didn't with their mothers were excluded.

3.6. Sample Size Determination

The sample size was estimated using Epi Info 7 software. The parameters that used to estimate the sample size was: confidence level of 95%, power of 80%, the case-control ratio of 1:2, expected percent of exposure in control to be 15.8%, and percent exposure among cases, 5.4%. It

was estimated from one study done in North Eastern Brazil, age of mother > 35 years as one of the main exposure variable for neonatal near-miss that provide the maximum sample size of 402 with 10% non-response rate (De Lima et al., 2018). Accordingly, these yields a minimum sample size of 134 cases and 268 controls.

Table 1: Sample size calculation to determine the determinants of Neonatal near miss among neonates admitted to Ambo University Referral Hospital and Ambo General Hospital 2018.

Factors Considered	Assumptions	ST	References
Age >35 years	CI:95% Power:80% Ratio: 1:2 Case = 5.4 % Control= 15.8 %	365	(De Lima et al., 2018)
Previous low birth weight	CI:95% Power: 80 Ratio: 1:2 Case: 18.4% Control: 7.4%	348	(Kassar SB et al., 2013)
Birth weight	CI:95 Power=80 Ratio: 1:2 Case=22.3% Control=5.44%	161	(Navdeep S et al., 2018)

3.7. Sampling procedures

Two Governmental Hospitals were selected purposely (AURH and AGH). The case was recruited sequentially and control was recruited by simple random technique according to the inclusion criteria during the study period until the desired sample size was fulfilled. According to the 2017/2018 G.C HMIS report, AURH has an annual delivery of 3250 while AGH has an annual delivery of 3120. Total annual delivery in both Hospitals =6370. So the sample size allocated for

each hospital was; For AURH = $3250 \times 402 / 6370 = 205$ (68 cases and 137 controls) and for AGH = $3120 \times 402 / 6370 = 197$ (66 cases and 131 controls).

3.8. Data Collection Method

3.8.1. Data Collection Tool

Near misses' events were identified by data collectors in post-natal or neonatal wards according to the above-mentioned criteria. Data were collected in three rounds by 7 midwife and 8 neonatal nurses with the experience in data collection and fluently speak both English and Afaan Oromo (the first 10 days by 5 data collectors and 2 supervisors, next 10 days by 5 data collector and 2 supervisors and third 10 days by 5 data collectors and 2 supervisors). Data collection was supervised and checked for consistency and completeness by six supervisors. Incomplete and unclear questionnaires were returned to interviewers to be completed since respondents were selected sequentially. The data was collected by using a structured interview pre-tested questionnaires administered by trained data collectors in the class arranged for data collection after the neonates were assured survive. In addition to that, pertinent information was abstracted from the medical records (case notes, operation notes, midwives' reports, and discharge summaries) of study respondents.

Sociodemographic characteristics, obstetric factors, maternal, and neonatal related complication and neonatal related factors were collected. A questionnaire was prepared in English, translated to Afaan Oromo, and then back-translated to English by English teacher expert to ensure consistency.

3.8.2. Data Collection Producers

The data were collected by an institution-based face to face interview of the mothers using the pretested structured Afaan Oromo questionnaire and also their documents were reviewed to extract important information. The interviewers have informed the mothers about all details of the research. The women were encouraged to feel free and told that the confidentiality of their responses was assured and no information was shared with third parties, except the investigator. After this, women that were willing to participate and signed the informed consent document were interviewed in a quiet and comfortable room after survival of the neonate were assured. On-site supervision was carried out during the whole period of data collection on a daily basis by the supervisor and principal investigator. At the end of each day, questionnaires were reviewed and

cross-checked for completeness, accuracy and consistency by the supervisor, and principal investigator and corrective measures were taken.

3.9. Variables

3.9.1. Dependent Variable

Determinants of Neonatal Near Miss.

3.9.2. Independent Variables

Socio-demographic characteristics: Age, Marital status, Educational level, Residence, Occupation, distance.

Pregnancy-related factors: Pregnancy type, ANC follows up, Parity, Mode of delivery.

Maternal and neonatal related factors: Birth weight, APGAR score, Gestational Age, Maternal related complication, Neonatal related complication.

3.10. Operational Definitions

Antenatal care: is stated that 4 prenatal consultations, one each quarter and one before delivery (American College of Obstetricians and Gynecologists, 2012).

A healthy newborn: is defined as any birth to the good adaptation to extrauterine life (APGAR > 7) and had no clinically detectable malformation (American College of Obstetricians and Gynecologists, 2012).

APGAR score: this variable was defined as 7-10 indicate healthy baby and 0-6 indicate distressed neonates (Apgar V, 1953; Apgar V et al., 1958).

Birth weight: was defined as Very low birth weight <1.5 kg, low birth weight 1.5 kg-2.5 kg, normal birth weight 2.5-4 kg and macrosomia \geq 4 kg (Battaglia FC and Lubchenco LO, 1967; Alexander GR et al., 1996).

Gestational Age: gestational age has been defined as Preterm if GA<37, Term if GA=37- 42 and Post-term if GA>42 weeks (American College of Obstetricians and Gynecologists, 2012).

Maternal complication: Those mothers comes with one of the following compliance: Obstructed labor, hypertensive disorders of pregnancy, Hemorrhage, Sepsis and Others(American College of Obstetricians and Gynecologists, 2012).

Neonatal asphyxia: in this study context, it is defined by clinical criteria (abnormal fetal heartbeat and APGAR score < 3 in 5 minutes) (Faix RG et al., 1989).

Neonatal infection: neonates with infection were selected according to criteria (OMS, 2015): suspicion of chorioamnionitis, maternal temperature >38 C, spontaneous prematurity <37 weeks age rupture of membranes 12 hours, maternal colonization with Group B Streptococcus without antibiotic prophylaxis, changes in fetal heartbeats, meconium amniotic fluid, symptomatic newborn (hypo or hyperthermia, respiratory distress, respiratory pause, gray complexion, tachycardia, bradycardia, hypotension, blurred tone, disturbance of consciousness, eating disorders (Loubna Doukkali et al., 2016).

A Neonatal Near Miss; neonate who had severe morbidity (organ dysfunction or failure) but who survived this condition within the first 27 days of life with at least one of the pragmatic and management criteria. The pragmatic criteria were: birth weight below 1750 g, APGAR score below 7 at 5 minutes of life and gestational age below 33 weeks. As a proxy for organ dysfunction, the following management criteria were also used: parenteral therapeutic antibiotics; NCPAP; any intubation during the first 27 days of life; phototherapy within the first 24 hrs. of life, cardiopulmonary resuscitation; the use of vasoactive drugs, anticonvulsants, surfactants, blood products and steroids for refractory hypoglycemia and any surgical procedure (Femhealth, n.d; Suchitra Surve et al., 2017; Silva AAM et al., 2014; Santos et al., 2015a; De Lima et al., 2018).

3.11. Data Quality Controls

To make the data valid and reliable; the structured questionnaire was pre-tested on 20(5%) individuals from Gendeberat General Hospital, Ethiopia. Additionally, one-day training was provided for data collectors and supervisors by the principal investigator to create awareness on timely collection and data management on the basic technique of data collection, approaches and on the issue of confidentiality and privacy. To get informed consent and reliable data, a clear explanation of the purpose and procedure of the study was given to the study participants.

Moreover, the data collectors were supervised daily by supervisors. The filled questionnaires were checked daily by the supervisors and principal investigator for completeness and consistency.

3.12. Methods of Data Analysis

Data were checked for consistency, coded and entered using EPI INFO 7 and exported to SPSS version 22 for analysis. Data cleanup and cross-checking were done before analysis. Both descriptive and analytical, statistical procedures were utilized. Tables were used for data presentation. Binary logistic regression was used to identify factors associated with Neonatal Near Miss on the basis of OR, 95% CI and p-value of less than 0.05. Variables with $p < 0.25$ in bivariate analysis were entered into a multivariate logistic regression model using the Backward Stepwise (Likelihood Ratio) to control confounding. During multivariable analysis model fitness has been checked by Hosmer Lemeshow model fitness and which was insignificant ($P=0.873$). No multicollinearity was detected.

3.13. Ethical Considerations

Ethical clearance was obtained from Haramaya University, College of Health and Medical Sciences, Institute of Health Research Ethics Review Committee (IHRERC). A formal letter for permission and support was written to Ambo University Referral and Ambo General Hospital from Haramaya University. Permission was secured from the respective Hospital administrators. All the study participants were informed of the purpose of the study, their right to refuse. Informed voluntary written and signed consent was obtained from all study participants prior to distributing the questionnaires. The respondents were told that the information obtained from them were kept with confidentiality and do not cause any harm to them.

4. RESULT

4.1. Sociodemographic factors

In this study, a total of 402 participants were interviewed, with a response rate of 100%. We selected 134 cases and 268 controls by using standardized Latin American Center for Perinatology Neonatal Near Miss Criteria. About, 137 (34.1%) of the participants were found within the age group of 25-29 years, which accounted for 25.4% of cases and 38.4% of controls. Sixty-six point eight percent (66.8%) of controls lived in urban whereas, 56% of cases were from rural areas. Most of the cases 74.6% and 44.9% of the control were coming from greater than 15km away from health facilities. The majority, (84.3%) of the case and (88.4%) of the control were married. The percentage of cases with no formal education was three times that of controls. Most of the cases, 41.8% and 31.3% of the controls were a housewife.

Table 2: Socio-demographic characteristics of mothers of neonates admitted (n=402) to the Ambo University Referral Hospital and Ambo General Hospital, 2019.

Variable	Category	Case(%)	Control(%)	Total frequency(%)
Age in years	15-19 years	10(7.5)	27(10.1)	37(9.2)
	20-24 years	29(21.6)	77(28.7)	106(26.4)
	25-29 years	34(25.4)	103(38.4)	137(34.1)
	30-34 years	24(17.9)	48(17.9)	72(17.9)
	35+	37(27.6)	13(4.9)	50(12.4)
Residence	Urban	59(44)	179(66.8)	238(59.2)
	Rural	75(56)	89(33.2)	164(40.8)
Distance from health facility	<1hour/5-15km	34(25.4)	149(55.6)	183(45.5)
	≥1hour/≥15km	100(74.6)	119(44.4)	219(54.5)
Marital status	Never married	11(8.2)	10(3.7)	21(5.2)
	Married	113(84.3)	237(88.4)	350(87.1)
	Divorced/widow	10(7.5)	21(7.8)	31(7.7)
Educational level	No formal education	61(45.5)	36(13.4)	97(24.1)
	Primary	27(20.1)	87(32.5)	114(28.3)
	Secondary	28(20.9)	80(29.9)	108(26.9)
	More than secondary	18(13.4)	65(24.3)	83(20.6)
Occupation	Government	12(9)	48(17.9)	60(14.9)
	Farmer	43(32.1)	68(25.4)	111(27.6)
	Housewife	56(41.8)	84(31.3)	140(34.8)
	Merchant	10(7.5)	45(16.8)	55(13.7)
	Other/specify*	13(9.7)	23(8.6)	36(9.0)

Other: student, daily laborer, no job, private employer*

4.2. Obstetrics Related Factors

More than 33% of cases were grand multiparous whereas, 59.3% of controls were a multiparous mother. More than half, 59% of the cases and 77.2% of the controls fetal presentation were cephalic at birth. Most of the current pregnancy, 43.3% of cases and 64.6% of the controls were wanted but unplanned. Majority of the cases (82.8%) had less than four ANC visit, but 57.8% of the control had greater than four ANC visit during this pregnancy. Majority of the controls (84.3%) and 58.5% of the case gave birth at the gestational age of 36-41 weeks. Only 26.9% of the cases and 22.8% of the controls had complications at birth and from this 44.4% and 58.3% of controls were due to obstructed labor. Half of the case, 47.8% and 64.2% the controls gave birth by spontaneous vaginal delivery.

Table 3: Obstetrics characteristics of neonatal near miss among neonates admitted (n=402) to the Ambo University Referral Hospital and Ambo General Hospital 2019.

Variables	Category	Near miss status		Total (%)
		Case (%)	Control (%)	
Parity	Nulliparous	36(26.9)	88(32.8)	124(30.8)
	Multiparous	53(39.6)	159(59.3)	212(52.8)
	Grand multiparous	45(33.6)	21(7.8)	66(16.4)
Fetal presentations during birth	Cephalic	79(59)	207(77.2)	286(71.4)
	Breech	40(29.9)	44(16.4)	84(20.9)
	Transverse/brow/face	15(11.1)	17(6.3)	31(7.7)
Current pregnancy type	Wanted planned	20(14.9)	76(28.4)	96(23.9)
	Wanted unplanned	58(43.3)	173(64.6)	231(57.5)
	Unwanted unplanned	56(41.8)	19(7.1)	75(18.6)
Have you visit ANC during this pregnancy?	Yes	93(69.4)	250(93.3)	343(85.3)
	No	41(30.6)	18(6.7)	59(14.7)
If yes how much did you visit?	< 4 visit	111(82.8)	113(42.2)	224(55.7)
	≥4 visits	23(17.2)	155(57.8)	178(44.3)
Gestational age at birth	≤36 weeks	37(27.6)	21(7.8)	58(14.42)
	37-41 weeks	78(58.5)	226(84.3)	304(75.6)
	≥42 weeks	19(14.2)	21(7.8)	40(9.95)
Did complication happen during birth?	Yes	36(26.9)	61(22.8)	97(24.1)
	No	98(73.1)	207(77.2)	305(75.9)
If yes which complication?	Obstructed labor	16(44.4)	21(58.3)	37(38.1)
	HDP	3(8.3)	9(25)	12(12.3)
	Hemorrhage	9(25)	6(16.7)	15(15.5)
	Sepsis	1(2.8)	1(2.7)	2(2.1)
	Other/specify**	7(19.5)	24(66.7)	31(32)
Delivery mode	SVD	64(47.8)	172(64.2)	236(58.7)
	C/S	34(25.4)	78(29.1)	112(27.9)
	Instrumental	36(26.9)	18(6.7)	54(13.4)

Other*: compound presentation, Other/specify**: oligohydramnios, polyhydramnios, fetal distress

4.3. Neonatal related factors

More than half of the cases, 60.4% and 88% controls neonatal birth weight were within the normal range (2.5-4.00kg). Fifty-eight percent of the cases had greater than 7 APGAR score at the 5th minute of birth. Most of the cases (35.8%) were birth asphyxia at birth.

Table 4: Neonatal related characteristics of neonatal near miss among neonates admitted (n=402) to the Ambo University Referral Hospital and Ambo General Hospital, 2019.

Variables	Category	Near miss status		Frequency(%)
		Case (%)	Control (%)	Total
Birth weight of the baby	<2.5 kg	42(31.3)	22(8.2)	64(15.9)
	2.5-4 kg	81(60.4)	236(88.1)	317(78.9)
	≥4 kg	11(8.2)	10(3.7)	21(5.2)
APGAR score at 5th minute	<7	56(41.8)	0	56(13.9)
	≥7	78(58.2)	268(100)	344(85.6)
What type of neonatal complication happen?	Prematurity	18(13.4)	0	18(13.4)
	Sepsis	36(26.9)	0	36(26.9)
	Congenital anomalies	8(6)	0	8(6)
	Birth asphyxia	48(35.8)	0	48(35.8)
	Jaundice	10(7.5)	0	10(7.5)
	Other/specify*	14(10.4)	0	14(10.4)

Other*: viral infection, bacterial infection, skin, CVS.

4.4. Determinants of Neonatal Near Miss

In Bivariable analysis variables like; age, marital status, educational level, occupation, residence, distance from health institution, pregnancy type, parity, fetal presentation, number of ANC visit, mode of delivery, gestational age and birth weight at birth were selected for multivariable logistic regression with $P \leq 0.25$. Those mothers who were ≥ 15 km (>1 hour) far away from health institution had odds of 2.11 times higher of experiencing NNM than those mothers of nearby health institution [AOR=2.11, 95% CI: (1.09, 4.095)]. Mothers who were unwanted and unplanned current pregnancy had odds of 3.71 times higher experiencing NNM than mothers who were wanted and planned current pregnancy [AOR=3.71, 95% CI: (1.28, 10.79)]. Neonates of mother's less than four ANC follow up had odds of 6.55 times higher experiencing NNM than neonates of mother's visited ANC follow up more than four times. [AOR= 6.55, 95% CI: (3.07, 13.98)]. Neonates of 36-41 weeks of GA had odds of 0.13 times lower of experiencing NNM than neonates of ≥ 42 weeks of gestational age at birth [AOR=0.13, 95% CI: (0.051, 0.32)]. Neonates who were given birth by instrumental delivery were 4.62 times higher of experiencing NNM than neonates gave birth by SVD [AOR=4.62, 95% CI: (1.78, 11.98)]. Neonates of normal birth weight were 0.09 less likely experiencing NNM than neonates of ≥ 4 kg [AOR= 0.09, 95% CI: (0.03, 0.28)]

Table 5: Determinants of neonatal near miss among neonates admitted (n=402) to the Ambo University Referral Hospital and Ambo General Hospital, 2019.

Variables (N=402)	Neonatal near miss		COR (95%CI)	AOR (95%CI)	
	Case	Control			
	N ^o (%)	N ^o (%)			
Age in years	15-19 years	10(7.5)	27(10.1)	1.00	1.00
	20-24 years	29(21.6)	77(28.7)	1.01(.438-2.36)	0.76(0.26-2.18)
	25-29 years	34(25.4)	103(38.4)	0.89(.392-2.03)	0.44(0.16-1.25)
	30-34 years	24(17.9)	48(17.9)	1.35(.562-3.24)	1.15(0.37-3.53)
	35+	37(27.6)	13(4.9)	7.67(2.94-20.11)*	2.07(0.58-7.46)
Distance from health facility	<1hour/5-15km	36(26.9)	149(55.6)	1.00	1.00
	≥1hour/≥15km	98(73.1)	119(44.4)	3.68(2.33-5.82)*	2.11(1.09-4.095)**
Educational level	No formal education	60(44.8)	36(13.4)	6.12(3.147-11.9)*	1.50(0.47-4.78)
	Primary	25(18.7)	82(30.6)	1.12(.569-2.20)	0.35(0.12-1.02)
	Secondary	28(20.9)	80(29.9)	1.26(.643-2.49)	0.70(0.23-2.09)
	More than secondary	21(15.7)	70(26.1)	1.00	1.00
Occupation	Government	12(9)	48(17.9)	1.00	1.00
	Farmer	43(32.1)	68(25.4)	2.53(1.21-5.29)*	0.518(0.15-1.75)
	Housewife	56(41.8)	84(31.3)	2.67(1.30-5.46)*	0.737(0.23-2.37)
	Merchant	10(7.5)	45(16.8)	0.889(.350-2.26)	0.29(0.07-1.24)
	Other/specify***	13(9.7)	23(8.6)	2.261(.893-5.73)	1.83(0.51-6.57)
Current pregnancy type	Wanted planned	20(14.9)	76(28.4)	1.00	1.00
	Wanted unplanned	58(43.3)	173(64.6)	1.28(.717-2.27)	0.86(0.38-1.98)
	Unwanted unplanned	56(41.8)	19(7.1)	11.2(5.47-22.93)*	3.71(1.28-10.79)**
ANC visit	< 4 visit	111(82.8)	113(42.2)	6.62(3.97-11.02)*	6.55(3.07-13.98)**
	≥4 visits	23(17.2)	155(57.8)	1.00	1.00
Gestational age at birth	≤36 weeks	37(27.6)	21(7.8)	1.95(.858-4.42)	1.00(0.35-2.86)
	37-41 weeks	78(58.5)	226(84.3)	0.38(.195-0.747)*	0.13(0.051-0.32)**
	≥42 weeks	19(14.2)	21(7.8)	1.00	1.00
Delivery mode	SVD	64(47.8)	172(64.2)	1.00	1.00
	C/S	34(25.4)	78(29.1)	1.17(.714-1.921)	1.81(0.91-3.60)
	Instrumental	36(26.9)	18(6.7)	5.38(2.85-10.14)*	4.62(1.78-11.98)**
Birth weight of the baby	<2.5 kg	42(31.3)	22(8.2)	1.74(.639-4.72)	0.28(0.069-1.11)
	2.5-4 kg	81(60.4)	236(88.1)	0.31(.128-.762)*	0.09(0.026-0.28)**
	≥4 kg	11(8.2)	10(3.7)	1.00	1.00

*Significant at $P \leq 0.25$, **significant at P-value of ≤ 0.05 , *** student, daily laborer, no job, private employer,

5. DISCUSSION

In this study, distance ≥ 15 km (>1 hrs) from health facilities, less than four ANC follow up, unwanted and unplanned current pregnancy, gestational age ≥ 42 weeks, instrumental deliveries and birth weight ≥ 4 kg were identified as determinants of the neonatal near miss.

Multivariable analysis shows that mothers who were greater than 15km (≥ 1 hour) far away from health facilities had higher odds of experiencing neonatal near miss than those mothers of nearby health facilities. This evidence is consistent with evidence from southern parts of Ethiopia (Hayelom G. M and Berhe W. Sahle, 2017; Weldearegawi B et al., 2015). In India and Vietnam villages with no health facility (≥ 15 km) were higher risky to have neonatal near miss (RP UPADHYAY et al., 2012; Mats Målqvist et al., 2010). In some countries, a lot of women were troubled reaching health facility to get service due to long distance and this leads to Neonatal Near Miss (Gayral-T et al., 2005). The same evidence from Brazil show that long distance from a health facility (≥ 15 km) were the major factors caused Neonatal Near Miss (Victora CG and FC., 2001; S. Lansky et al., 2014; Gonçalves AC et al., 2015). It is scientifically known that being nearby health facility helps to get any necessary health services on time by the right person at the right places and also access to healthcare services improves overall population health status.

The odds of Neonatal Near Miss were six times higher among women who had less than four ANC visit, which is supported by studies in Eastern Brazil that shows fewer prenatal care visits were the leading determinants of Neonatal Near Miss (De Lima et al., 2018; Kale et al., 2017; Kassar SB et al., 2013). However, the study done in Brazil and Morocco revealed that there was no association between Neonatal Near Miss and ANC follow up (Victora CG and FC., 2001; Brasil, 2005; Kassar SB et al., 2013; Nascimento RM et al., 2012; Guilherme Alberto Silva et al., 2017; Loubna Doukkali et al., 2016). These controversies indicate gaps in knowledge about the participation to access prenatal care, the quantity, and quality of consultations in the determination of negative outcomes for the mother and the newborn in Ethiopia. Not only this but also, in socioeconomic contexts, there are great disparities, such as in the case in Brazil, since they were developed countries than Ethiopia they can provide good quality and quantity of ANC visits.

This study revealed that the odds of neonatal near miss among unwanted and unplanned current pregnancy were higher than those mothers wanted and planned current pregnancy. This evidence is supported by a study conducted in Cameroon that shows unwanted and unplanned pregnancy

was significantly associated with the neonatal near miss (E.N. Emmanuel et al., 2016). Not only this but also unintended pregnancy is a worldwide problem that affects women, their families, and society in the developing world can result in serious, long-term negative health effects (Klima CS, 1998). Those mothers who were Unwanted and unplanned current pregnancy were didn't give attention for their pregnancy because they are not interested to the pregnancy, this leads the fetus in the uterus exposed to many problems that later becomes sever neonatal morbidities (near miss). In Ethiopia most of the women becomes pregnant suddenly, for that matter the pregnancy was indeed unwanted, therefore, no seek health facility for prenatal care and consultation, and they become high risk during the postnatal period. Not only this but also, mothers who were unplanned and unwanted current pregnancy may not get important information regarding nutritional counsel and monitoring of fetal wellbeing were compromised. The other reason was related to less ANC follow up practice of the respondents that could directly influence the neonate's health.

Neonates of 36-41 weeks of gestational age were protected against neonatal near miss than neonates of ≥ 42 weeks of gestational age at birth. But study conducted in Brazil, shows that more than 80 percent of those near miss case were < 30 weeks of gestational age (Antônio A et al., 2014; Cynthia Pileggi et al., 2010) and also one of the Latin American Centre for Perinatology (CLAP) standardized definition component of NNM was age of < 36 weeks at birth (Santos et al., 2015a; Santos JP et al., 2015a). This controversy has happened because in Ethiopia organ dysfunction and most complication were supposed to be related to prematurity than post-term neonates, this indicated that there was a little emphasis for post-term neonates. Additionally, as most of the respondents were from the rural area and uneducated, they didn't know the exact date of delivery to seek health support for post-term neonates and this leads to neonatal near miss and morbidities than term neonates. The other reason was because of those studies were using large sample size than current study.

Neonates of normal birth weight were protective against of experiencing near-miss than macrocosmic neonates. This shows that those neonates birth weight $\geq 4.00\text{kg}$ at birth were risky to be near miss than normal birth weight baby. This result is in line with the study done in Tigray that shows neonate of normal birth weight was 55% lesser hazards of death (Hayelom Gebrekirstos Mengesha et al., 2016). In contrast to our study, evidence from Morocco and Brazil indicated that Newborns who were small for gestational age and very low birth weight were strongly associated

with NNM than neonates of normal birth weight (Loubna Doukkali et al., 2016; Cynthia Pileggi et al., 2010; Muwanguzi et al., n.d). This controversy is due to most of the pregnant women in Ethiopia had low awareness about sign and symptom and treatment of Diabetics and Gestational Diabetics disease that increase the weight of the baby and leads to neonatal near miss and morbidities (Kassahun C. W and Mekonen A. G, 2017; Asmamaw A et al., 2015). Another issue is regarding difference in terminating pregnancy plan, in Ethiopia, there is low attention for the macrocosmic baby than low birth weight baby since a lot of person think big baby is the sign of health. The other reason is because of different study set up and different socioeconomic status of current study and other studies.

The current study shows that Neonates who were given birth by instrumental delivery had higher odds of experiencing neonatal near miss than neonates gave birth by spontaneous vaginal delivery. Even though there was no study support this finding, it is a fact that instrumental delivery can cause a lot of adverse effect on neonates and mothers. But in other ways, evidence from Brazil stated that neonatal near miss rate was higher among babies delivered by cesarean section than in those delivered through vaginal birth (Antônio A et al., 2014; Kale et al., 2017). Inline to this study evidence from the Southern part of Brazil indicated that cesarean section delivery was two times higher among NNM than vaginal delivery (Silva GA et al, 2017). This controversy is due to different prevalence of cesarean section among developed countries and developing countries like Ethiopia. In Ethiopia, the prevalence of cesarean section was very small (Moges Ayano et al., 2015)and this indicates that the problem related to cesarean section like neonatal near miss also expected to be very small too. In Ethiopia, most of the physicians try instrumental delivery as the second option to vaginal delivery before going to perform a cesarean section, since instrumental delivery is performed on the real physical body of both mothers and baby there is a high risk that leads neonates to near miss event.

In this study residence, occupation, marital status, complication during labor and delivery, parity, fetal presentation and were insignificantly associated with neonatal near miss. This evidence was supported by the study conducted in Brazil (Antônio A et al., 2014; Guilherme Alberto Silva et al., 2017). But in another study these factors were significantly associated with the NNM(Kale et al., 2017; Nugussie Feven et al., 2018; Victora CG and FC., 2001)

6. STRENGTHS AND LIMITATIONS

6.1. Strengths

This study has several strengths, including employing a validated and standardized neonatal near miss identification criteria to avoid misclassification. Since our sampling technique for the case was sequential the incomplete and irrelevant questionnaires were filled by replacing the old questionnaires. The other strength of this study was 100% response rate of the respondents.

6.2. Limitations

This study used some of neonatal mortality and morbidity literature, since there were only a few studies done on the neonatal near-miss. This study didn't analysis the single points criteria used to select the case event, we used the criteria only to identify the neonatal near miss event.

7. CONCLUSION AND RECOMMENDATIONS

7.1. Conclusion

Distance from health institution, ANC visit, type of current pregnancy, birth weight at birth, mode of delivery and gestational age at birth were determinants of the neonatal near miss. Among these, ANC visit, type of current pregnancy and mode of delivery were the strongest determinants of the neonatal near miss. The data analyzed here can provide information that can contribute to global neonatal and maternal morbidity research agenda about the most frequent complications related to the neonatal near miss.

7.2. Recommendations

Recommendation were forwarded for responsible body based on study finding as follows:

Health care providers

- ✓ Health care providers working in this unit should have to trained about instrumental delivery and ANC follow up.
- ✓ Should counsel mothers about healthy diet, to have appropriate birth weight baby.
- ✓ Should inform mothers about expected date of birth, to avoid post term pregnancy.

Hospital Administrators

- ✓ Should prepare adequate and periodic training for health care providers working in NICU wards and delivery wards to provide effective services.
- ✓ Targeted ANC follow-up of women should be practical in both hospitals.
- ✓ Subsidizing transportation like an ambulance to facilities.

Researchers

- ✓ The other researchers should do further investigation to identify other factors by using other tools and other study design.

8. REFERENCES

- Alexander GR, Himes JH and Kaufman RB. (1996). A United States national reference for fetal growth. *Obstet Gynecol*, 87: 163.
- Almeida MF, Novaes HMD, Alencar GP, et al. (2002). Mortalidade neonatal no Município de São Paulo: influência do peso ao nascer e de fatores sócio-demográficos e assistenciais. *Rev Bras Epidemiol*, 5: 93-107.
- American College of Obstetricians and Gynecologists. (2012) *Guidelines for Perinatal Care*.
- Annetee N, Scovia N M, Rose C N, et al. (2015) Still births, neonatal deaths and neonatal near miss cases attributable to severe obstetric complications: a prospective cohort study in two referral hospitals in Uganda. *BMC Pediatrics* 15: 44.
- Antônio A M, Silva , Álvaro J. m. d, Zeni C l, et al. (2014) Neonatal near miss in the Birth in Brazil survey. *Saúde Pública, Rio de Janeiro*, 30: 1-10.
- Apgar V. (1953) A proposal of a New Method of Evaluation of the Newborn Infant. *Current Researches in Anesthesia and Analgesia* 32: 267.
- Apgar V, Holaday DA and James LS. (1958) Evaluation of the newborn infant. *JAMA* 168: 1988.
- Asmamaw A, Asres G, Negese D, et al. (2015) Knowledge and Attitude About Diabetes Mellitus and Its Associated Factors Among People in DebreTabor Town, Northwest Ethiopia: Cross Sectional Study. *Sci J Public Heal* 3: 209.
- Atnafu MT, Gesit MA and Tefera YA. (2018). Reasons for admission and neonatal outcome in the neonatal care unit of a tertiary care hospital in Addis Ababa: a prospective study. *Research and Reports in Neonatology*, 6: 16.
- Avenant T. (2009) Neonatal near miss: a measure of the quality of obstetric care. *Best Pract Res Clin Obstet Gynaecol* 23: 369-374.
- Barbosa IRC, Silva WBM, Cerqueira GSG, et al. (2015) Maternal and fetal outcome in women with hypertensive disorders of pregnancy: the impact of prenatal care. *Ther Adv Cardiovasc Dis* 9: 140-146.
- Battaglia FC and Lubchenco LO. (1967) A practical classification of newborn infants by weight and gestational age. *J Pediatr* 71: 159.
- Berkowitz, G.S. and Papiernik E. (1993) Epidemiology of Preterm Birth. *Epidemiologic Reviews* 15: 414-441.
- Brasil. (2005) Secretaria de Atenção à Saúde. Departamento de Ações Programáticas E Área Técnica de Saúde da Mulher. Pré-natal e Puerpério: atenção qualificada e humanizada - manual técnico. *Ministério da Saúde Brasília, D F*.
- Carrie K, Shapiro-Mendoza, Kay M, et al. (2006) Risk Factors for Neonatal Morbidity and Mortality Among “Healthy,” Late Preterm Newborns. *Elsevier seminars in perinatology* 2.
- Cecatti JG, Souza JP, Oliveira Neto AF, et al. (2011) Pre-validation of the WHO organ dysfunction based criteria for identification of maternal near miss. *Reprod Health* 8: 22.
- Cynthia Pileggi, P. J, Souza, et al. (2010) Neonatal near miss approach in the 2005 WHO Global Survey Brazil. *Jornal de Pediatria* 86: 21-26.
- De Jonge A, van der Goes B, Ravelli A, et al. (2009) Perinatal mortality and morbidity in a nationwide cohort of 529 688 low-risk planned home and hospital births. *BJOG* 116: 1184.
- De Lima THB, Katz L, Kassar SB, et al. (2018) Neonatal near miss determinants at a maternity hospital for high-risk pregnancy in Northeastern Brazil: a prospective study. *BMC Pregnancy Childbirth* 18: 401.

- Dorling JS, Field DJ and Manktelow B. (2005) Neonatal disease severity scoring systems, Arch Dis Child Fetal Neonatal Ed. *PMC* 90: 16.
- E.N. Emmanuel, K.K.D. Christiane, M. Hervé, et al. (2016) FACTORS ASSOCIATED WITH EARLY NEONATAL MORBIDITY AND MORTALITY IN AN URBAN DISTRICT HOSPITAL IN DOUALA, CAMEROON. *International Journal of Latest Research in Science and Technology ISSN (Online)* 5: 43-49.
- EDHS. (2016) Central Statistical Agency (CSA) [Ethiopia] and ICF Key Indicators Report. *Addis Ababa, Ethiopia, and Rockville, Maryland, USA CSA and ICF*.
- Emmanuel O, Adewuyi, Yun Zhao, et al. (2016) Socioeconomic, bio-demographic and health/behavioral determinants of neonatal mortality in Nigeria: a multilevel analysis of 2013 demographic and health survey. *International Journal of Contemporary Pediatrics* 3: 311-323.
- Faix RG, Viscardi RM, DiPietro MA, et al. (1989) Adult respiratory distress syndrome in full-term newborns. *Pediatrics* 83: 971.
- Femhealth. (n.d) near miss and quality of care tool.
- Foo L, Tay J, Lees CC, et al. (2015) Hypertension in pregnancy: natural history and treatment options. *Curr Hypertens Rep* 17: 1-18.
- Garg P, Krishak R and DK. S. (2005) NICU in a community level hospital. *Indian J Pediatr* 72: 27-30.
- Gayral-T M, Daubisse-M L, Baron M, G., et al. (2005) Caractéristiques socio-démographiques et risques périnataux des mères en situation de précarité. *Journal de Gynécologie Obstétrique et Biologie de la Reproduction* 34: 23-32.
- Gonçalves AC, Costa MCN, Barreto FR, et al. (2015) Tendência da mortalidade neonatal na cidade de Salvador (Bahia-Brasil), 1996-2012. *Rev Bras Saúde Mater Infant.* 15: 337-347.
- Guilherme Alberto Silva, Karin A.R, Elizabeth S.F.S, et al. (2017) A populational based study on the prevalence of neonatal near miss in a city located in the South of Brazil: prevalence and associated factors. *Rev. Bras. Saúde Matern. Infant., Recife*, 17: 159-167.
- Hayelom G. M and Berhe W. Sahle. (2017) Cause of neonatal deaths in Northern Ethiopia: a prospective cohort study. *BMC Public Health* 17: 62.
- Hayelom Gebrekirstos Mengesha, Alem Desta Wuneh, Wondwossen Terefe Lerebo, et al. (2016) Survival of neonates and predictors of their mortality in Tigray region, Northern Ethiopia: prospective cohort study. *BMC Pregnancy and Childbirth* 16: 202.
- http://www.who.int/gho/child_health/mortality/neonatal/en/.
- Kale PL, Mello-Jorge MHP, Silva KSD, et al. (2017) Neonatal near miss and mortality: factors associated with life-threatening conditions in newborns at six public maternity hospitals in Southeast Brazil. *Cad Saude Publica* 33: e00179115.
- Kassahun C. W and Mekonen A. G. (2017) Knowledge, attitude, practices and their associated factors towards diabetes mellitus among non diabetes community members of Bale Zone administrative towns, South East Ethiopia. A cross-sectional study. *PLoS ONE* 12.
- Kassar SB, Melo AMC, Coutinho SB, et al. (2013) Determinants of neonatal death with emphasis on health care during pregnancy, childbirth and reproductive history. *J Pediatr.* 89: 269-277.
- Klima CS. (1998) Unintended pregnancy. Consequences and solutions for a worldwide problem. *J Nurse Midwifery* 43: 491.
- Laopaiboon M, Lumbiganon P, Intarut N MR, et al. (2014) maternal age and pregnancy outcomes: a multicountry assessment. *Advanced BJOG* 121: 49-56.

- Lawn JE, Cousens S and Zupan J. L. (2005) Neonatal Survival Steering:4 million neonatal deaths: when? Where? Why? *lancet* 365.
- Leal MC, Silva AA, Dias MA, et al. (2012) Birth in Brazil: national survey into labour and birth. *Reprod Health* 9: 15.
- Leal Mdo C, Gama SG, Campos MR, et al. (2004) [Factors associated with perinatal morbidity and mortality in a sample of public and private maternity centers in the City of Rio de Janeiro, 1999-2001]. *Cad Saude Publica* 20 Suppl 1: S20-33.
- Lecomte T, Mizrahi A and Mizrahi A. (1996) Précarité sociale: Cumul des risques sociaux et médicaux. Enquête sur la santé et les soins médicaux en France. . *CREDES, Paris*.
- Lima S, Carvalho ML and AGG. V. (2008) Proposta de modelo hierarquizado aplicado à investigação de fatores de risco de óbito infantil neonatal. *Cad Saude Publica* 24: 1910-1916.
- Loubna Doukkali, Nada Bennani Mechita, Laila Lahlou, et al. (2016) Factors of Neonatal Morbidity at the Provincial Hospital Center of Missour. *Journal of Biosciences and Medicines* 4: 48-57.
- Mats Målqvist, Nazmul Sohel, Tran T Do, et al. (2010) Distance decay in delivery care utilisation associated with neonatal mortality. A case referent study in northern Vietnam. *BMC* 10: 176.
- Moges Ayano, Ademe Wondafrash Beyene and Akessa Geremew (2015) Prevalence and Outcome of Caesarean Section in Attat Hospital, Gurage Zone, SNNPR, Ethiopia. *iMedPub Journals* 7: 8.
- Moyer CA, Adanu RM and CM. E. (2013a) The relationship between facilitybased delivery and maternal and neonatal mortality in Sub-Saharan Africa. *Int J Gynaecol Obstet* 122: 263-265.
- Moyer CA, Dako-Gyeke P and RM. A. (2013b) Facility-based delivery and maternal and early neonatal mortality in sub-Saharan Africa: a regional review of the literature. *Afr J Reprod Health* 17: 30-43.
- Mukwevho MT, Avenant T and Pattinson RC. (2007) Developing a practical clinical definition of severe acute neonatal morbidity to evaluate obstetric care: a pilot study. Presentation at the 27th Conference on Priorities in Perinatal Care in Southern Africa. *Hartenbos*.
- Muwanguzi P, Byaruhanga R and Nyangabyaki C. (n.d) RISK FACTORS OF NEONATAL NEAR MISS AT A PERI-URBAN HOSPITAL IN UGANDA.
- Nascimento RM, Leite AJM, Almeida NMGS, et al. (2012) Determinantes da mortalidade neonatal: estudo caso-controle em Fortaleza, Ceará, Brasil. *Cad Saúde Pública*. 28: 559-572.
- Navdeep S, Sanjay C, Sunny C, et al. (2018) Pattern of Neonatal Morbidity and Mortality: A Prospective Study in a District Hospital in Urban India. *Journal of Clinical Neonatology* 5.
- NNFI. (2003) National Neonatology Perinatal Database Report for Year 2002-2003. *New Delhi: NationalNational Neonatology*.
- Nugussie Feven , Alemayehu Mussie and Kidanu G Mariam. (2018) A Case-Control Study Examining Determinants of Neonatal Near-Miss in Public Hospitals in Tigray Region, Northern Ethiopia. *journal of medical science and technology* 7: 11.
- OMS. (2015) Recommandations nationales de bonnes pratiques. *Ministère de la santé Rabat Maroc*.

- Pacagnella RC, Cecatti JG, Osis MJ, et al. (2012) The role of delays in severe maternal morbidity and mortality: expanding the conceptual framework. *Reprod Health Matters* 20: 155-163.
- Pattinson RC and Hall M. (2003) Near misses: a useful adjunct to maternal death enquiries. *Br Med Bull.* 67: 231-243.
- Philip Briggs. (2002) *The Bradt Travel Guide*, Ethiopia Chalfont St Peters: Bradt.
- Pileggi-Castro c, JS Camelo Jr, Perdon G, et al. (2014) Development of criteria for identifying neonatal near-miss cases: analysis of two WHO multicountry cross-sectional studies on Maternal and Newborn Health Research Network. *WHO*.
- Pileggi-Castro C, Camelo Jr J, Perdoná G, et al. (2014) Development of criteria for identifying neonatal near-miss cases: analysis of two WHO multicountry cross-sectional studies. *BJOG: An International Journal of Obstetrics & Gynaecology* 121: 110-118.
- RP UPADHYAY, PR DWIVEDI , SK RAI PM, et al. (2012) Determinants of Neonatal Mortality in Rural Haryana: A Retrospective Population Based Study. *indian pediatrics* 49.
- S. Lansky, AAL.Friche , AAM.Silva, et al. (2014) Pesquisa Nascido no Brasil: perfil da mortalidade neonatal e avaliação da assistência à gestante e ao recém-nascido. *Cad Saude Publica* 30: 192-207.
- Santos JP, Cecatti JG, Serruya SJ, et al. (2015a) "Paho Neonatal Near Miss working Group. Neonatal Near Miss: the need for a standard definition and appropriate criteria and the rationale for a prospective surveillance system." *Clinics* 70: 820-826.
- Santos JP, Pileggi-Castro C, Camelo J, et al. (2015b) *Neonatal Near Miss: a systematic review*.
- Santos JP, Cecatti JG, Serruya SJ, et al. (2015a) Neonatal Near Miss: the need for a standard definition and appropriate criteria and the rationale for a prospective surveillance system. *Clinics (Sao Paulo)* 70: 820-826.
- Santos JP, Pileggi-Castro C, Camelo JS, Jr., et al. (2015b) Neonatal near miss: a systematic review. *BMC Pregnancy Childbirth* 15: 320.
- Say L. (2010) Neonatal near miss: a potentially useful approach to assess quality of newborn care." *JPediatr* 86: 1-2.
- Say L, Pattinson RC and Gülmezoglu AM. R. (2004) WHO systematic review of maternal morbidity and mortality: the prevalence of severe acute maternal morbidity (near miss). *Reprod Health* 1: 3.
- Say L, Souza JP and Pattinson RC. (2009) WHO working group on Maternal Mortality and Morbidity classifications: Maternal near miss—towards a standard tool for monitoring quality of maternal health care. *Best Pract Res Clin Obstet Gynaecol* 23: 287-296.
- Silva AAM, Leite AJM, Lamy ZC, et al. (2014) "Morbidade neonatal near miss na pesquisa Nascido no Brasil." *Cad Saude Publica* 30.
- Skinner JR, Chung SK, Montgomery D, et al. (2005) Near-miss SIDS due to Brugada syndrome. *Arch Dis Child* 90: 528-529.
- Storeng KT, Murray SF, Akoum MS, et al. (2010) Beyond body counts: a qualitative study of lives and loss in Burkina Faso after 'near-miss' obstetric complications. *Soc Sci Med* 71: 1749-1756.
- Suchitra Surve, Sanjay Chauhan and Ragini Kulkarni. (2017) Neonatal near miss review: Tracking its conceptual evolution and way forward. *Curr Pediatr Res* 21: 264-271.
- Ugwu GI. (2012) Pattern of morbidity and mortality in the newborn special care unit in a tertiary institution in the Niger Delta region of Nigeria: A two year prospective study. *Glob Adv Res J Med Med Sci* 1: 133-138.

- UNICEF, WHO, WB, et al. (2012) Levels & Trends in Child Mortality: Estimates Developed by the UN Inter-agency Group for Child Mortality Estimation (IGME). *New York, USA*.
- Victora CG and FC. B. (2001) Infant mortality due to perinatal causes in Brazil: trends, regional patterns and possible interventions. . *Sao Paulo Med J* 119 33-42.
- Weldearegawi B, Yohannes AM, Semaw FA, et al. (2015) cohort of 3684 births. Infant mortality and causes of infant deaths in rural Ethiopia: a populationbased. *BMC Public Health*. 15: 770.
- WHO. (2014) Every newborn: An action plan to end preventable deaths. Available at: www.who.int/about/licensing/copyright_form/en/index.html. Accessed on: 12/2/2019.
- WHO. (2015) Maternal mortality. Available at: <http://www.who.int/mediacentre/>. Accessed on: 30/02/2019. In: WHO (ed). Geneva
- Yared M, Biruk T, Daniel S T, et al. (2013) neonatal mortality in Ethiopia: trends and determinants. *BMC Public Health* 13: 483.

9. ANNEXES

9.1. Annex I: English Version Participant Information and Written Informed Voluntary Consent Sheet of Head of the Facility

My name is (_____). I am working as a data collector for the study being conducted in this Hospital by Ephrem Yohannes (BScM) who is studying for his Master 's degree in Maternity and Neonatal Nursing at Haramaya University, College of Health and Medical Sciences. I kindly request you to lend me your attention to explain you about the study and your institution being selected as the study setting.

1. The Study/Project Title:

Determinants of neonatal near miss among neonates admitted to post-natal or neonatal wards in Ambo Teaching and Referral Hospital and Ambo General Hospital, Ambo, Ethiopia, 2019.

2. Purpose/aim of the study:

The findings of this study can be of a paramount importance for the Hospitals to plan intervention programs to reduce the neonatal morbidity and mortality in the study area. Moreover, the aim of this study is to conduct a thesis as a partial requirement for the fulfillment of a master's degree program in Maternity and Neonatal Nursing for the principal investigator.

3. Procedure and Duration:

I will be interviewing mothers who come post-natal or neonatal wards in your Hospitals using a questionnaire and review documents like patient cards, registration books and others to provide me with pertinent data that is helpful for the study. There are 25 questions to answer. The interview will take about 35 minutes and document review will takes around 10 minutes per each case.

4. Risks and Benefits:

The risks of being participating in this study are very minimal, but only taking a few minutes from mothers. There would not be any direct payment for participating in this study. But the findings from this research may reveal important information for the local health planners.

5. Confidentiality:

The information that we will be provided will be kept confidential. There will be no information that will identify the participants in particular. The findings of the study will be general for the study participant and will not reflect anything particular of individual persons. The questionnaire

will be coded to exclude showing names. No reference will be made in oral or written reports that could link you to the research.

6. Rights:

Participation in this study is fully voluntary. The participants have the right to declare to participate or not to participate in this study. You have the right to permit or not for this study. If you decide to permit the study, you have the right to terminate the study at any time if you consider something related to the study is wrong.

7. Contact Address:

If there are any questions or inquires any time about the study or the procedures, please contact and speak to (principal investigator: Ephrem Yohannes Cell Phone: +251927376254, E-mail: efremjohn27@gmail.com/ Contact address of the responsible Institutional Health Research Ethics Review Committee (IHRERC) at office phone 0254662011 or P.O. Box 235, Harar).

8. Declaration of Informed Voluntary Consent

I have read the participant information sheet. I have clearly understood the purpose of the research, the procedure, risks and benefits, issues of confidentiality, the rights of participating and the contact address for any queries. I have been given the opportunity to ask questions about things that may have been unclear. I was informed that participants have the right to withdraw from the study at any time or not to answer any question that they do not want. I am also informed that the Hospitals has the right to stop this study from being conducted if any misdeeds and unethical procedures are observed during the data collection process in the health center/hospital's premises. Therefore, I declare my voluntary consent on behalf of (_____) management to allow this study to be conducted in the Hospitals with my initials (Signature) as indicated below.

Name and Signature of head of the Hospitals: _____ Date _____

Name and Signature of Data Collector: _____ Date _____

Thank you for your cooperation!!!

9.2. Annex II: English Version Participant Information Sheet and Written Voluntary Informed Consent Form

My name is (_____). I am working as a data collector for the study being conducted in this community by Ephrem Yohannes (BScM) who is studying for his Master 's degree in Maternity and Neonatal Nursing at Haramaya University, College of Health and Medical Sciences. I kindly request you to lend me your attention to explain you about the study and being selected as the study participant.

1. The Study/project Title:

Determinants of neonatal near miss among neonate admitted to post-natal or neonatal wards in Ambo Teaching and Referral and Ambo General Hospital, Ambo, Ethiopia 2018.

2. Purpose/aim of the study:

The findings of this study can be of a paramount importance for the Hospitals to plan intervention programs to reduce neonatal near miss and mortality rate in the study area. Moreover, the aim of this study is to write a thesis as a partial requirement for the fulfillment of a master's degree program in Maternity and Neonatal Nursing for the principal investigator.

3. Procedure and Duration:

I will be interviewing you using a questionnaire to provide me with pertinent data that is helpful for the study. There are 25 questions to answer where I will fill the questionnaire by interviewing you. The interview will take about 35 minutes, so I kindly request you to spare me this time for the interview.

4. Risks and Benefits:

The risks of being participating in this study are very minimal, but only taking a few minutes from Your time. There would not be any direct payment for participating in this study. But the findings from this research may reveal important information for the local health planners.

5. Confidentiality:

The information you will provide us will be confidential. There will be no information that will identify you in particular. The findings of the study will be general for the study participant and will not reflect anything particular of individual persons or housing. The questionnaire will be coded to exclude showing names. No reference will be made in oral or written reports that could link you to the research.

6. Rights:

Participation in this study is fully voluntary. You have the right to declare to participate or not to participate in this study. If you decide to participate, you have the right to withdraw from the study at any time and this will not label you for any loss of benefits which you otherwise are entitled. You do not have to answer any question that you do not want to answer.

7. Contact Address:

If there are any questions or enquires any time about the study or the procedures, please contact and speak to (principal investigator: Ephrem Yohannes, Cell Phone: +251927376254/0966089087, E-mail:efremjohn27@gmail.com. Contact address of the responsible Institutional Health Research Ethics Review Committee (IHRERC) at office phone 0254662011 or P.O. Box 235, Harar).

Declaration of Informed Voluntary Consent:

I have read/was read to me the participant information sheet. I have clearly understood the purpose of the research, the procedure, risks and benefits, issues of confidentiality, the rights of participating and the contact address for any queries. I have been given the opportunity to ask questions about things that may have been unclear. I was informed that I have the right to withdraw from the study at any time or not to answer any question that I do not want. Therefore, I declare my voluntary consent for to participate in this study with my initials (Signature) as indicated below.

Name and Signature of Participant: _____ Date _____

Name and Signature of Data Collector: _____ Date _____

Thank you for your cooperation!!!

9.3. Annex III: English Version Questionnaire

**HARAMAYA UNIVERSITY
POST GRADUATE STUDY PROGRAM**

Dear Respondents

This questionnaire is prepared to determine the determinants of neonatal near miss among neonates admitted to post-natal or neonatal wards in Ambo University Teaching and Referral Hospital and Ambo General Hospital, 2018.

The assessment is made for the partial fulfillment of the MSc Degree in Maternity and Neonatal Nursing. The questionnaire contains both closed and open-ended questions and will be interviewed. You are therefore kindly requested to provide a genuine response to the questions. The information you provide is confidential and is used only for the purpose of this study. If you have any question, don't hesitate to ask the data collector. Your cooperation and participation until the completion of the interview is very necessary for the successful completion of the assessment.

Thank you in advance for your cooperation!!!

Interview Record for Quantitative Data

Questionnaire ID : ----- Type of health institution_____

Name of health institution_____ mother's serial number_____

Date of interview in Ethiopian Calendar (dd/mm/yy) _____/_____/_____

Interviewer's Name _____ code _____ signature _____

Supervisor's Name _____ code _____ signature _____

Result of interview: 1. Completed 2. Partially complete

Latin American Center for Perinatology Standardized Criteria of Neonatal Near Miss.

Does the newborn considered as near-miss case?	Yes No
If Yes which of the followings classify the neonate as near miss? If No jump to next question	<p>Pragmatic criterion</p> <ul style="list-style-type: none"> ✓ Birthweight of < 1750 g ✓ APGAR score of <7 at 5 minutes ✓ Gestational age of < 33 complete weeks <p>Management criteria</p> <ul style="list-style-type: none"> ➤ Parenteral antibiotic therapy (before 28 days of life) ➤ Nasal CPAP ➤ Any intubation up to 7 days and before 28 days of life ➤ Phototherapy within 24 hours of life ➤ Cardiopulmonary resuscitation ➤ Use of vasoactive drugs ➤ Use of anticonvulsants ➤ Use of surfactant ➤ Use of blood products ➤ Use of steroids for the treatment of refractory hypoglycemia ➤ Surgery ➤ Identification of severe congenital malformation

English Version Questionnaire

S/N	Part One: Sociodemographic Factors	
101	Age of the mother	-----years old
102	Current residence of the mother	1 Urban 2 Rural
103	How long estimated distance from health facility?	-----kilometers
104	What is mother's marital status?	1. Never married 2. Married 3. Living together 4. Divorced/separated 5. Widowed
105	Educational level of the mother	1. No formal education 2. Primary 3. Secondary 4. More than secondary
106	What is mother's occupation?	1. Government employee 2. Farmer 3. House wife 4. Merchant 5. Other(specify)
Part Two: Obstetric Conditions		
201	Parity of the mother	-----
202	Presentation of fetus during labor and delivery	1. Cephalic 2. Breech 3. Transvers/face/brow 4. Others--.....
203	Type of current pregnancy	1. Wanted and planned 2. Wanted but unplanned 3. Unwanted and unplanned
204	Have you visited ANC during current pregnancy?	1 Yes

		2 No
205	If yes to question No 205, how many times you visit ANC?	_____ visits
206	What was GA at birth?	_____ weeks
207	Did complication happen during labor and delivery?	1 Yes 2 No
208	If question number 307 yes, which obstetric complication was detected?	1. Obstructed labor 2. hypertensive disorders of pregnancy 3. Hemorrhage 4. Sepsis 5. Others (specify)_____
209	What was current baby mode of birth?	1. SVD 2. C/S 3. Instrumental delivery
Part Three: Neonate Related Factors		
301	What was birth weight of the baby at the birth?	1. <1.5 kg 2. 1.5-2.5 kg 3. 2.5-4 kg 4. \geq 4 kg
302	What was APGAR score at 5 th minute of life?	-----
303	Did the baby have any complication?	1 Yes 2 No
304	If yes to question number 403, specify it.	1 Prematurity 2 Sepsis 3 Congenital anomalies 4 Birth asphyxia 5 Jaundice 6 Others(specify)

9.4. Annex IV: Afaan Oromo Questionnaire

Gaaffilee adda addaa fi Uunkaa waliigaltee Afaan Oromootti hiikkame

Uunkaa hirmaannaa fi Gaaffiileef odeeffaanoo kennuu

Qorannoon kun kan irratti xiyyeeffatu ijoollee dhalataniis umrin isaani guyyaa 28 gadi jiraan kanneen sababotaa adda addatin du'arraa hafaan gara hospitaalaa kanatti yaalamuf dhufaanif yoo ta'an, Gaaffilee dhiyaataniif odeeffannoo sinirraa funaanuuf eyyama kan itti gaafannuu dha. Duraan dursee Nagaan koo isin haa ga'u jechaa, maqaan koo obbo _____ jedhama. Yeroo ammaa kana Yunivarsiitii Haramaaya keessatti Fayyaa hadhootaa fi ijolleetiin Digrii lammaffaatiin eebbifamuuf qorannoo Obbo Efirem Yohannisitiin gaggeefamu irratti odeeffannoo walitti qabuutti jirra. Kanaafu har'a kaniin dhufe ijoolle umriin isaani guyyaa 28 gadi ta'ani hospitaala kanatti sabaabaa adda addatiin yaalamuuf jiraanii fi sababotaa ijoollee kana Afaan du'aatiin gahee garuu yaala argaatanin ykn carraan du'aa irraa oolan irratti qorannoo gaggeeffamuuf ragaa sassaabuufiin. Qorannoo kana gaggeessuun dura haala fi maaluummaa qorannoo kanaaf ragaa tahu isiniif ibsuufin yaala.

Mata duree Qorannichaa: - Hospital Referaala Universitii Ambooo fi Hospitaala WaliGala Ambooti bara 2011ALH sababootaa daa'imman dhalataani guyyaa 28 gaddii ta'aan afaan du'aarran ga'aan garuu sababotaa adda addatiin du'araa akkka hafaan taasisan.

Kaayyoo Qorannichaa: - Hospital Referaala Universitii Ambooo fi Hospitaala Wali gala Ambooti sababootaa daa'imman dhalataani guyyaa 28 gaddii ta'aan afaan du'aarran ga'aan garuu sababotaa adda addatiin du'araa akkka hafaan taasisan irratti kan xiyyeeffatu dhaa.

Haalaa fi yeeroo qorannichaa: Qorannoo kana irratti ragaaan kan walitti qabamu seenaa daa'imman guyyaa 28 gadii fi haadholiisaanirraa yoo ta'uu kanneen carraan ba'eef hundi odeffanno barbaachisaa ta'ee akka kennani fi akkasumaas odeffannon raga adda addaa unkaa seenaa yaalisaanirras kan fudhatamu ta'a. qorannoon ogeessaan ni godhama, akkasumas gaffileen adda addaa ni gaafatamu. Daa'imman keessan qorannoo kanaaf filatamatan marti kan qorannoo kana gaggeessinu yoo hayyama maatii ykn kunuunsitoonni daa'immanii irraa argannee fi isaan fedhii qabaataniidha. Kanaaf qorannoo daa'ima keessaniif gaggeessinuu fi gaaffii isin gaafannuuf daqiiqaa 30 qofa isin duraa fudhanna. Gaaffileen keenyaas gaaffilee 25 qofaa ta'usaa isiin ibsuun barbadaa.

Bu'aa fi miidhaa Qorannoo kun fiduu danda'u

Qorannoo kana keessatti hirmaachuu fi odeeffannoo kennuun miidhaa tokkollee isin irraan waan ga'u hin qabu. Garuu yeroo kessan qofaa siin jalaa akka fudhatudha.

Kaffaltii Raawwatama

Qorannoo kana irratti hirmaachuun wanti kafalamu ykn kennamu tokkolleen hin jiru. Akkasumaas qorannoo kana irratti hirmaachuun bahiin baaftan tokkolleen hin jiru. Garuu qorannoon kun gara fula duraatti du'aatii daa'immani xiqqeessuf qooda guddaa akka taphatu sinitti himuu barbadaa.

Iccitti Odeeffanichaa

Odeeffannoon qorannoo kanaaf funanamu hunduu iccitiin isaa kan eegamuu dha. Namoonni odeeffannoo kana yommuu kennitan maqaan keessan hin barreeffamu, garuu mallattoo/Lakkoofsi addaa kan isinii kennamu ta'uusaa sinif ibsuu barbaadaa. Itti dabaluu odeeffannoo kana nama qorannoo kana adeemsisuun ala namni kamiyyuu akka hin-argine ni godhama.

Mirga qorannoo irratti hirmaachuu fi hirmaachuu dhiisuu.

Qorannoo kana irratti hirmachuu fi hirmaachuu dhiisuun mirga nama dhuunfaa taha. Hubannoo Gad – fageenyaan yoo barbaaddan teessoowwan armaan gadii dubbisuun argachuu dandeessu.

Abbaa Qorannichaa:

Maqaa: Efreem Yohaannis

Tessoo: Amboo

Bilbila: 0927376254/0966089087

Email: efremjohn27@gmail.com

Koree Jiddu Galeessa Qorannoo fi Qo'annaa

Haramaayaa Yunibarsiitii, Koollejji Saayinsii Fayyaa

L.S.P 235

Bilbila 025-666/899

Duraan dursee gaafiilee koo deebisuuf yeroo keessan kennitanii hirmaachuu keessaniif baayyee isin galateeffadha.

Qorannoo kana akka gaggeessinuuf hayyama keessan gaafanna?

Eeyyee_____ Lakki_____

Eeyyee yoo jettan jalatti mallatteessaa.

Lakki yoo ta'e deebii keessan asii bira hin darbinaa.

Hayyamamoo ta'uu hirmaattootaa mirkaneessuu.

Ani kan armaan gadiitti mallatteesse kaayyoo qorannoo kanaa hubadhee odeeffannoo gubbaa irratti kenname bu'ura godhachuun qorannoo kana Hospitaala keenya keessatti daa'imma koorraati akka adeemsiftan hayyameen jira.

Mallattoo Guyyaa

Waan na gargaartaniif irra deebi'ee isin galateefadha.

Maqaa odeeffannoo walitti qabaa _____

Uunkaa hirmaannaa fi Gaaffiileef odeeffaanoo kennuu

Qorannoon kun kan irratti xiyyeeffatu ijoollee dhalatani umrin isaani guyyaa 28 gadi jiraan kanneen sababotaa adda addatin du'arraa hafaan gara hospitaalaa kanatti yaalamuf dhufaanif yoo ta'an, Gaaffilee dhiyaataniif odeeffannoo sinirraa funaanuuf eyyama kan itti gaafannuu dha. Duraan dursee Nagaan koo isin haa ga'u jechaa, maqaan koo obbo _____ jedhama. Yeroo ammaa kana Yunivarsiitii Haramaaya keessatti Fayyaa hadhootaa fi ijjolleetiin Digrii lammaffaatiin eebbifamuuf qorannoo Obbo Efirem Yohannisitiin gaggeefamu irratti odeeffannoo walitti qabuutti jirra. Kanaafu har'a kaniin dhufe ijjoole umriin isaani guyyaa 28 gadi ta'ani hospitaala kanatti sabaabaa adda addatiin yaalamuut jiraanii fi sababootaa ijoollee kana Afaan du'aatiin gahee garuu yaala argaatanin ykn carraan du'aa irraa oolan irratti qorannoo

gaggeeffamuuf ragaa sassaabuufiin. Qorannoo kana gaggeessuun dura haala fi maalummaa qorannoo kanaaf ragaa tahu isiniif ibsufin yaala.

Mata duree Qorannichaa: - Hospital Referaala Universitii Amboo fi Hospitaala Waligala Ambooti bara 2011ALH sababootaaa daa'imman dhalataani guyyaa 28 gadii ta'aan afaan du'aarran ga'aan garuu sabotataa adda addatiin du'araa akka hafaan taasisan.

Kaayyoo Qorannichaa: - Hospital Referaala Universitii Amboo fi Wospitaala Wali gala Ambooti sababootaaa daa'imman dhalataani guyyaa 28 gaddii ta'aan afaan du'aarran ga'aan garuu sabotataa adda addatiin du'araa akka hafaan taasisan irrati kan xiyyeffatu dhaa.

Haalaa fi yeeroo qorannichaa: Qorannoo kana irratti ragaaan kan walitti qabamu seenaa daa'imman guyyaa 28 gadii fi haadholiisaanirraa yoo ta'uu kanneen carraan ba'eef hundi odeffanno barbaachisaa ta'ee akka kennani fi akkasumaas odeffannon raga adda addaa unkaa seenaa yaalisaanirras kan fudhatamu ta'a. qorannoon ogeessaan ni godhama, akkasumas gaffileen adda addaa ni gaafatamu. Daa'imman keessan qorannoo kanaaf filatamatan marti kan qorannoo kana gaggeessinu yoo hayyama maatii ykn kunuunsitoonni daa'immanii irraa argannee fi isaan fedhii qabaataniidha. Kanaaf qorannoo daa'ima keessaniif gaggeessinuu fi gaaffii isin gaafannuuf daqiiqaa 30 qofa isin duraa fudhanna. Gaaffileen keenyaas gaaffilee 25 qofaa ta'usaa isiin ibsuun barbadaa.

Bu'aa fi miidhaa Qorannoo kun fiduu daanda'u

Qorannoo kana keessatti hirmaachuu fi odeeffannoo kennuun miidhaa tokkollee isin irraan waan ga'u hin qabu. Garuu yeroo kessan qofaa siin jalaa akka fudhatudhaa.

Kaffaltii Raawwatama

Qorannoo kana irratti hirmaachuun wanti kafalamu ykn kennamu tokkolleen hin jiru. Akkasumaas qorannoo kana irratti hirmaachuun bahiin baaftan tokkolleen hin jiru. Garuu qorannoon kun garaa fulaa duraatii du'aati da'immani xiqqessuf qoodaa guddaa akka taphaatu siniti himuu barbannaa.

Iccitti Odeeffanichaa

Odeeffannoon qorannoo kanaaf funaanamu hunduu iccitiin isaa kan eegamuu dha. Namoonni odeeffannoo kana yammuu kennitan maqaan keessan hin barreeffamu, garuu mallattoo/Lakkoofsi

addaa kan kennamuuf ta'a. Itti dabaluu odeeffannoo kana nama qorannoo kana adeemsiisuun ala namni kamiyyuu akka hin-argine ni godhama.

Mirga qorannoo irratti hirmaachuu fi hirmaachuu dhiisuu.

Qorannoo kana irratti hirmachuu fi hirmaachu dhiisuun mirgaa nama dhuunfaa taha. Hubannoo Gad – fageenyaan yoo barbaaddan teessoowwan armaan gadii dubbisuun argachuu dandeessu.

Abbaa Qorannichaa:

Maqaa: Efreem Yohaannis

Tessoo: Amboo

Bilbila: 0927376254/0966089087

Email: efremjohn27@gmail.com

Koree Jiddu Galeessa Qorannoo fi Qo'annaa

Haramaayaa Yunivarsiitii, Koollejji Saayinsii Fayyaa: L.S.P:235, Bilbila: 025-666/899

Duraan dursee gaafiilee koo deebisuuf yeroo keessan kennitanii hirmaachuu keessaniif baayyee isin galateeffadha. Qorannoo kana akka gaggeessinuuf hayyama keessan gaafanna?

Eeyyee_____ Lakki_____

Eeyyee yoo jettan jalatti mallatteessaa . Lakki yoo ta'e deebii keessan asii bira hin darbinaa

Eeyyama Dura Bu'aa Hospitaalaa Mirkaneessuu.

Ani itti gaafaatamaan Hospitaala kanaa kan armaan gadiitti mallatteesse kaayyoo qorannoo kanaa hubadhee odeeffannoo gubbaa irratti kenname bu'ura godhachuun daa'imman Hospitaala koo qorannoo kana irratti akka hirmaataniif hayyamu kiyya mallattoo kiyyaan mirkaneessaa, deeggarsa gama kiyyaan barbaadamu hunda laachuuf qophii dha.

Mallattoo

Guyyaa

Waan na gargaartaniif irra deebi'ee isin galateefadha.

Maqaa odeeffannoo walitti qabaa

Mallattoo_____

Unkaa Gaffilee**Kutaa Tokko:Gaafilee Seensaa Haala Hawaassumaa Fi Dimograafii**

101	Umriin keessan meeqa?	_____ waggaa dhaan.
102	Bakki jireenya keessanii eessa?	1. Magaalaa 2. Baadiyaa
103	Manni yaalaaganda keessan irraa hangam deemsisa?	1.Daqqiqa_____deemsisa 2.kiloometra meqaa?-----
104	Haalli heeruma haadha akkam turee ?	1. Hin heeruminne 2. Heerumeera 3. Waliin jiraadha 4. Hiikeera 5. Abbaan manaa koo du'eraa
105	Sadarkaan barumsaa haadhaa maal fakkataa?	1. Hin baranne 2. Sadarkaa tokkoffaa 3. Sadarkaa lammaffaa 4. Sadarkaa lammaffaa oli
106	Akaakuun hojii haadhaa maalidha?	1. Hojjataa mootummaa 2. Haadha manaa 3. Qote bulaa 4. Daldalaa 5. Kan biro(.....) ibsi

Kutaa Lama : Sirna Ulfaaf Dahumsaa Ilaalchisee

201	Hanga ammaa meeqa lubbun deesse?
202	Daa'imi kun yoo deesse haala kamin dhufee?	1. Mataan 2. huddun 3. tikishaan 4. kan biro
203	Haalaa ulfaa ammaa	1. Barbaderaas karoorseraa 2. Barbaderaa hin koorsisinee 3. Hin barbadnes kin karoorsines
204	Ulfa ammaatiif tajaajila dahumsaa duraa argatee jirtaa?	1. Eyyen 1. Hin arganne
205	Yeroo meeqaaf tajaajila argatte?	Yeroo_____deddeebisaan Tajajila argadhe.
206	Da'imnii aamma yoo dhalatuu torbaan meeqa ture?	----- torbaan
207	Yeroo da'umsaa rakkon umamee ni jiraa turee?	1. Eyyen 2. Lakki
208	Eyyen yoo jette rakoo akkamitu umamme?	1. Da''umsaa lafarraa gototamee 2. Dhibba dhigaa 3. Dhangala'u dhigaa 4. Dhukubaa gadameessa 5. Kan biro.....
209	Da'imnii amma kun haala kamin dhalatee?	1. Karaa qaamaa saalaatin 2. Yaalaa baqaaqsutin 3. Meeshalee adda addaa fayadamun

Kutaa Sadi: Seenaa Daa'ima Ergaa Dhaalatee

301	Kiloon da'ima yeroo dhalatu meeqa turee?	1. <1.5 kiloo 2. 1.5-2.5 kiloo 3. 2.5-4 kiloo 4. >=4 kiloo
302	Haaalii tilmaamaa wali gala fayya da'ima daqiqaa 5ffat maal fakkataa ture?	1. <7 2. >=7
303	Da'imichi rakko qabaa turee?	1. Eyyen 2. Lakki
304	Yoo eyyen jette rakko akkami qabaa turee?	1. Otoo hin ga'in dhalatee 2. Qaama hir'uu turee 3. Dhukubaa sepsis 4. Rakko hargansuu qabaa turee 5. Halluun kello turee/jaundice 6. Kan biro

9.5. Annex VI: Curriculum vitae of the investigators

1. Personal Information

Full Name: Ephrem Yohannes Roga

Date of Birth: April 30, 1993G.C

Place of Birth: Ambo, Ethiopia.

Sex: Male

Marital Status: Single

Nationality: Ethiopian

Contact Address: +215927376254/+251966089087

P.O. Box: 1145- Wollo University, Ethiopia

E-mail: efremjohn27@gmail.com

2. Educational Background

Level of Education	Universities and /or Schools	Year	Awards
Higher Education	Wollo University	2012- 2015	BSc in midwifery
Preparatory Education	Gendeberat Preparatory and Secondary School	2010-2011	Grade 11-12
Secondary Education	Abuna Gendeberat Preparatory and Secondary School	2008-2009	Grade 9-10
Primary Education	Gute Andode Elementary School	1999-2007	Grade 1-8

3. Language

Language	Speaking	Reading	Writing	Listening
Afaan Oromiffa	Excellent	Excellent	Excellent	Excellent
English	Excellent	Excellent	Excellent	Excellent
Amharic	Excellent	Excellent	Excellent	Excellent

4. Qualification

I had been graduated from Wollo University in BSc midwife at 2015 G.C with CGPA 3.86 and my MSc CGPA is 3.99.

5. Work experiences

I have two-year work experience at Wollo University, Faculty of Health Science, Department of midwifery, one year as Graduate Assistant and the next one year as Assistant Lecturer.

6. Trainings received

- i. Teaching Methods, Classroom Organization and Management, Assessment and Evaluation and Psychology of the learner (Induction training) organized by Wollo University, Educational and Behavioral Science Faculty.
- ii. Training on mental health organized by Wollo University in collaboration with USAID and WHO in 2016.
- iii. Supervisory Training Skills targeted on supervision of health science students on clinical sites (Health Centers, Hospitals and Field Works) organized by JHPIGO.
- iv. Higher diploma programme (HDP) for higher education instructors organized by Wollo University.
- v. Training on helping baby breathing prepared by Ethiopian Midwives association
- vi. Observational and structured clinical examination training prepared by JHPIGO.

7. Statistical Software

I am familiar with a number of statistical software packages like Microsoft Word, Excel, Power Point, Access, SPSS, open code, End note, STATA, Epi-data and Epi-Info, Revman and CMA.

8. Hobbies

- ✓ Reading various books, articles, press and writing.
- ✓ Listening spiritual songs and visiting historical places.

9. References

1. Mr. Amare Workie (BSc, MSc in clinical midwifery): Lecturer at Wollo University, Dessie, Ethiopia.

Tel: +251938509376, E- mail: amityw12@gmail.com

2. Lemma Negesa Bulto (MSc, PhD Candidate) Lecturer, Haramaya University College of Health and Medical Sciences

Phone: +251 923190110

Email: lemmitti@gmail.com