

**ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCE
SCHOOL OF NURSING AND MIDWIFERY
DEPARTMENT OF NURSING**

**PREVALENCE OF NEONATAL HYPOTHERMIA AND
ASSOCIATED FACTORS AT DELIVERY WARD IN PUBLIC
HOSPITALS OF ADDIS ABABA, ETHIOPIA 2020.**

BY: MAHELET ALEMAYEHU(BSc)

ADVISORS:

- 1. BEREKET GEBREMICHAEL (MSC, ASS'T
PROFESSOR)**
- 2. FEVEN MULUGETA (MSC)**

**A THESIS TO BE SUBMITTED TO POST GRADUETE
STUDIES, ADDIS ABABA UNIVERSITY, COLLEGE OF
HEALTH SCIENCE, SCHOOL OF NURSING AND
MIDWIFERY, DEPARTMENT OF NURSING FOR PARTIAL
FULFILLMENT OF THE REQUIRMENT FOR MASTERS OF
SCIENCE IN NEONATAL NURSING.**

ADDIS ABABA ETHIOPIA

JUNE, 2020

ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCES
SCHOOL OF NURSING AND MIDWIFERY
DEPARTMENT OF NURSING
POST GRADUETE STUDIES

Name Principal Investigator	Mahelet Alemayehu(BSc)
Name of advisors	1. Mr. Bereket Gebremichael (MSc, Ass't Professor) 2. Feven Mulugeta (MSc)
Full title of the research project	Prevalence of Neonatal Hypothermia and Associated Factors at Delivery Ward in Public Hospitals of Addis Ababa, Ethiopia 2020.
Duration	November 2019 -- June 2020
Study area	Addis Ababa, Ethiopia
Address of investigator	Phone: +251-913-63-64-86 <u>Email: Mahoayal1@gmail.com</u>

APPROVAL SHEET

I, the undersigned MSc student, declare that I have submitted my original work on prevalence of neonatal hypothermia and associated factors at delivery ward in public hospitals of Addis Ababa town.

Submitted by:

Name: Mahelet Alemayehu (BSc) Signature: _____ Date _____

This thesis work has been submitted for examination with my approval as an advisor.

Examiner:

1. Mr. Girum Sebsibie	_____	_____
Name of Examiner	Signature	Date

Advisors:

1. Mr. Bereket Gebremichael	_____	_____
Name of Major Advisor	Signature	Date
2. Feven Mulugeta	_____	_____
Name of Co-Advisor	Signature	Date

DECLARATION

I, the undersigned, declare that this thesis is my original work and has not been presented for a degree in this or another university and that all sources of materials used for this thesis have been fully acknowledged.

Name: Mahelet Alemayehu (BSc)

Signature: _____

Date _____

Place: Addis Ababa University, College of Health Sciences, School of Nursing and Midwifery,
Department of Nursing and Midwifery

Date of submission: _____

This thesis is submitted for examination with my approval as university advisors.

Approved by:

1. Name of Major Advisor: Mr. Bereket Gebremichael (MSc, Ass't Professor)

Signature _____

Date _____

2. Name of Co-Advisor: Feven Mulugeta (MSc)

Signature _____

Date _____

APPROVAL BY THE BOARD OF EXAMINATION

This thesis by Mahelet Alemayehu (BSc) is accepted in its present form by the board of examiners as satisfying thesis requirement for degree of Masters of Science in Neonatal Nursing.

1. EXAMINER: Mr. Girum Sebsibie (MSc, Ass. Prof, Phd Fellow)

Signature _____

Date _____

2. RESEARCH ADVISORS:

1. Name of Major Advisor: Bereket Gebremichael

Rank: (MSc, Ass't Professor)

Signature _____

Date _____

2. Name of Co-Advisor: Feven Mulugeta (MSc)

Signature _____

Date _____

3. DEPARTMENT HEAD:

1. Name of department head: Niguse Tadele (MSC, Ass. Prof.)

Rank: Department head

Signature _____

Date _____

STATEMENT OF THE AUTHOR

By my signature below, I declare and confirm 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.

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Name: Mahelet Alemayehu

Signature _____ Date _____

School/Department: Nursing and Midwifery/Nursing

ACKNOWLEDGEMENT

First of all, I would like to thank my almighty God for keeping me in all phases of my life and helping me in doing this thesis. I would also like to thank Gandhi Memorial Hospital for sponsoring me to attend this master's program at Addis Ababa University. My gratitude also goes to my advisors Bereket Gebremichael (Ass't Professor), Feven Mulugeta (MSc). I am also indebted to Dr Asrat Demtse (Neonatologist, Ass't Professor) and Thomas Eusterbrock, (MD) for their encouragement and support.

ABBREVIATIONS AND ACRONYMS

ANC	Ante Natal Care
AOR	Adjusted Odds Ratio
APGAR	Appearance, Pulse, Grimace, Activity, Respiratory
CI	Confidence Interval
COR	Crude Odds Ratio
C/S	Cesarean Section
GA	Gestational Age
GMH	Gandhi Memorial Hospital
LBW	Low Birth Weight
LGA	Large for Gestational Age
NICU	Neonatal Intensive Care Unit
°C	Degree Centigrade
OR	Odd Ratio
RR	Relative Risk
PROM	Prolonged Rupture of Membrane
SD	Standard Deviation
SVD	Spontaneous Vaginal Delivery
SGA	Small for Gestational Age
SPSS	Statistical Package for Social Science
TASH	Tikur Anbesa Specialized Hospital
WHO	World Health Organization
Y12HMC	Yekatit 12 Hospital
ZMH	Zewditu Memorial Hospital

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ABSTRACT

Background: Globally the prevalence of hypothermia at hospital level ranges from 32% to 85% even in tropical environments. Hypothermia is associated with a nearly fivefold increase in mortality during the first 7 days of newborn life. For that reason, addressing neonatal hypothermia might bridge achievement of the 2030 development agenda, which is reducing neonatal mortality to at least as low as 12 deaths per 1000 live births by ending preventable neonatal death.

Objective: The main aim of this study was to assess the prevalence of neonatal hypothermia and associated factors in public hospitals of Addis Ababa, Ethiopia 2020.

Methodology: Institutional based cross sectional study was conducted among 377 new born with in six hours of delivery at labor ward, in representative randomly selected public hospitals from April 1st 2020 to May 12, 2020 in Addis Ababa, Ethiopia. Simple random sampling technique was used to select four public hospitals. To select study participants systematic random sampling techniques were utilized. Data were collected by using pretested, structured questionnaire through face to face interview with the mother. Additional data were collected by direct observation and from mother chart review by using checklist. The collected data was entered using Epi data version 4.6 and exported to SPSS version 24 for analysis. Variables that have P-value <0.25 were entered in to multivariable logistic regression model to control for confounder. Statistical significance was declared at p-value ≤ 0.05 . Odds ratio with 95% CI is used to determine the direction and strength of association.

Result: The prevalence of neonatal hypothermia in the study area was 63.4% [95% CI:58.6%, 68.2%]. Temperature of the delivery room $\leq 24^{\circ}\text{c}$ (AOR=5.5, 95%CI: 2.4,12.55), night time delivery (AOR=4.07, 95%CI: 2.02, 8.2), drying by non-pre-warmed towel (AOR=6.9, 95%CI: 2.09,22.9), newborn head not covered by hat (AOR=3.6, 95%CI: 1.62, 8.01), number of ANC ≤ 4 visits (AOR=2.08, 95%CI: 1.03, 4.2), not initiate breast feeding within one hour of birth (AOR=3.11, 95%CI: 1.39, 6.98) and age of the newborn $\leq 2:59\text{hr}$ (AOR=3.58,95%CI: 1.57, 8.13) were factors associated with neonatal hypothermia.

Conclusion and recommendation: Prevalence of neonatal hypothermia in Addis Ababa public hospitals is high. Therefore, implementing low cost and easy warm chain interlinked procedure for every delivery will have a paramount effect in reducing the problem.

Keywords: Hypothermia, Neonate, Thermal care, Public hospital, Addis Ababa

1 INTRODUCTION

1.1 Background

After birth the first few minutes are the most crucial time for a new born. This is because it's the time of shifting from the intra uterine life to the external environment. During this time different adaptations take place.(1). As soon as an infant is delivered, the transition from the warm intrauterine environment to the cool, drafty environment causes significant heat loss. Neonatal hypothermia can result due to the rapid alteration in the environmental temperature during delivery, particularly if proper protective action is not taken (2). Hypothermia in newborns can be simply explained as an altered temperature that is under 36.5°C.(1).

For a new born, to survive the extra uterine life, preserving normal body temperature is an important task. Sophisticated ways are used to attain their body temperature with in the normal range by producing heat through shivering and non-shivering which are regulated and mediated by the hypothalamus and the endocrine pathways(3).

Generally, newborns are at risk of hypothermia because of their large surface area for small body mass. And if no preventive intervention is applied shortly after delivery, the newborns core and skin temperature can fall at a speed of around 0.1°C to 0.3°C per minute(4). Premature and LBW (Low Birth Weight) babies are at high risk to develop hypothermia particularly for the following reasons. These are highly permeable skin which increases epidermal water loss, deficient subcutaneous fat with less insulation, deficient stores of brown fat, immature central thermoregulation, poor caloric intake and poor oxygen consumption because of associated pulmonary problems(5).

The fact that preterm and post term babies are unable to adjust to extra uterine life and therefore are prone to specific complications like breathing difficulties, intracranial bleeding, infections and hypothermia(6).

The impacts of hypothermia in new born health is metabolic acidosis, hypoxemia, hypoglycemia and increased renal excretion of water and solutes(7). Failure to diagnose and manage

hypothermia may lead to chronic symptoms such as weight loss or slow weight gain, with the eventual outcome of negatively impeding normal growth and development(8).

Hypothermia is not direct cause of neonatal morbidity and mortality but increases the newborn's metabolic requirements and is associated with hypoglycemia, hypoxia, and ultimately severe infections and newborn mortality(9). But in premature newborns and low birth weight babies less than 2,500 grams, hypothermia can cause metabolic deterioration and death because these babies' ability to keep their body temperature at the normal range are affected easily(10).

Despite newborns physiologic way of controlling hypothermia, they are affected by the problem. As a result, guide lines are prepared for the managements of neonates that are in danger of hypothermia by World Health Organization (WHO) to counterpart the growing problem. It proposes a "warm chain", or a series of interlinked procedures to minimize the risk of hypothermia in newborns. This includes warming the delivery place, immediate drying, skin-to-skin care, early and exclusive breast-feeding to promote close warming contact with the mother and provide energy to generate heat, postponing bathing, appropriate clothing and bedding, and placing mother and baby together(1). The burden of hypothermia remains questionable despite the reasons predisposing neonates to hypothermia are simply preventable with a slight cost. More over the problem is highly prevalent in developing nations, Sub-Sahara Africa including Ethiopia (11).

1.2 Statement of the Problem

Abnormally low body temperature (hypothermia) is a worldwide issue across all climates(12). Global burden of hypothermia at hospital level was at the range of 32% to 85% even in tropical environments(13). A study conducted in Islamic republic of Iran among neonates to estimate the prevalence neonatal hypothermia immediately after birth at 1st , 2nd and 4th hour using axillary temperature was 47.5%, 46.4% and 37.2% of healthy full term neonates (14).

A systematic review in sub Saharans Africa also showed the prevalence of hypothermia was high. In Nigeria 62%, Senegal 94.9%, and in Zimbabwe prevalence on admission at 10, 30, 60, and 90 minutes of post-partum was 29%, 82%, 83% and 79% respectively(11). Different studies have also noted that mortality as a result of hypothermia is very high in different regions of the world. Hypothermic children were three to five times more likely to die than their counter part. (4, 15).

The prevalence of hypothermia is also very high in Ethiopia. A cross sectional study conducted in Gondar, Ethiopia showed that the prevalence of hypothermia was 69.8%(16). Similarly another study conducted in Eastern Ethiopia and South West Ethiopia revealed that the prevalence was 66.3% and 50.3% respectively (17, 18)

A study conducted at Jima university medical center showed that hypothermia is 4th leading cause of neonatal admission and the 5th leading cause of death (19). Other studies conducted in different part of Ethiopia (Gonder and Bahirdar) showed high burden of hypothermia(20-22).

Due to high prevalence of hypothermia and its serious complications, preventive action is taken by reducing heat loss and/or providing warmth through external heat sources. Precautionary steps routinely include ensuring a warm delivery room; drying immediately after birth, especially the head; wrapping in pre warmed dry blankets (including the head); pre-warming surfaces; and eliminating draughts(12) .

As a result, addressing neonatal hypothermia might bridge achievement of the goal of the 2030 development agenda reducing neonatal mortality to at least as low as 12 deaths per 1000 live births in 2030 by ending preventable neonatal death(23).

Despite the high prevalence, complications, economic burden related to hypothermia little emphasis is given to understand the problem. Very few studies are performed, particularly in the study area. Moreover, most of the studies conducted globally and locally regarding hypothermia were done only at hospital level in neonatal intensive care unit, where neonates who are sick and admitted. This had either positive or a negative impact on their temperature whether hypothermic or hyper thermic by cause of the disease process. In addition, most studies did not put a time limit to asses a prevalence and risk factor of hypothermia.

So, determining the prevalence of neonatal hypothermia and its associated predictors within six hours after delivery among neonates delivered in Addis Ababa public health hospitals is the core aim of this study.

1.3 Significance of the Study

Hypothermia related problem begin at the delivery and postnatal ward and most of the problem are easily preventable with low cost. A better understanding of the prevalence and associated factors of neonatal hypothermia in this fragile group of population is important for planning and designing appropriate quality improvement projects at institutional level based on the study finding. So, this study tried to make available additional data on the prevalence of neonatal hypothermia and identify why new born become hypothermic.

In addition, the identification of possible factors for the onset of neonatal hypothermia in delivery ward will have greater input to program managers and policy makers for designing proper implementation and evaluation of programs on reduction of neonatal morbidity and mortality to achieve a sustainable development goal three. Moreover, the study finding will help to develop future quality improvement projects for clinicians. Furthermore, it will also serve as additional information for future researches and it helps those working in education to work from the source to bridge the gap.

2 LITERATURE REVIEW

2.1 Prevalence of Neonatal Hypothermia

Globally Hypothermia is highly prevalent in newborns at hospitals level with the range of 32% to 85% even in tropical environments(13). In 2016, in babies admitted to the neonatal intensive care unit (NICU) in India, 70% neonates were hypothermic, 28% had cold stress (36°C–36.4°C), 39% had moderate hypothermia (32°C–35.9°C) and 3% had severe hypothermia (<32°C)(24).

Study conducted in Nigeria 67.6% were hypothermic and, that were low birth weight 89.1% , were premature 88.9%, aged less than six hours 80.6%, were not breastfed 79.2% (25). Another study conducted in this country shows that the body temperature on admission ranged from 32.5°C to 37.9°C with a mean of $35.9 \pm 0.9^\circ\text{C}$. Moreover, 24.2% had significant hypothermia (26).

Non evidence based practice of the new born and high burden of neonatal hypothermia were discovered in a global systemic review of hospital based studies in Africa. The prevalence ranged from 44-69% in Zambia, 62-68% in Nigeria, 53% in Ethiopia and 85% in Zimbabwe were seen(13).

An institution based cross sectional study in Eastern part of Ethiopia stated that 66.3% (95% CI: 61.1, 70.5%) of newborns were hypothermic (18). Another study in Gondar showed hypothermia in the study area was 69.8%(16). And in Arbaminch during the admission of neonates to NICU fifty percent of them were hypothermic. (17).

2.2 Associated Factors of Neonatal Hypothermia

Neonatal hypothermia is related to a number of risk factors, which are categorized in to five main groups. These are environmental factors, physiological factors, behavioral factors and socio economic/socio demographic factors and contextual factors (13).

Environmental risk factors include geographical area, time of the year (seasons) and room temperature at the time of birth and other related factors. Initially, neonates body temperature is primarily associated with their mother's body temperature and then it associated to the

environmental temperature in which the neonate is born, as well as time of the year (seasons)(1, 13).While the prevalence of neonatal hypothermia is higher during the winter season, being delivered during the summer months or in a warm tropical climate, does not automatically reduce the risk of a baby becoming hypothermic and highlights the need for continued vigilance to prevent, identify and manage neonatal hypothermia(27).

Physiological risk factors mainly relate to neonatal problems such as prematurity, low birth weight and intrauterine growth restriction. Babies who are ‘small for gestational age ‘or hypoglycemic are also at increased risk for hypothermia(13, 28).

Behavioral risk factors are considered to be any non-evidence based practices, sometimes undertaken for cultural reasons, which may potentially cause a reduction in the baby’s temperature resulting in hypothermia. Two examples of such practices are: delay initiation of breast feeding, and/or lack of ante natal care (ANC) during pregnancy(11, 29).

Socioeconomic factors can also contribute to neonatal hypothermia. Socially mothers who are either young and inexperienced, or multiparas who are caring many children; babies born in families with a low income and/or from resource poor countries are also more likely to be socially and economically disadvantaged. Health professionals in resource poor countries may not have access to knowledge and/or best available evidence or other resources to support best practice, therefore babies born in these countries may also be at risk of neonatal hypothermia (13).

Birth context related factors such as mode of birth and place of birth are also contributing factors of neonatal hypothermia(18).

2.2.1 Environmental factors

Global Systematic review of resource limited environment revealed that Not only in high hills and mountains that are seen as predisposes to hypothermia newborns get hypothermic, but also in tropical and hot climates hypothermia is still major health problem for neonates, as was first reported more than fifty years ago(13).

On a Study conducted in Nepal was revealed that of neonatal hypothermia was more observed in low temperature of the delivery room $\leq 27.5^{\circ}\text{C}$ (61.5%) than in those with temperature $>27.5^{\circ}\text{C}$ (38.5%). And in addition bivariate analysis at 4 h after birth shows temperature of postnatal room below 27°C ($P < 0.01$) and delivery room below 27°C ($P < 0.01$) were significant predictors of neonatal hypothermia (14).

Another notable result of regression analysis in Iran showed that neonate's body temperature was significantly associated to low environmental temperature of the delivery rooms ($P < 0.001$). The neonates had higher risk for being hypothermic when the operating room or neonatal unit temperature was decreased(30).

A systematic review of several studies in a resource limited environment shows that the intuitive association of environmental temperatures with the cold seasons. Study conducted in India showed, with an overall hypothermia prevalence of 17%, showed environmental temperature differences between summer (14.8%) to winter (21.5%). Additional studies from Haryana in Northern India reported an overall hypothermia prevalence of 11%, ranging from 3% in the summer to 19% in winter. In Uttar Pradesh India, hypothermia was observed in 14% and it was found to powerfully associate with environmental temperature. Another study from the same state found a higher rate of 45%, which likewise was associated with environmental temperatures and varied considerably over the seasons, ranging from 70% during winter to 20% at the time of summer(13).

Cross sectional study conducted in north west Ethiopia Gondar town showed, new born who delivered during night time were about 6.6 times more likely to develop hypothermia compared to those who were delivered during the day (AOR=6.61, 95%CI: 3.75, 11.66)(16).

2.2.2 Physiological factors

A study was done in Iran on healthy term neonates for one-year period by recording their temperature immediately after birth, at 1hr, 2hr, and 4hr. And the result indicated that the prevalence of hypothermia was 41.2%, 47.5%, 46.4% and 37.2% at the respective hours. (14).

Cross sectional study held in Californian showed that maternal hypertension and low first and fifth minute APGAR scores ($P < 0.0001$) were associated with hypothermia (31). Study held in Iran determined that premature newborns had almost two times more likely being hypothermic when compared to term neonates(30).

A systematic document review in Sub-Saharan Africa disclosed that the thermal challenge in low birth weight newborns is higher than in the term normal birth weight ones. Estimates that the risk of hypothermia is increased by 31.3% for every 100grams below 2000 grams and by 7.4% for every 100 grams below 3000grams birth weight(11).

In a similar way, Cross sectional study conducted in Nigeria found that incidence of hypothermia was decreased when birth weight increases for babies weighing between 1.5- 2.49 kg (84.3%) and for babies who weighed greater than 2.5 kg (42.9%). Thirty-three (82.5%) of the preterm babies had hypothermia when compared with 60 (54.5%) of term babies with statistical significance (RR = 1.51; CI= 1.21–1.89). And also, incidence of hypothermia was significantly higher among Small for Gestational Age (SGA) babies (57; 65.5%) when compared with newborns who were appropriate and large-for-gestational age (LGA) (36; 57.1%) (RR = 1.15; CI = 0.88 – 1.49)(32).

Study conducted in Uganda showed that low-birth-weight was significant risk factors for early neonatal hypothermia at admission ($P=0.000$)(25). And also on a study in south west Ethiopia neonates whose had low birth weight ($<2500\text{gm}$) during admission were almost 4 times more likely to be hypothermic when compared with those normal birth weight ($\geq 2500\text{ gm}$)(AOR = 3.61, 95% CI: 2.10, 6.18)(17). Another study conducted in Gonder neonates with low birth weight to were almost 4 times more likely to have hypothermia compared to normal birth weight ones (AOR=3.75, 95%CI: 1.29, 10.88)(16).

According to a study conducted in Eastern part of Ethiopia those newborns who were born to mothers having obstetric complication during last pregnancy were 2.4 times more likely to be hypothermic when compared to those born to mothers without any obstetric complication during pregnancy (AOR =2.42, 95% CI: 1.28, 4.57), and preterm newborns were 3.4 times more likely to be hypothermic when compared to term neonates (AOR = 3.37, 95% CI: 1.53, 7.44)(18).

2.2.3 Behavioral factors

After birth the baby should be immediately dried with dry towel, including its head while the cord is still attached. While newborn is being dried it should be on a mother's chest or abdomen or pre-warmed cloth on bed. Then the baby should be covered with a second dry towel while discarding the first towel. This prevents the newborn from developing hypothermia(1).

Study conducted in Southern Nepal revealed that the prevalence of skin to skin contact was 41%(4). And in a cross sectional study conducted in Ethiopia Northwest part of the country showed that new-born who did not placed to their mother's abdomen within one hour after delivery were almost three times more likely to be hypothermic when compared to those neonates placed mothers abdomen for skin to skin contact within one hour (AOR=2.81, 95%CI: 1.40, 5.66)(16).

Study in Eastern part of Ethiopia within six hours of birth showed that, newborns who weren't placed in skin to skin contact with their mothers after delivery were almost three times more likely to be hypothermic as compared to counterpart (AOR = 2.87,95% CI: 1.48, 5.57). And also newborns who didn't wear cape were two times more likely to be hypothermic when compared to those who were dressed with cap (AOR = 2.10, 95% CI: 1.17, 3.76)(18).

According to study conducted in Southern Nepal hypothermia was almost in 50% newborns highly prevalent among for whom breastfeeding was not initiated during the 1st one hour of birth(4). And in Nigeria the incorrect belief that colostrum is harmful in rural communities underlies the practice of delayed initiation of breast feeding and thus contributing to the risk of hypothermia. In by where the study was done 79.2% of hypothermic infants did not have timely initiation of breastfeeding and the association between lack of breastfeeding and development of hypothermia was shown significant association (P = 0.028)(11). Study conducted in Uganda showed that, lack of breastfeeding were a significant risk factors for neonatal hypothermia during admission (P=0.028)(25).

And also study conducted in Gonder, Ethiopia those new-born for whom breast feeding was not initiated within one hour were almost eight times more likely to develop hypothermia when

compared to those who have started breast feeding within one hour (AOR=7.58, 95%CI: 3.61, 15.91)(16).

According to WHO thermal protection guideline when baby is transferred from one section of the hospital to another section of hospital such as post-natal ward or NICU, it is important to keep the baby warm during transportation. This is a step that, if overlooked can result in drop of newborn baby's body temperature even if thermal protection measure were adequate at the time of birth(1). Study conducted in Ethiopia showed new born who weren't warmly transported in intra facility from one unit (delivery) to the other (postnatal unit or NICU) were three times more likely to be hypothermic when compared to those warmly transported ones (AOR = 3.18, 95% CI: 1.84, 5.48)(18).

Weighing of the baby at birth also puts it at risk of heat loss and should be postponed for several hours. Before weighing the baby, it should be wrapped. The weight recorded can then be adjusted by subtracting weight of covers. Babies should be kept with their mothers 24 hour a day, preferably in the same bed, in warm room, this is known as "rooming in". This important to keep the baby warm and easier to breast feed on demand(1).

2.2.4 Socio demographic related factors

The mothers had low family income, less nourished, most depleted and work-overloaded mothers could give birth more frequently to fragile preterm and/or underweight neonates, who are more exposed to the direct effects of hypothermia and its related diseases(10). California study shows that hypothermia had no associations with maternal age, parity, educational status and occupational status(31). And also a population-based cohort study in Similarly in Iran the prevalence of neonatal hypothermia immediately after birth did not differ significantly with parity and maternal age(14)

A study in Ugandan peri-urban hospital showed in teenage mothers had hypothermia were significantly observed for their newborns ($p=0.025$). On the other hand, parity did not associate with hypothermia when compared to normothermic and hypothermic newborns(33).. And like wise in Ethiopia factors like ethnicity, religion, parity, educational and occupational status was not associated to incidence of hypothermia(18).

2.2.5 Contextual Factors

Factors such as mode of delivery and place of delivery are discussed in this section. Californian cross-sectional study revealed that Cesarean section ($P < 0.0001$) was significantly associated with hypothermia(31). And Iranian study revealed that neonatal hypothermia in women who had gave birth via Spontaneous vaginal delivery was significantly lower hypothermia observed when compared to those gave birth with episiotomy ($P < 0.01$)(14).

According to this literature review the prevalence of hypothermia was high in all over the world especially in Africa including Ethiopia. And also there are different contributor factors of hypothermia, those factor are environmental factors (temperature of the delivery room, delivery place), physiological factors (obstetric complication, prematurity, APGAR Score, birth weight decrement, low birth weight and SGA),behavioral factors (ANC, drying, wrapping, skin to skin contact, wearing cap, breast feeding initiation, warm transportation, delay weighing and socio demographic related factors also have distal factors for neonatal hypothermia.

2.3 Conceptual Framework of the Study

The conceptual framework is adapted after reviewing different literatures and modified according to our context (1, 11, 16, 18, 27, 28). It conceptualized neonatal hypothermia as a result of interaction between various factors such as socio-economic determinants, physiologic related factors, contextual factors, behavioral factors, and environmental factors.

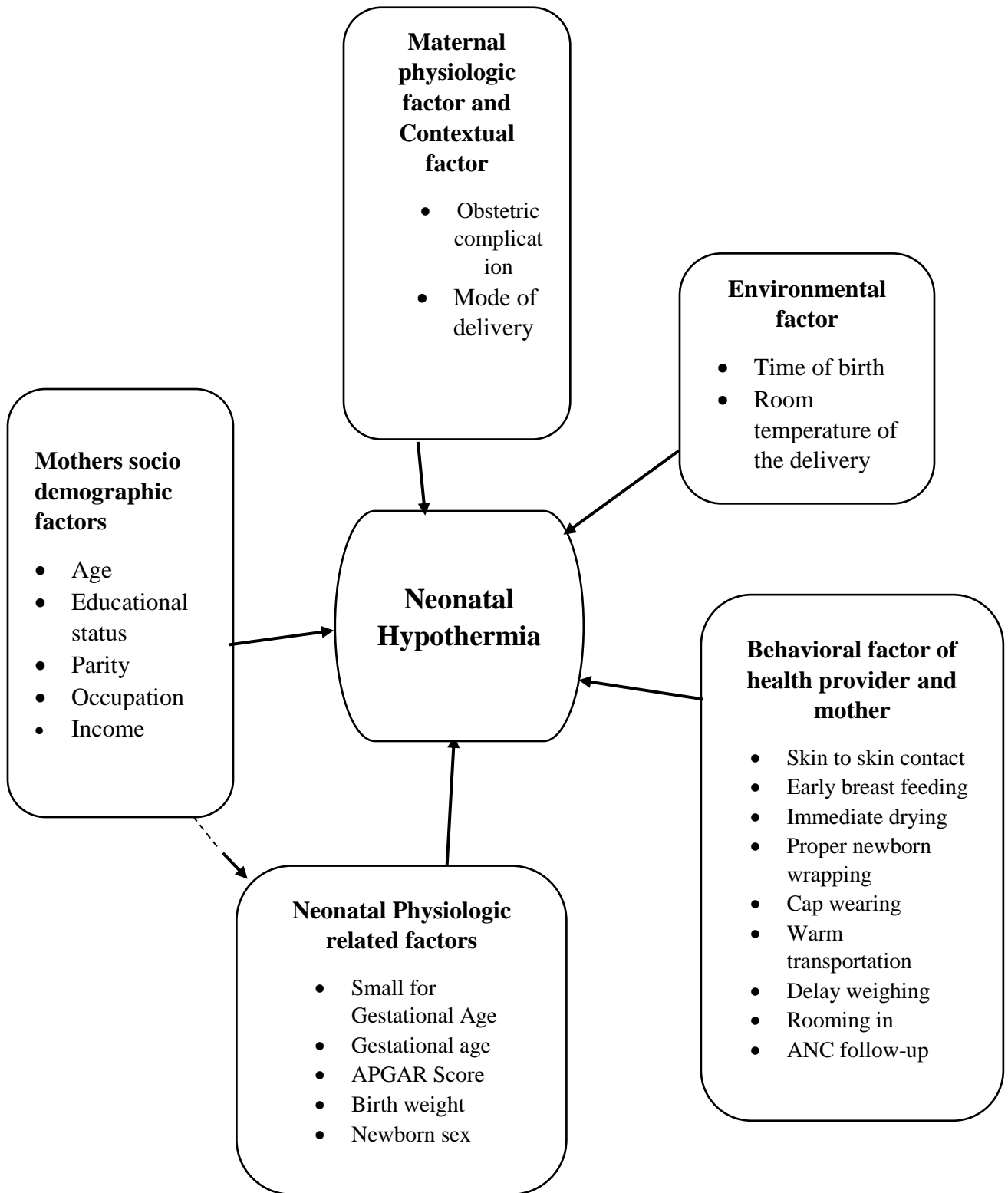


Figure 1: Conceptual framework for the study in Prevalence of Neonatal hypothermia and associated factors adapted from different literature

3 OBJECTIVES

3.1 General Objective

- To assess the prevalence and associated factors of neonatal hypothermia within six hours of birth at labor and delivery ward in public hospitals of Addis Ababa, Ethiopia, 2020.

3.2 Specific Objectives

- To determine the prevalence of neonatal hypothermia
- To identify factors associated with neonatal hypothermia

4 METHODOLOGY

4.1 Study Area and Period

The study was conducted in the public hospitals in Addis Ababa from April 1st to May 12th 2020. Addis Ababa is the capital city of Ethiopia and seat of African Union and the United Nations World Economic Commission for Africa. It covers an area of 527 square kilometers and has 10 sub cities with a total population of 3,384,569 according to the 2007 census(34). The city has 12 public Hospitals, from those 11 hospitals have labor and delivery ward. Among these hospitals, the study was conducted in four randomly selected hospitals namely, Ghandi Memorial hospital, Zewditu Memorial hospital, Yekatit 12 hospital and Tikur Anbessa Specialized hospital.

Gandhi Memorial Hospital is one of the public Hospitals under Addis Ababa City Administration Health Bureau. The hospital has annual delivery of 12,115 new born and it has Labor and delivery ward with an average 1009 new born per month. Zewditu Memorial Hospital is also under Addis Ababa health bureau. The Hospital has annual delivery of 7200 new born and it has its own labor and delivery ward with an average 600 new born per month. Yekatit 12 Hospital Medical College has annual delivery of 8424 new born and it has Labor and delivery ward with an average 702 new born per month. Tikur Anbessa specialized Teaching Hospital is one of the tertiary referral Hospital in the country under Addis Ababa University. Tikur Anbessa Hospital has annual number of 3900 deliveries and it has Labor and delivery ward with an average 325 new born per month.

4.2 Study Design

Institution based Cross-sectional study design was used.

4.3 Population

4.3.1 Source population

All newborns with their mothers within six hours after delivery at delivery ward in public hospitals of Addis Ababa city, Ethiopia from April 1st to May 12th 2020.

4.3.2 Study population

All newborns with their mothers that were delivered within six hours after delivery at labor and delivery ward of selected public hospitals in Addis Ababa during the data collection time.

4.3.3 Study unit

Selected newborns with their mothers that were delivered within six hours after delivery at labor and delivery ward of selected public hospitals in Addis Ababa during the data collection time.

4.4 Inclusion and Exclusion Criteria

4.4.1 Inclusion Criteria

- All newborns with their mothers in delivery ward of the selected public hospitals was included in the study.

4.4.2 Exclusion Criteria

- Neonates whose mothers are not present during the study period, died or abandoned baby was excluded from the study, because ante natal care follow up, skin to skin contact, and initiation of breast feeding within one hour after birth was asked and collected from the mothers.
- Neonates whose mothers has mental illness
- Newborns GA < 34 week
- LBW newborns \leq 1500gm
- Newborns require NICU admissions

4.5 Sample size determination and sampling procedure

4.5.1 Sample size determination

Sample size was determined by using single population proportion formula using prevalence of Neonatal hypothermia (66.3%) from the previous study conducted in eastern part of Ethiopia(18).

$$n = \frac{(Z\alpha/2)^2 p(1-p)}{d^2}$$

$$n = \frac{(1.96)^2 0.663 (1-0.663)}{0.0025}$$

$$n=343$$

Considering 10% non-respondent rate the final sample size was estimated to be
~~=343~~
=377

Where, n=the required sample size

d=margin of error between the sample and population=5%=0.05

Z=standard normal distribution value at 95% confidence level

Z $\alpha/2$ =1.96 for 95% confidence interval

p=Prevalence of Neonatal hypothermia (66.3%) from the previous study
 conducted in eastern part of Ethiopia.

4.5.2 Sampling technique and procedure

The study was conducted in Addis Ababa public hospitals. Among the hospitals, 30% (four hospitals) were selected by using simple random sampling technique. Then allocation of the sample size to each hospital was made proportionally based on their average number of deliveries per month that was obtained from annual delivery report from each hospital.

Participants were selected using systematic random sampling technique after estimating kth interval for each hospital. The first participant was selected using simple random sampling technique.

The Proportionate allocation is showed in schematic presentation below

Where; n_j is sample size of the jth stratum

N_j is population size of the jth stratum

N = Total population or total new born delivered in delivery ward per month in all hospitals

$$N = N_1+N_2+N_3+N_4$$

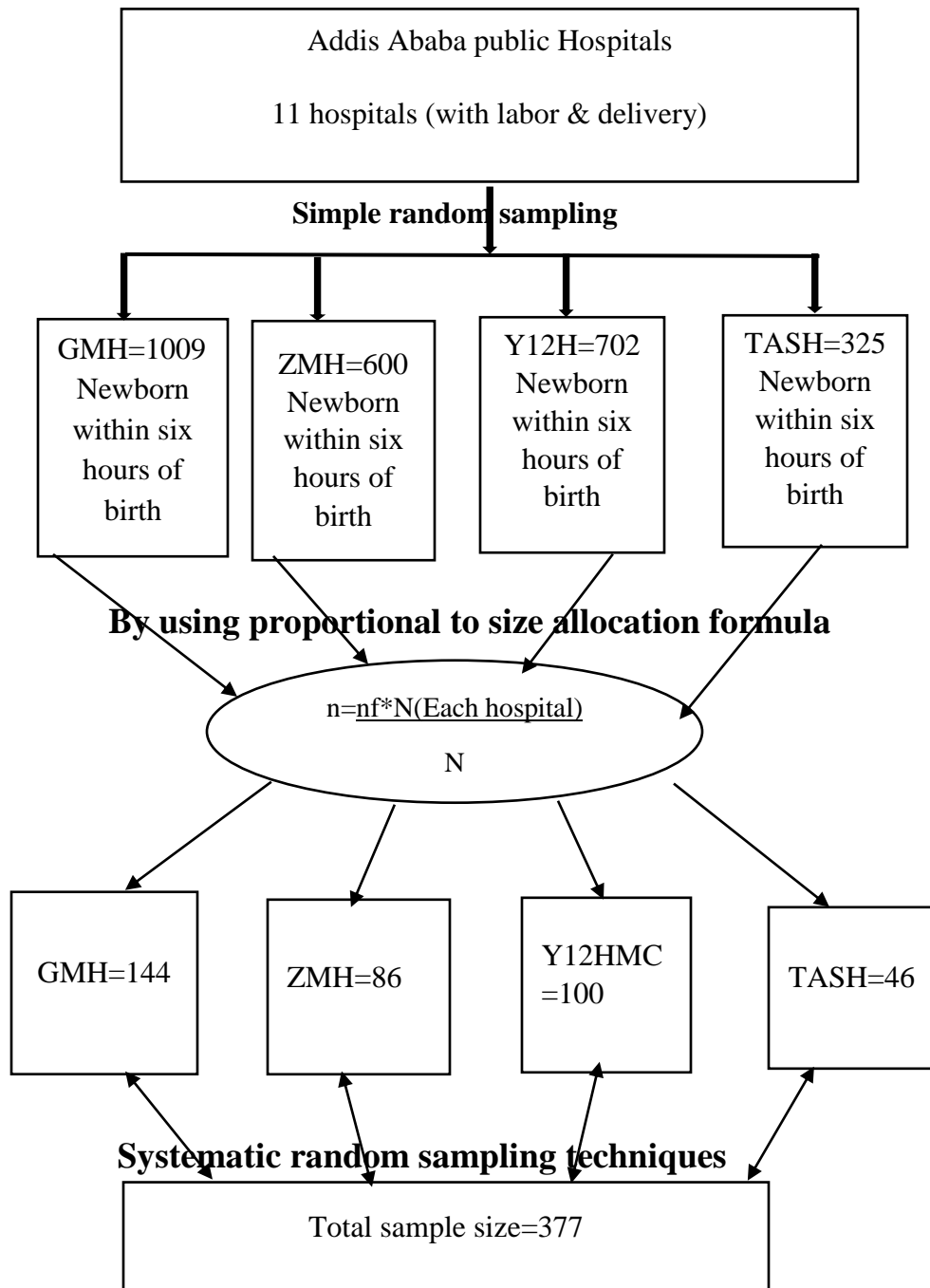


Figure 2 Schematic Presentation of Sampling of the neonates in the selected public hospitals of Addis Ababa, Ethiopia, 2020

4.6 Definition of terms

- **Hypothermia:** an axillary temperature of less than 36.5°C(1, 5).
- **Cold stress (mild hypothermia):** an axillary temperature of 36°C - 36.4°C(1, 5).
- **Moderate hypothermia:** an axillary temperature of 32 - 35.9°C(1, 5).
- **Severe hypothermia (cold injury):** an axillary temperature of <32°C(1, 5).
- **Normothermia:** An axillary temperature of 36.5°C-37.5°C(1, 5).
- **Immediate drying:** A newborn was considered as immediately dried if and only if its skin is dried as soon as delivery prior to cord cutting on maternal abdomen using dry and pre warmed towel(1).
- **Proper wrapping:** A newborn was considered as properly wrapped if and only if its whole body including the head and the limbs are wrapped with the use of a pre warmed and dry towel(1).
- **Warm intra- facility transportation:** A newborn was considered as warmly transported if and only if it is taken from delivery unit to postnatal or operation theatre room to post-natal ward while being in direct skin to skin contact with its mother's skin(1).
- **Skin to skin contact:** A newborn was considered as placed to skin to skin contact if its put on mother abdomen or chest during drying and transfer to postnatal ward in direct skin to skin contact(1).
- **Early breast feeding:** A newborn was considered as having early if breast feeding if it begins preferably within an hour of birth(1).
- **Low APGAR score:** When the fifth minute APGAR score of the newborn is less than 4(5).
- **Moderate APGAR score:** When the fifth minute APGAR score of the newborn is between 4 and 7(5).
- **Normal APGAR score:** When the fifth minute APGAR score of the newborn is greater than 7(5).
- **Rooming in:** Babies should be kept with their mothers 24 hour a day, preferably in the same bed, in warm room, this is known as "rooming in". This important to keep the baby warm and easier to breast feed on demand(1).

- **Delay weighing:** A newborn was considered as Weighing of the baby at birth postponed for at least for one hours and before weighing the baby, it should be wrapped. And the weight recorded can then be adjusted by subtracting weight of covers.
- **Obstetric complication:** A new born was considered as the mother having obstetric complication such as APH, Preeclampsia, uterine rupture, PROM/sepsis, postpartum hemorrhage and other pregnancy related complication.
- **Small for Gestational age:** A newborn was considered as the birth weight is less than 10th percentile for the gestational age based on growth chart.

4.7 Study variables

4.7.1 Dependent variable

- Neonatal hypothermia

4.7.2 Independent variable

➤ Socio demographic characteristics of the mother:

- Age
- Educational status
- Parity
- Occupation
- Income (family)

➤ Physiological factors:

- Obstetric complication
- SGA (Small for Gestational Age)
- Gestational age
- APGAR Score
- Birth weight
- Sex of the newborn

➤ Behavioral factors:

- Ante natal care
- Skin to skin contact,
- Early breast feeding,
- Immediate drying,
- Proper newborn wrapping,
- Cap wearing
- Warm transportation
- Delay weighing
- Rooming in

➤ **Birth context related factors**

- Mode of delivery

➤ **Environmental factor**

- Time of birth
- Room temperature of the delivery room

4.8 Data collection tool and procedure

Data collection tool: The tool was adapted and modified from a studies conducted in Ethiopia(16, 18), and it was modified according to our context. Data collection tool was structured and interviewer administered. In addition, observational checklist during the first one hour of birth and secondary data from the mother’s medical record was reviewed by checklist. The questionnaire has eight parts which incorporates the environmental factors, an observational checklist assessing contextual factors, observational checklist assessing the care givers behavioral factors, the socio demographic factors, mothers’ behavioral factors, care givers behavioral factors (interview from mothers), maternal related physiological factors (was filled from mother medical record) and neonatal physiological factors (was filled from mother medical record). The first three factors were assessed within one hour of delivery; the rest were assessed after one up to six hours of delivery.

Data Collection Procedure and Measurement: Data was collected through observation, interview and secondary data from mother's chart review. Initially, the first three-part of the questioner was collected through a direct observation by data collectors during the first one hour of birth and environmental temperature of the delivery room were measured by using wall thermometer during the time of delivery, and it was measuring with range between 0°C and 50°C. Fourth part in socio demographic factors, fifth and sixth part contains mothers and care giver behavioral factors were collected from the mother through interview and axillary temperature of the newborn was measured for 3 minutes by using digital thermometer during the first one to six hours. The axillary temperature measuring instrument has measuring range of 32°C~43°C, with accuracy $\pm 0.1^\circ\text{C}$ between 35°C and 42°C, $\pm 0.2^\circ\text{C}$ below 35°C and between 42.1°C and 43.0°C. The seventh and eighth part were physiologic related factors of the mother and newborn were collected from mother chart through a checklist. Data collection was done by seven BSc and one MSc midwives.

4.9 Data quality control

Data collection tool; The questionnaire was prepared in two languages, intended for the data collector to use in the languages of personal convenience. It was prepared in English and then translated to Amharic, and re-translation was made back to English by language experts and health professionals to check for reliability. Thermometer calibration was done to confirm reliability of the thermometer before using the instrument for data collection. Tools were given to expertise to check content validity and accuracy.

Pre-test; The questioner was pre-tested on 5% (n=19) of the sample size similar newborns in hospital outside the study area two weeks prior to the actual data collection time to assess for its completeness, clarity, validity, reaction of the respondents to the questions, length, skip patterns and correctness of filled questioners. After the pre-test, the questionnaire was modified.

Training of data collectors; One- day training was given for data collectors and supervisors by principal investigator on how to collect the data and how to record room temperature and ethical procedure during data collection.

Supervision; During data collection, data collectors were closely supervised and guided by two BSC midwife's supervisors and the principal investigator.

4.10 Data analysis procedure

Data were double entered into Epi-data version 4.6 by investigator. Entered data was exported and analyzed using SPSS Software version 24. Descriptive statistics like frequency, proportions, mean and standard deviation were computed to describe the study variable in relation to the population. Bivariate and multivariable logistic regression model were fitted to see associations between dependent and independent variables. Those variables that have p value ≤ 0.25 was taken to the multivariable logistic regression model to adjust the effect of possible confounders. The strength of association was declared at p-values < 0.05 Odds ratio with 95% CI is used to show the strength and direction of association.

4.11 Ethical consideration

Ethical clearance was obtained from institutional review board School of Nursing and Midwifery, College of Health Sciences, Addis Ababa University. Formal letter was obtained from Addis Ababa public health research and emergency management core process in order to get permission to carry out the study. Informed verbal consent was obtained from each respondent after explaining the purpose and procedure of the study. No name or other personal identifying information was included in the instrument.

Each study participant was adequately informed about the purpose, method and anticipated benefit and risk of the study by their data collector. The respondents were told that they have the right to respond or refuse to the interview. And also they were informed their right to withdraw the interview at any time or skip any question that they do not want to respond. All the information given by the respondents were used for research purposes only and confidentiality and privacy was maintained.

The thermometer was disinfected by 70 % ethyl alcohol disinfectant with a cotton after every measure of axillary temperature of the newborn to prevent cross contamination of infection. Newborns who was not given appropriate preventive measure were given the care after data

collection by the data collector as much as possible. Hypothermic newborns with associated problems were helped for referral to neonatal intensive care unit for better management whereas those mildly and moderately hypothermic ones without medical problem were helped by rehabilitative thermal care measures like proper wrapping, frequent breast feeding, skin to skin contact, closing doors and windows etc. Moreover, mothers were advised about thermal care measures.

4.12 Dissemination and utilization of the result

The thesis will be presented to Addis Ababa University, School of Nursing and Midwifery as partial fulfillment of master's degree in Neonatal Nursing. The thesis will also be disseminated to federal minister of health, Addis Ababa public health research and emergency management core process and Addis Ababa town public hospitals. Hard and soft copy will be made available in the library of Addis Ababa University for graduate students as well as for other concerned readers. The findings will be presented in different seminars and meetings. Moreover, attempt will be made to publish the finding in peer reviewed and reputable journal.

5 RESULT

5.1 Socio demographic characteristics

In this study, a total of 377 neonates with their mothers were included, making a response rate of 100%. The mean (SD) maternal age was 27 (4.5) and 42.4% of mothers were in the age group of 25-29 years of age. The age ranges from 18-40 years. Ninety-three percent of mothers were from urban areas. With regard to educational status 33.4% of respondents were diploma and above. Almost thirty-eight percent of respondents were house wife. With regard to family income the range between 1000.00-16,000.00 birr with the mean income 3898.00 birr. And 53.1% of the mothers were multiparous.

Table 1: Socio demographic characteristics of the mothers with their neonates at selected public hospitals, Addis Ababa, Ethiopia, 2020 (n=377).

Variable (N=377)	Category	Frequency	Percentage(%)
Age of the mothers	≤ 24	97	25.7
	25-29	160	42.4
	30-34	92	24.4
	≥35	28	7.4
Residence	Urban	354	93.9
	Rural	23	6.1
Maternal educational status	No formal education	51	13.5
	Primary school	93	24.7
	Secondary school	107	28.4
	Diploma and above	126	33.4
Maternal occupation	House wife	142	37.7
	Government worker	112	29.7
	Private employee	39	10.3
	Self-employee	84	22.3
Family income	<2500	90	23.9
	2500-3000	76	20.2

	3001-4000	83	22
	4001-5000	81	21.5
	>5000	47	12.5
Parity	Primi-para	177	46.9
	Multi para	200	53.1

5.2 Environmental factors of hypothermia at selected public hospitals

Fifty-seven percent of the newborn were delivered in temperature of the delivery room less than or equal to 24°C, the mean (SD) temperature of the delivery room was 24.07°C (1.45). More than fifty percent of the newborns were delivered during the day time.

Table 2: Environmental factors of hypothermia at selected public hospitals

Variable (N=377)	Category	Frequency	Percentage(%)
Temperature of the delivery room	≤ 24°C	215	57
	≥ 25°C	162	43
Time of the delivery room	Daytime	194	51.5
	Night time	183	48.5

5.3 Physiological factors of hypothermia at selected public hospitals

From all respondents 29.7% of the mothers had obstetric complication during this pregnancy. From these complication APH accounts 15 (13.4%), preeclampsia/eclampsia 30(26.8%), PROM/sepsis 28 (25%), obstructed prolonged labor 13 (11.6%), post-partum hemorrhage six (5.4%) and other 43(38%) like gestational diabetics and intra uterine growth restriction.

Almost ninety-eight percent of newborns were single and 50.4% of newborns were males. Around eighty-three percent of newborns were delivered at GA of 37-42. Majority of the newborns had normal birth weight ≥2.5kg, the mean (SD) of birth weight was 3.02kg (0.66). All newborns APGAR score of the 5th minute were ≥ 7. Its Only 24.1% were small for gestational

age. The mean (SD) age of the newborn during axillary temperature measurement were 3.54hr (1.42).

Table 3: Physiological factors of hypothermia at selected public hospitals

Variable (N=377)	Category	Frequency	Percentage(%)
Obstetric complication	Yes	112	29.7
	No	265	70.3
Type of pregnancy	Single	368	97.6
	Multiple	9	2.4
Sex of the newborn	Male	190	50.4
	Female	187	2.4
GA during delivery	34-37	46	12.2
	37-42	311	82.5
	>42	20	5.3
Birth weight	1.5-2.5kg	82	21.8
	≥ 2.5kg	295	78.2
Small for gestational age	Yes	91	24.1
	No	286	75.9
Age of the newborn during axillary T° measurement	≤ 2:59hr	168	44.6
	3:00-4:00hr	87	23.1
	4:01-6:00hr	122	32.4

5.4 Behavioral factors of hypothermia at selected public hospitals

Most of the mothers 98.7% had ANC during this last pregnancy, from those the minimum ANC were two visits. Almost sixty-four percent of mothers had ≤4 ANC visits. Ninety-four percent of newborns were dried immediately after delivery including the head. Regarding type of drying material 10.1% by pre-warmed hospitals own towel, 45.4% by non-pre-warmed hospital own towel, 1.4% by pre-warmed mothers own towel and 43% by non-pre-warmed mothers own towel were used for drying.

Eighty-six percent of newborns were dried after the cord cut and 14% of newborn dried before cord cut. More than half of the newborn 53.5% were dried at the table, 23.7% in mother's abdomen/chest, 12.1% in preheated incubator, 10.1% in radiant warmer and the rest 0.6% were in baby couch, from those dried newborns 95.5% of babies the first drying towel were changed, whereas the rest 4.5% was not changed. From changed towels only 18% newborn towels were pre-warmed but rest 82% was not warmed. Regarding to wrapping 75.6% of newborn were wrapped properly. From those wrapping towel 89.5% were prepared by family whereas the rest 10.5% was prepared by hospitals. 43.2% of newborns were covered by hat.

Table 4: Behavioral factors of hypothermia at selected public hospitals

Variable (N=377)	Category	Frequency	Percentage(%)
Number of ANC visits (n=372)	≤ 4	241	64.8
	>4	131	35.2
Immediate drying	Yes	355	94.2
	No	22	5.8
Type drying material (n=355)	Pre-warmed towel	40	11.3
	Non-warmed towel	315	88.7
Place of drying (n=355)	Pre-warmed place	163	46
	Non-pre-warmed place	192	54
Wrapping	Yes	285	75.6
	No	92	24.4
Newborn head covered by hat	Yes	163	43.2
	No	214	56.8
Newborn placed on skin to skin after birth	Yes	185	49.1
	No	192	50.9
Newborn measuring weight is delayed for at least one hour	Yes	13	3.4
	No	364	96.6

When weighing the newborn, the body covered by cloths	Yes	30	8
	No	347	92
BF within one hour of delivery	Yes	242	64.2
	No	135	35.8
Skin to skin during intra -facility transport	Yes	25	6.6
	No	352	93.4
Rooming in together	Yes	351	93.1
	No	26	6.9

5.5 Birth context related factor of hypothermia

Regarding to contextual or birth context factors 56% by SVD, 11.9% by instrumental, and 31.6% newborns were delivered by C/S.

5.6 Prevalence of neonatal hypothermia

The prevalence of neonatal hypothermia among newborn who delivered at delivery ward in public hospitals of Addis Ababa was 239 (63.4%) [95% CI:58.6%, 68.2%] with mean (SD) temperature of the newborn were 36.14^oc (0.66). Around thirty-two percent of newborns had moderate hypothermia, 32.6% had mild hypothermia whereas the rest 36.6% were normothermic.

5.7 Determinants factor of neonatal hypothermia

From bivariate logistic regression analysis, factors which were associated with hypothermia were temperature of the delivery room, time of the delivery, type of drying material, timing the baby dried, wrapping of newborn, newborn covered by hat, newborn placed on mothers abdomen for skin to skin contact, measuring weight delayed for at least one hour, age of the mother, residence, educational status, number of ANC visits, newborn skin to skin contact during intra facility transport, mothers have obstetric problem, birth weight, SGA, age of the newborn, and newborn started breast feeding. Then multivariable logistic regression analysis was used to

adjust possible confounders. In multivariable logistic regression analysis factors that were significantly associated with the outcome were temperature of the delivery room $\leq 24^{\circ}\text{c}$, night time delivery, using non-pre-warmed towel for drying purpose, not wearing hat, number of ANC that ≤ 4 visits, newborn not starting breast feeding within one hour of delivery and age of the newborn $\leq 2:59\text{hr}$ during axillary temperature measurement.

Neonates who were delivered in a room $\leq 24^{\circ}\text{c}$ were 5.5 times (AOR=5.5,95% CI: 2.4,12.55) more likely to be hypothermic when compared to neonates who delivered in temperature of the delivery room $\geq 25^{\circ}\text{c}$. Neonates who delivered during night time were 4 times (AOR= 4.07,95% CI: 2.02, 8.2) more likely to be develop hypothermia when compared to day time delivery. Neonates who were dried by non-pre-warmed towel were almost seven times (AOR=6.9,95% CI: 2.09,22.9) more likely to be hypothermic compared to neonates who dried by pre-warmed towel. In addition, newborns who were not breastfed within one hour have 3 times (AOR=3.11,95%CI:1.39,6.98) more likely to be hypothermic when compared to newborns who initiated breast feeding within one hour. The other variable that was associated with neonatal hypothermia was age of the newborn during axillary temperature measurement. Those neonates whose temperature was measured in $\leq 2:59\text{hr}$ were almost four times (AOR=3.58,95% CI:1.57, 8.13) more likely to be hypothermic when compared to age greater than four hours.

Table 5: Factors associated with neonatal hypothermia among neonates delivered in public hospitals of Addis Ababa, Ethiopia 2020.

Variables (n=377)		Hypothermic	Normothermic	COR	AOR(95%
		n (%)	n (%)	(95%CI)	CI)
Temperature of the delivery room	≤ 24°C	160 (74.4)	55(25.6)	3.06 (1.98,4.72)	5.5 (2.4,12.55) *
	≥ 25°C	79 (48.8)	83(51.2)	1.0	1.0
Time of delivery	Day time	104 (53.6)	90 (46.4)	1.0	
	Night time	135 (73.8)	48(26.2)	2.4 (1.58,3.76)	4.07 (2.02,8.2) *
Type of drying material (n=355)	Pre-warmed	12 (30)	28 (70)	1.0	1.0
	Non-warmed	212 (67.3)	103 (32.7)	4.8 (2.35,9.8)	6.9 (2.09,22.9) *
When newborn dried (n=355)	Before cord cut	23 (46.9)	26 (53.1)	1.0	1.0
	After cord cut	201 (65.7)	105 (34.3)	2.16 (1.18,3.98)	2.2 (0.8,5.97)
Wrapping	Yes	168 (58.9%)	117 (41.4)	1.00	1.00
	No	71 (77.2)	21 (22.8)	2.26 (1.37,4.05)	0.58 (0.22,1.58)
Head covered by hat	Yes	73 (44.8)	90 (55.2)	1.0	1.0
	No	166 (77.6)	48 (22.4)	4.26 (2.7,6.66)	3.6 (1.62,8.01) *
Skin to skin after birth	Yes	99 (53.5)	86 (46.5)	1.0	1.0
	No	140 (72.9)	52 (27.1)	2.34 (1.5,3.59)	1.55 (0.67,3.6)

Weight measuring delayed for one hour	Yes	11 (84.6)	2 (15.4)	1.0	1.0
	No	228(62.6)	136 (37.4)	0.3(0.06,1.39)	0.67 (0.08,5.35)
Age of the mother	≤ 24	68 (70.1)	29 (29.9)	1.1 (0.45-2.7)	1.47 (0.35-6.23)
	25-29	103 (64.4)	57 (35.6)	0.86 (0.36-2.02)	0.77(0.2-2.78)
	30-34	49 (53.3)	43 (46.7)	0.5 (0.22-1.3)	0.29 (0.08-1.1)
	≥35	19 (67.9)	9 32.1)	1.0	1.0
Residence	Urban	220 (62.1)	134 (37.9)	1.0	1.0
	Rural	19 (82.6)	4 (17.4)	2.89 (0.96,8.67)	0.6 (0.11,3.5)
Educational status	No formal education	36 (70.6)	15 (29.4)	1.9 (0.9-3.8)	0.5 (0.1-2.18)
	Primary school	65 (69.9)	28 (30.1)	1.86 (1.05-3.3)	1.45 (0.47-4.4)
	Secondary school	68 (63.6)	39 (36.4)	1.4 (0.8-2.36)	0.7 (0.25-1.9)
	Diploma and above	70 (55.6)	56 (44.4)	1.0	1.0
Number of ANC visits (n=372)	≤4 visits	162 (67.2)	79 (32.8)	1.63 (1.05-2.5)	2.08 (1.03, 4.2) *
	>4 visits	73 (55.7)	58 (44.3)	1.0	
Skin to skin during intra facility transport	Yes	8 (32)	17 (68)	1.0	1.0
	No	231 (65.6)	121 (34.4)	4.06 (1.7,9.67)	2.77 (0.73,10.51)

Mothers have obstetric complication	Yes	89 (79.5)	23 (20.5)	2.97 (1.77,4.98)	1.1(0.4-2.8)
	No	150 (56.6)	115 (43.4)	1.0	1.0
Birth weight	<2.5kg	72 (87.8)	10 (12.2)	5.52 (2.74,11.12)	1.98 (0.4-9.7)
	>2.5	167 (56.6)	128 (43.4)	1.0	1.0
SGA	Yes	80 (87.9)	11 (11.2)	5.8 (2.9,11.38)	3.1 (0.92, 10.7)
	No	159 (55.6)	127 (44.4)	1.0	1.0
Age of the newborn during axillary temperature measurement	≤ 2:59hr	125 (74.4)	43 (25.6)	3.01 (1.83,4.9)	3.58 (1.57, 8.13) *
	3:00-4:00hr	54 (62.1)	33(37.9)	1.69 (0.97, 2.96)	1.6 (0.6, 3.98)
	4:01-6:00hr	60 (49.2)	62 (50.8)	1.0	1.0
Breast feeding with in the 1st one hour	Yes	112 (46.3)	130 (53.7)	1.0	1.0
	No	109 (80.7)	26 (19.3)	3.6 (2.1, 5.94)	3.11 (1.39, 6.98) *

- * significant at p-value < 0.05

6 DISCUSSION

This study tries to determine prevalence of neonatal hypothermia and factors contributing to it. Environmental, behavioral and physiological factors were assessed. The study revealed that 63.4% [95% CI:58.6%, 68.2%] of neonates was hypothermic within six hours after delivery. Hypothermia was found to be more significantly higher among neonates who were dried by non-pre-warmed towel, Newborns delivered within delivery room temperature $\leq 24^{\circ}\text{c}$, those delivered during night time, those who didn't wear hat and those who were not breastfed within one hour of birth were some of the variables associated with neonatal hypothermia.

6.1 Prevalence of hypothermia

The prevalence of neonatal hypothermia among newborns in the study area was 63.4% which was almost similar with study done in Nigeria (67.6%)(25) and study conducted in Eastern, Ethiopia (66.3%)(18). But also this study finding was lower than with study conducted in India (70%)(24), Zimbabwe (85%)(13) and Gondar, Ethiopia (69.8%)(16). But the finding of this study was higher than study conducted in, Nigeria (24.2%)(26) and in Arbaminch, Ethiopia (50%)(17). This variation might be due to temperature measuring instrument, measuring site, study design, seasonal variation and socio demographic factors between the study area.

6.2 Environmental factors of hypothermia

According to WHO thermal control of the newborn practical guide delivery room temperature should be at least 25°c (1). The study revealed that newborns who were delivered in room which temperature were $\leq 24^{\circ}\text{c}$ were 5.5 times more likely to be hypothermic when compared to those who delivered in room temperature $\geq 25^{\circ}\text{c}$.

The finding was similar to different studies conducted Nepal and Iran where prevalence of neonatal hypothermia was observed more in low temperature of the delivery room (14, 30). This could be due to heat losses from the newborns body to the colder environment.

According to these study newborns who delivered during night time were about four times more likely to be hypothermic compared to their counterpart. This finding also is also in line with study conducted in Gondar showed newborns delivered during night time were almost seven times to be hypothermic when compared to those delivered during daytime. This might be due to

the fact that room temperature is low during night time when compared day time. Another possible reason could be work load and the number of health care provider might be smaller during night time (duty hours) when compared to day time which may have a negative impact to implement essential newborn care practice such as apply skin to skin contact and initiate breast feeding timely and other procedure. It also makes it difficult to follow both mothers and newborns health status closely.

6.3 Physiological factors of hypothermia

This study revealed that newborns who were taken axillary temperature within the first 3hour were almost four times more likely to be hypothermic when compared to those taken greater than three hours. The prevalence of hypothermia was decrease when the newborn age in hour increased. This finding was higher than a study conducted in Iran on consecutively healthy full term neonate's temperature was documented at 60, 120 and 240 minutes after birth and the prevalence were 47.5%, 46.4% and 37.2% respectively(14). This discrepancy might be due to differences in the temperature measurement instrument and standard of care and facility.

The reason of when age increases the risk of hypothermia decreases might be due to the newborn may adapt extra-uterine environment by the mechanisms of heat production such as metabolic process brain, heart and liver produce the most metabolic energy by oxidative metabolism of glucose, fat and protein(7).

6.4 Behavioral factors of hypothermia

According to WHO while newborn is being dried it should be by pre-warmed cloth(1). In this study, newborns that were not dried with pre-warmed towel or newborns who were dried by non-pre-warmed towel were almost seven times more likely to be hypothermic when compared to those dried by pre-warmed towels. This could be due to the fact that towel might be dry but could be cold in this case the newborn might be lose heat through conduction.

Neonates who were not wearing hat after birth were approximately four times more likely to be hypothermic when compared to those who were wearing hat. This finding is in line with study conducted in Eastern Ethiopian where neonates who weren't wearing cap after birth were two times more likely to be hypothermic(18). This might be due to the fact that they have large head

with open fontanel. In first hour after birth clothing should always include cap (hat), since as much as 25% of heat loss in newborn baby may be from uncovered head(1).

Number of ANC follow up less than four visits were another factor associated with neonatal hypothermia. Those neonates whose mother had $ANC \leq 4$ were two times more likely to be hypothermic when compared to newborns mother who had > 4 ANC visits. This might be mothers who have more ANC visits have a better chance to prepare herself for birth preparedness with good knowledge about thermal protective measures, including drying and wrapping with good and well prepared towel.

Lastly newborns who were not initiated for breastfeeding within one hour of birth were significantly associated with neonatal hypothermia. Newborns who were not breast fed within one hour of birth were three times more likely to be hypothermic when compared to those who were breast fed within one hour. The finding was supported by a study conducted in Southern Nepal where hypothermia was almost in 50% more prevalent among newborns for whom breastfeeding was not initiated timely(4), The finding is also similar to study conducted in Uganda lack of breast feeding is significant risk factor for hypothermia(25). Our finding is line with when compared to a study conducted in Nigeria (11). But our finding is lower than study conducted in Gondar, Ethiopia newborns who weren't breast feeding had eight times more likely to be hypothermic when compared to breast fed ones(16). This difference might be due to socio cultural difference, study setting variation between study areas and mother may had better knowledge regarding breast feeding in this study area.

7 CONCLUSION AND RECOMMENDATION

7.1 Conclusion

The prevalence of neonatal hypothermia in Addis Ababa public hospitals delivery ward is high, 32 percent of newborns had moderate hypothermia, 32.6% had mild hypothermia whereas the rest 36.6% were normothermic. Moreover, the study found that temperature of the delivery room, night time delivery, newborns dried by non-pre-warmed towel, neonate who weren't wear hat, mothers who had fewer ANC visits, newborns who were not initiated to breast feeding within one hour after delivery and age of the newborn $\leq 2:59$ hr were significantly associated with increased odds of neonatal hypothermia.

7.2 Recommendation

- ❖ For maternity health care providers
 - Health care providers who works in the delivery ward should implement the thermal protection guideline and “warm chain” inter-linked procedure mainly warm delivery room, immediate drying with pre-warmed clothes, initiate breast feeding within one hour and appropriate clothing (bedding) including wearing a hat.
 - In addition, during night time delivery the neonate needs more attention because the thermal environment is different from the day time and due to work load “warm chain” might be breached.
- ❖ For hospitals
 - For all delivery the labor room should be in neutral thermal environment and every delivery rooms should have calibrated room temperature measuring instrument, the hospital should have system for controlling the temperature of the delivery rooms.
 - The hospital should put thermal protection guideline as a hospital guideline, monitor and evaluate the implementation daily.
 - It should have responsibility to prepare and supply heat sources for warming rooms and clothes.
 - It should have to balance the health care provider’s number during day and night shift appropriately.
- ❖ For researchers
 - It is recommended for researcher to conduct longitudinal study to investigate seasonal variation
 - It is recommended to conduct qualitative study to investigate the challenges of “warm chain” implementation.

8 STRENGTH AND LIMITATION OF THE STUDY

Strength

- ❖ The previous conducted studies did not consider delivery room temperature but this study investigated this factor.
- ❖ Another strength is the previous study collect data regarding factor associated with neonatal hypothermia by using mother interview which may have recall bias but in this study the data were collected through direct observation during the time of delivery in addition to interview and record review.

Limitation

- ❖ This study was conducted with in a short period of time that means, it doesn't investigate seasonal variation.
- ❖ Furthermore, during the data collection the data collector might be biased to the study because the data collectors were staff of the hospitals. This happened as a result of COVID-19 pandemic in which the investigator can't hire data collector from out of the hospitals.

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10 APPENDIX

Annex I: English version of participant information Sheet

How are you? My name is _____. I am a data collector for the study being conducted in four hospitals and this hospital are one of this hospitals on by prevalence of neonatal hypothermia and associated factors within six hours of delivery at delivery ward in public hospitals of Addis Ababa, Ethiopia 2020, by Mahelet Alemayehu who is studying for her Master's degree at Addis Ababa University, Collage of Health science, School of Nursing and Midwifery and Department of Nursing. I kindly request you to give me your attention to explain you about the study and your hospital being selected as the study setting.

1. The study title: Prevalence of neonatal hypothermia and associated factors within six hours of delivery at delivery ward in public hospitals of Addis Ababa, Ethiopia 2020.

2. Purpose of the study: the main aim of this study is to prepare thesis for partial fulfillment of the requirement for masters of science in neonatal nursing by investigator. In addition, the study finding will be used as baseline data, evidence and input to develop future quality improvement projects so this hospital will have benefited for this study, and also governmental and nongovernmental organizations will be used this study finding for designing proper implementation and evaluation on reduction of neonatal morbidity and mortality.

3. Procedure and duration: Data will be collected through direct observation, interviewing the mothers and mothers chart review by using a questionnaire and a check list to provide applicable data that is helpful for this study. This questionnaire contains 37 questions, the first 15 questions of which are to be answered through checklist while during the first one hour of birth, the next 14 questions answered by mothers while I am interviewing them and the rest 8 questions will be collected from the mother's chart. The interview will take around 20 minutes for each participant, so I kindly request the mothers to give me for their precious time for the interview. Before starting the interview, I will take the room temperature of delivery ward from wall thermometer, and observational data will be collected to assess thermal protective action with the first hour of birth, then we will start the interview. After finishing the question, I will take axillary temperature of the newborn.

4. Risks and benefits: there is no any risk to participate in this study, but only taking few minutes from the mother's time. There is no payment in the participation but, the findings from this research will give important information for the hospital, ministry of health and for health planners.

5. Confidentiality: The questionnaire will be coded to keep privacy of the participants. The information which mother will give us will be kept confidentially. There will be no information that will identify the mothers in particular. The findings of the study will be generalized for the study population and it will not reflect anything specific of individual participants. No reference will be made in oral or written reports which link participants to the research.

6. Rights: Mothers have the right to participate or not in this study, participation for this study is fully voluntary. If the mother agrees to participate, she have the right to withdraw from the study at any time and this will not label her for any loss of benefits which she otherwise is entitled. Mothers do have the right to not respond any question that she doesn't want to answer.

7. Contact address: If there are any questions or enquires any time about the study or procedures, please contact by the following address.

- Principal investigator: Mahelet Alemayehu
- E -mail: mahoayal1@gmail.com
- Mobile phone: +251-913-63-64-86.

Annex II: English version of participant declaration of informed voluntary consent for the head of the hospital

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 questions. I have been given the opportunity to ask questions for 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 respond any question that they do not want. I am also informed that the Hospital has the right to discontinue this study from being conducted if any misdeeds and unethical procedures are observed during the data collection process in the hospital principles.

Therefore, I declare my voluntary consent on behalf of (_____) management to allow this study to be conducted in the Hospital with my initials (Signature) as indicated below.

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

Name and Signature of Data Collector: _____ Date _____

Thank you for your collaboration!!!

Annex III: English version of participant information Sheet

How are you? My name is _____. I am a data collector for the study being conducted in four hospitals and this hospital are one of this hospitals on by prevalence of neonatal hypothermia and associated factors within six hours of delivery at delivery ward in public hospitals of Addis Ababa, Ethiopia 2020, by Mahelet Alemayehu who is studying for her Master's degree at Addis Ababa University, Collage of Health Science Department of Nursing and Midwifery. I kindly request you to give me your attention to explain you about the study and be selected as the study participant.

1. The study title: Prevalence of neonatal hypothermia and associated factors within six hours of delivery at delivery ward in public hospitals of Addis Ababa, Ethiopia 2020.

2. Purpose of the study: the main aim of this study is to prepare thesis for partial fulfillment of the requirement for masters of science in neonatal nursing by investigator. In addition, the study finding will be used as baseline data, evidence and input to develop future quality improvement projects so this hospital will have benefited for this study, and also governmental and nongovernmental organizations will be used this study finding for designing proper implementation and evaluation on reduction of neonatal morbidity and mortality.

3. Procedure and duration: I will be interviewing you using a questionnaire to provide me with applicable data that is helpful for this study. This questionnaire contains 37 questions, the first 15 questions of which are to be answered through checklist while during the first one hour of birth, the next 14 questions answered by you while I am interviewing you and the rest 8 questions will be collected from your chart. The interview will take around 20 minutes for each participant, so I kindly request you to give me this precious time for the interview. Before starting the interview, I will take the room temperature from wall thermometer, then we will start the interview. After finishing the question, I will take axillary temperature of your newborn.

4. Risks and benefits: there is no any risk to participate in this study, but only taking few minutes from your time. There is no payment in the participation but, the findings from this research will give important information for the hospital, ministry of health and for health planners.

5. Confidentiality: The questionnaire will be coded to keep privacy of the participants. The information which you will give us will be kept confidentially. There will be no information that will identify you in particular. The findings of the study will be generalized for the study population and it will not reflect anything specific of individual participants. No reference will be made in oral or written reports which link participants to the research.

6. Rights: You have the right to participate or not in this study, participation for this study is fully voluntary. If you agree 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 have the right to not respond any question that you don't want to answer.

7. Contact address: If there are any questions or enquires any time about the study or procedures, please contact by the following address.

- Principal investigator: Mahelet Alemayehu
- E -mail: mahoayal1@gmail.com
- Mobile phone: +251-913-63-64-86.

Annex IV. English version of declaration of informed voluntary consent for participant

The participant information sheet was read for me. I have clearly understood the purpose of the research, the procedures, the risks and benefits, issues of confidentiality, the right of participation and the contact address for any questions. I have been given the opportunity to ask any questions for things that may have been unclear. I was informed that I can terminate the study at any time. Therefore, I confirm my voluntary consent to participate in this study with my signature as indicated below.

- Signature of the participant _____ date _____
- Signature of data collector _____ date _____

This voluntary consent form will be signed face to face in the presence of the data collector and its copy should be given to the participant.

Thank you for your collaboration!!

Annex V: English version of the questionnaire

Questionnaire code _____

Part one: Environmental factors of hypothermia

No	Variable	
1	Temperature of the delivery room (from wall thermometer) during the first one hour of birth	_____
2	Time of the newborn birth (thick in front of the answer)	Day time <input type="checkbox"/> Night time <input type="checkbox"/>

Part two: Observational check list in contextual factors of hypothermia (thick in side of box or X)

No	Variable	
3	Mode of delivery	SVD <input type="checkbox"/> Instrumental assisted delivery <input type="checkbox"/> Cesarean section <input type="checkbox"/>

Part three: Observational check list in care giver behavioral factors of hypothermia (thick in side of box or X)

No	Variable	
4	Drying	
4.1	Immediately after delivery the baby dried including the head	Yes <input type="checkbox"/> No <input type="checkbox"/>
4.2	Type of drying material uses for drying propose	Pre warmed Hospitals Own Towel <input type="checkbox"/> Non pre warmed Hospital Own Towel <input type="checkbox"/> Pre warmed Mothers Own Towel <input type="checkbox"/> Non pre Warmed Mothers Own Towel <input type="checkbox"/>

	4.3	The newborn dried	Before cord cut <input type="checkbox"/> After cord cut <input type="checkbox"/>
	4.4	Where newborn dried	Mother abdomen/chest <input type="checkbox"/> On the table <input type="checkbox"/> Baby couch <input type="checkbox"/> Pre heated incubator <input type="checkbox"/> Radiant warmer <input type="checkbox"/> Other specify _____
5	Wrapping related care		
	5.1	The first drying towel changed by new dry towel for covering baby	Yes <input type="checkbox"/> No <input type="checkbox"/>
	5.2	The changed towel pre warmed	Yes <input type="checkbox"/> No <input type="checkbox"/>
	5.3	The baby body with dry/pre warmed towel including the head and limbs covered	Yes <input type="checkbox"/> No <input type="checkbox"/>
	5.4	Dry/Pre warmed towel prepared by	Hospital <input type="checkbox"/> Family <input type="checkbox"/>
6	Newborn covered by hat		Yes <input type="checkbox"/> No <input type="checkbox"/>
7	The newborn placed on mother abdomen after birth for skin to skin contact		Yes <input type="checkbox"/> No <input type="checkbox"/>
8	Weighing the newborn related care		
	8.1	The newborn	Yes <input type="checkbox"/> No <input type="checkbox"/>

		measuring weight is delayed for at least one hour	
	8.2	When the time of weighing the newborn, the newborn body was covered by cloths	Yes <input type="checkbox"/> No <input type="checkbox"/>

General instruction for part 4, 5 and 6

1. Choose the best answer for multiple choice questions
2. If the answer is not listed among alternatives, please put the specific answer in the space provided.

Part Four: Socio demographic characteristics of interviewing questions

No	Variable	
9	Age of the mother	_____
10	Residence	A. Urban B. Rural
11	Maternal educational status	A. Unable to read and write B. Primary school C. Secondary school D. Diploma and above
12	Maternal occupation	A. House wife B. Government worker C. Private employee D. Self-employee E. Others
13	Family income	_____Eth. Birr
14	Parity	A. Primi-para B. Multi-para

Part five: Mothers behavioral factors of interviewing questions

No	Variable		Skip
15	ANC		

	15.1	Did you have ANC follow-up? If yes go to Q 15.2	A. Yes B. No	→Go to Q 16
	15.2	how many visits do you have until delivery?	_____	

Part six: Care giver behavioral factors interviewing from the mother

No	Variable	
16	Has the newborn started breast feeding within one hour of delivery?	A. Yes B. No
17	Was the newborn held in direct contact with its mother's skin during intra - facility transport (from delivery/OR to Postnatal unit)?	A. Yes B. No
18	Was the new born and the mother rooming in together in same room and bed?	A. Yes B. No

Part seven: Maternal related physiologic factors assessing Checklist (to being filled from mother's chart) physiologic related factors of hypothermia

No	Variable		Skip
19	Obstetric complication		
	19.1	Mothers have obstetric complication	Yes <input type="checkbox"/> No <input type="checkbox"/> →20

	19.2	Type of obstetric complication	Preeclampsia/eclampsia <input type="checkbox"/> Ante partum hemorrhage <input type="checkbox"/> Uterine rupture <input type="checkbox"/> PROM/Sepsis <input type="checkbox"/> Obstructed/prolonged labor <input type="checkbox"/> Post partum hemorrhage <input type="checkbox"/> Other specify _____	
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Part eight: Neonatal related physiologic factors assessing Checklist (to being filled from mother's chart) physiologic related factors of hypothermia

No	Variable	
20	Axillary temperature of the newborn between one and six hour of after delivery	_____
21	Age of the newborn during axillary temperature measurement (hours)	<input type="text"/>
22	Sex of the newborn	Male <input type="checkbox"/> Female <input type="checkbox"/>
23	Birth weight in grams	<input type="text"/>
24	APGAR score	<input type="text"/>
25	Gestational age at birth (week)	<input type="text"/>
26	Type of pregnancy	Single <input type="checkbox"/> Multiple <input type="checkbox"/> Other <input type="text"/>
27	Small for gestational age	yes <input type="checkbox"/> No <input type="checkbox"/>

Annex VI: Amharic version of the participant information sheet for the head of the hospital

ሰላም ነዎት፡- ስሜ _____ እባላለሁኝ፡፡ አሁን ከእርሶ ጋር የተገናኘሁት መንግስት ሆስፒታሎች ላይ አተኩሮ በሚሰራው ጥናት ላይ መረጃ ሰብሳቢ ሆኜ ነው፡፡ እንዲሁም ይህ ሆስፒታል ጥናቱ ከሚካሄድባቸው ሆስፒታሎች ውስጥ አንዱ ነው፡፡ ጥናቱ የሚያተኩረው ጨቅላ ህጻናት በተወለዱ በስድስት ሰዓታት ውስጥ ስለሚያጋጥማቸው የሰውነት ሙቀት መቀነስ መጠንና ሊያመጡት የሚችሉትን ተዛማጅ ምክኒያቶችን ለማጥናት ነው፡፡ ጥናቱን የምታካሂደው በአዲስ አበባ ዩኒቨርሲቲ በጤና ሳይንስ ኮሌጅ፣ በነርቪንግና አዋላጅ ነርቪንግ ትምህርት ቤት በነርቪንግ ትምህርት ክፍል የሁለተኛ ዲግሪ ትምህርቱን በጨቅላ ህጻናት ነርስነት ተማሪ የሆነችው ማህሌት አለማየሁ ናት፡፡ ስለሆነም ስለጥናቱ የተወሰነ ማብራሪያ ስለምሰጠት ሆስፒታሎ የጥናቱ ተሳታፊ ይሆን ዘንድ ትኩረቶን ሰጥተው በጥሞና እንዲከታተሉኝ በትህትና እጠይቃለሁ፡፡

1. የጥናቱ ርዕስ፡- በአዲስ አበባ የሚገኙ የመንግስት ሆስፒታሎች በ2012 ዓ.ም በሚወለዱ ጨቅላ ህጻናት የሰውነት ሙቀት መቀነስ መጠንና ሊያመጡት የሚችሉ ተዛማጅ ምክኒያቶችን ማጥናት ነው፡፡

2. የጥናቱ ዓላማ፡- የጥናቱ ዋና ዓላማ የሁለተኛ ዲግሪዎን በጨቅላ ህጻናት ትምህርት ለምትረው ተማሪ ማህሌት አለማየሁ የመመረቂያ ጽሁፍ ለማዘጋጀት ነው፡፡ ከዚህ ጥናት የሚገኘው መረጃ እንደ መሰረት ያገለግላል፡፡ እንዲሁም ወደፊት አገልግሎቱን ለማሳደግ ለሚሰሩ ፕሮጀክቶች እንደ መረጃና ግብአት ሆኖ ስለሚያገለግል ይህ ሆስፒታል ተጠቃሚ ይሆናል፡፡ እዲሁም ደግሞ መንግስታዊና መንግስታዊ ያልሆኑ ድርጅቶች የጥናቱን ውጤት በመጠቀም የጨቅላ ህጻናትን ሞትና ህመም ሊያመጡ የሚችሉ ችግሮችን ለመቀነስ ያገለግል ዘንድ እቅድ ለመቅረጽ፣ ተግባር ላይ እንዲውል ለማድረግና ለመገምገም ይረዳል፡፡

3. የመጠይቁ አካሄድና የሚፈጀው ጊዜ፡- መረጃ የሚሰበሰበው በማዋለጃ ክፍል ውስጥ ለጨቅላ ህጻኑ የሚደረገውን እንክብካቤ በማየት፣ እናትየዋን በመጠየቅ፣ እና የእናትየዋን የህክምና ካርድ በማየት ሲሆን ይህም የሚደረገው በመጠይቅና በማገናዘቢያ ሲሆን ይህ ደግሞ ለጥናቱ ትክክለኛ መረጃ እንዲሆን ይጠቅማል፡፡ ይህ መጠይቅ 37 ጥያቄዎችን የያዘ ሲሆን የመጀመሪያዎቹ 15 ጥያቄዎች የሚመለሱት በማገናዘቢያው አማካኝነት ሲሆን ልጁ በተወለደበት የመጀመሪያው አንድ ሰዓት ውስጥ ይሆናል፣ የሚቀጥሉት 14 ጥያቄዎች የሚመለሱት እናቶች በሚጠየቁበት ጊዜ ይሆናል፣ እንዲሁም ደግሞ ቀሪዎቹ 8 ጥያቄዎች የሚሰበሰቡት ከእናትየው የህክምና ማህደር ላይ ይሆናል፡፡ ቃለ መጠይቁ በአማካኝ 20 ደቂቃ ለእያንዳንዱ ለጥናት ተሳታፊ የሚወስድ ይሆናል፡፡ ስለዚህ እናቶች ውድ ጊዜያቸውን ይሰጡኝ ዘንድ በትህትና እጠይቃቸዋለሁ፡፡ ቃለ መጠይቁን ከመጀመራችን በፊት የማዋለጋ ክፍሉን የሙቀት መጠን ከግድግዳ ላይ በተሰቀለ መለኪያ መሳሪያ አማካኝነት በወሊድ እመዘግባለው፡፡ እንዲሁም ደግሞ ልጁ በተወለደ 1 ሰዓት ውስጥ በጨቅላ ህጻኑ ሙቀቱን እንዳያጣ የሚደረጉ እንክብካቤዎችን በማየት ጥያቄዎቹን እሞላለሁ፡፡ ቀጥለን ቃለ መጠይቁን እናደርጋለን፡፡ ቃለ መጠይቁን ከጨረስን ቦኋላ የጨቅላ ህጻኑ የብብት ሙቀት መጠን እለካለው፡፡

4. የጥናቱ ጥቅምና ጉዳት፡- በጥናቱ ላይ መሳተፍ ምንም ጉዳት አያስከትልም ነገር ግን የእናትየውን ጥቂት ደቂቃዎች ሊሻማባት ይችላል፡፡ በዚህ ጥናት ስለተሳፉ ምንም አይነት ክፍያ የለውም ግን የጥናቱ ውጤት

ለሆስፒታሎች፣ ለጤና ጥበቃ ሚኒስትር እንዲሁም ለተለያዩ ጤና ላይ ትኩረት አድርገው ለሚሰሩ ጠቃሚ ማስረጃ ሆኖ ሊያገለግላቸው ይችላል።

5. የመረጃው ደህንነት፡- መጠይቁ የተሳታፊዎችን ሚስጥር ለመጠበቅ ሲባል መለያ ቁጥር ይሰጠዋል። የጥናቱ ተሳታፊ እናት የምትሰጠን መረጃ ምስጢራዊነቱ የተጠበቀ ነው። ማንኛውም ዓይነት ስለእናትየው ማንነት ሊገልጽ የሚችል መረጃ በመጠይቁ አይጻፍም። የጥናቱ ውጤት እንዳጠቃላይ ጥናት እንደወከላቸው ህዝቦች ይወሰዳል እንጂ እንደ ግለሰብ ለጥናቱ ተሳታፊ ብቻ አይወሰድም። በመጠይቁ ላይም የተሳታፊ ስም አይኖርም።

6. በጥናቱ የተከበረው መብት፡- ጥናቱ በእናትየው ሙሉ ፈቃደኝነት ላይ የተመሰረተ ነው። በጥናቱ የመሳተፍም ያለመሳተፍም ሙሉ መብት አላት። የጥናቱ አካል ለመሆን ፈቃደኛ ከሆነች መልስ ለመስጠት ፍቃደኛ ያልሆነችባቸውን ጥያቄ ያለመመለስ እንዲሁም ከጥናቱ በማንኛውም ጊዜ የማቋረጥ ሙሉ መብት ሲኖራት በዚህም ምክንያት የሚደርስባት የተለየ ጥቅም መጓደል ወይም ጉዳት ፈጽሞ ሊኖር አይችልም።

7. የጥናቱ አድራሻ፡- ይህ ጥናት በሚካሄድበት ማንኛውም ጊዜ የጥናቱን አካሄድ በተመለከተ ወይም ሌላ ማንኛውም ጥያቄ ካሎት ከዚህ በታች በተሰጠው አድራሻ ማግኘት ይቻላል።

- የጥናት አድራጊ ስም፡- ማህሌት አለማየሁ
- ኢሜል፡- mahoayalt@gmail.com
- የሞባይል ቁጥር፡- +251-913-63-64-86

AnnexVII: Amharic version of declaration of informed voluntary consent for the head the hospital

ከላይ በቀረበው የግንዛቤ ማስጨበጫ መሰረት የጥናቱ ተሳታፊ ለመሆን የፈቃደኝነት ማረጋገጫ ለመስጠት ስለጥናቱ የግንዛቤ ማስጨበጫ መረጃው ተነቦልኛል(አንብቤዋለሁ):: ስለጥናቱ መሰረታዊ ዓላማ፣አካሄድ፣ ጥቅምና ጉዳት፣ የመረጃው ደህንነት፣ እንዲሁም ሆስፒታሉ የስነምግባር ግድፈት ቢገኝ የማስቆም መብት እንዳለው እና የተሳታፊው መብት እና የአጥኝው አድራሻ ተገልጾልኛል:: በጥናቱ ጊዜ ስለሚያጋጥሙ ግልጽ ያልሆኑ ጥያቄዎችን መጠየቅ እንደሚችልና እንዲሁም ተሳታፊዎች በማንኛውም ጊዜ ጥናቱን የማቋረጥ መብት እንዳላቸው ተረድቻለው:: በዚህ መሰረት በጥናቱ ለመሳተፍ በሆስፒታላችን ስም ፈቃደኛ መሆናችንን ከዚህ በታች በተቀመጠው ፊርማ አረጋግጣለሁ::

የሆስፒታሉ ሀላፊ ስምና ፊርማ _____ ቀን _____

የመረጃ ሰብሳቢው ስምና ፊርማ _____ ቀን _____

ስለትብብሮ እናመሰግናለን::

Annex VIII: Amharic version of the participant information sheet

ሰላምነዎት:- ስሜ _____ እባላለሁኝ::

አሁን ከእርስዎ ጋር የተገናኘሁት መንግስት ሆስፒታሎች ላይ አተኩሮ በሚሰራው ጥናት ላይ መረጃ ሰብሳቢ ሆኜ ነው። እንዲሁም ይህ ሆስፒታል ጥናቱ ከሚካሄድባቸው ሆስፒታሎች ውስጥ አንዱ ነው። ጥናቱ የሚያተኩረው ጨቅላ ህጻናት በተወለዱ በስድስት ሰዓታት ውስጥ ስለሚያጋጥማቸው የሰውነት ሙቀት መቀነስ መጠንና ሊያመጡት የሚችሉትን ተዛማጅ ምክንያቶችን ለምታጠናው በአዲስ አበባ ዩኒቨርሲቲ በጤና ሳይንስ ኮሌጅ፣ በነርቪንግናአዋላጅነርቪንግትምህርትቤት በነርቪንግ ትምህርት ክፍል የሁለተኛ ዲግሪ ትምህርቷን በጨቅላ ህጻናት ነርስነት ተማሪ በሆነችው በማህሌት አለማየሁ ነው። ስለሆነም ስለ ጥናቱ የተወሰነ ማብራሪያ ስለምሰጠት እርስዎ የጥናቱ ተሳታፊ ይሆን ዘንድ ትኩረቶን ሰጥተው በጥሞና እንዲከታተሉኝ በትህትና እጠይቃለሁ።

- 1. የጥናቱ ርዕስ:-** በአዲስ አበባ የሚገኙ የመንግስት ሆስፒታሎች በ2012 ዓ.ም በሚወለዱ የጨቅላ ህጻናት የሰውነት ሙቀት መቀነስ መጠንና ሊያመጡት የሚችሉ ተዛማጅ ምክንያቶችን ማጥናት ነው።
- 2. የጥናቱ ዓላማ:-** የጥናቱ ዋና ዓላማ የሁለተኛ ዲግሪዎን በጨቅላ ህጻናት ትምህርት ለምትማረው ተማሪ ማህሌት አለማየሁ የመመረቂያ ጽሁፍ ለማዘጋጀት ነው። ከዚህ ጥናት የሚገኘው መረጃ እንደ መሰረት ያገለግላል። እንዲሁም ወደፊት አገልግሎቶችን ለማሳደግ ለሚሰሩ ፕሮጀክቶች እንደ መረጃና ግብአት ሆኖ ስለሚያገለግል ህዝቡ ተጠቃሚ ይሆናል። እዲሁም ደግሞ መንግስታዊና መንግስታዊ ያልሆኑ ድርጅቶች የጥናቱን ውጤት በመጠቀም የጨቅላ ህጻናትን ሞትና ህመም ሊያመጡ የሚችሉ ችግሮችን ለመቀነስ ያገለግል ዘንድ እቅድ ለመቅረጽ፣ ተግባር ላይ እንዲውል ለማድረግና ለመገምገም ይረዳል።
- 3. የመጠይቁ አካሄድና የሚፈጀው ጊዜ:-** መረጃ የሚሰበሰበው በማዋለጃ ክፍል ውስጥ ለጨቅላ ህጻኑ የሚደረገውን እንክብካቤ በማየት፣ እርስዎን በመጠየቅ፣ እና የእርስዎን የህክምና ካርድ በማየት ሲሆን ይህም የሚደረገው በመጠይቅ በማገናዘቢያ ሲሆን ይህ ደግሞ ለጥናቱ ትክክለኛ መረጃ እንዲሆን ይጠቅማል። ይህ መጠይቅ 37 ጥያቄዎችን የያዘ ሲሆን የመጀመሪያዎቹ 15 ጥያቄዎች የሚመለሱት በማገናዘቢያው አማካኝነት ሲሆን ጨቅላ ህጻንዎ በተወለደበት የመጀመሪያው አንድ ሰዓት ውስጥ ይሆናል፣ የሚቀጥሉት 14 ጥያቄዎች የሚመለሱት እርስዎን በመጠየቅ ይሆናል፣ እንዲሁም ደግሞ ቀሪዎቹ 8 ጥያቄዎች የሚሰበሰቡት ከእርስዎ የህክምና ማህደር ይሆናል። ቃለ መጠይቁ በአማካኝ 20 ደቂቃ ለእያንዳንዱ ለጥናት ተሳታፊ የሚወስድ ይሆናል። ስለዚህ እርስዎ ውድ ጊዜዎትን ይሰጡኝ ዘንድ በትህትና እጠይቃለሁ። ቃለ መጠይቁን ከመጀመራችን በፊት የማዋለጃ ክፍሉን የሙቀት መጠን ከግድግዳ ላይ በተሰቀለ መለኪያ መሳሪያ አማካኝነት በወሊድ ጊዜ እመዘግባለሁ። እንዲሁም ደግሞ ልጁ በተወለደ 1 ሰዓት ውስጥ በጨቅላ ህጻኑ ሙቀቱን እንዳያጣ የሚደረጉ እንክብካቤዎችን በማየት ጥያቄዎቹን እሞላለሁ። ቀጥለን ቃለ መጠይቁን እናደርጋለን። ቃለ መጠይቁን ከጨረስን ቦኃላ የጨቅላ ህጻኑን የብብት ሙቀት መጠን እለካለው።
- 4. የጥናቱ ጥቅምና ጉዳት:-** በጥናቱ ላይ መሳተፍ ምንም ጉዳት አያስከትልም ነገር ግን የእርስዎን ጥቂት ደቂቃዎች ሊሻግሩት ይችላሉ። በዚህ ጥናት ስለተሳፉ ምንም አይነት ክፍያ የለውም ግን የጥናቱ ውጤት ለሆስፒታሎች፣

ለጤና ጥበቃ ሚኒስትር እንዲሁም ለተለያዩ ጤና ላይ ትኩረት አድርገው ለሚሰሩ ጠቃሚ ማስረጃ ሆኖ ሊያገለግላቸው ይችላል።

5. የመረጃው ደህንነት፡- መጠይቁ የእርሶን ሚስጥር ለመጠበቅ ሲባል መለያ ቁጥር ይሰጠዋል። እርሶ የሚሰጡን መረጃ ምስጥራዊነቱ የተጠበቀ ነው። ማንኛውም ዓይነት ስለእርሶ ማንነት ሊገልጽ የሚችል መረጃ በመጠይቁ አይጻፍም። የጥናቱ ውጤት እንዳጠቃላይ ጥናት እንደወከላቸው ህዝቦች ይወሰዳል እንጂ እንደ ግለሰብ ለጥናቱ ተሳታፊ ብቻ አይወሰድም። በመጠይቁ ላይም የእርሶ ስም አይኖርም።

6. በጥናቱ የተከበረው ሙብት፡- ጥናቱ በእርሶ ሙሉ ፈቃደኝነት ላይ የተመሰረተ ነው። በጥናቱ የመሳተፍም ያለመሳተፍም ሙሉ ሙብት አለት። የጥናቱ አካል ለመሆን ፈቃደኛ ከሆኑ መልስ ለመስጠት ፍቃደኛ ያልሆኑባቸውን ጥያቄዎች ያለመመለስ እንዲሁም ከጥናቱ በማንኛውም ጊዜ የማቋረጥ ሙሉ ሙብት ሲኖሮት በዚህም ምክኒያት የሚደርስበት የተለየ ጥቅም መጓደል ወይም ጉዳት ፈጽሞ ሊኖር አይችልም።

7. የጥናቱ አድራሻ፡- ይህ ጥናት በሚካሄድበት ማንኛውም ጊዜ የጥናቱን አካሄድ በተመለከተ ወይም ሌላ ማንኛውም ጥያቄ ካሎት ከዚህ በታች በተሰጠው አድራሻ ማግኘት ይቻላል።

የጥናት አድራጊ ስም፡- ማህሌት አለማየሁ

ኢ.ሜል፡- mahoayali@gmail.com

የሞባይል ቁጥር፡- +251-913-63-64-86

Annex IX: Amharic version of declaration of informed voluntary consent for the participant

ከላይ በቀረበው የግንዛቤ ማስጨበጫ መሰረት የጥናቱ ተሳታፊ ለመሆን የፈቃደኝነት ማረጋገጫ ለመስጠት ስለጥናቱ የግንዛቤ ማስጨበጫ መረጃው ተነባብሮልኛል(አንብቤዋለሁ):: ስለጥናቱ መሰረታዊ ዓላማ፣አካሄድ፣ ጥቅምና ጉዳት፣ ስለመረጃው ደህንነት፣ ስለመብቱ የአጥኝው አድራሻ ተገልጾልኛል:: በጥናቱ ጊዜ ስለሚያጋጥሙኝ ግልጽ ያልሆኑ ጥያቄዎችን መጠየቅ እንደምችልና በማንኛውም ጊዜ ጥናቱን የማቋረጥ መብት እንዳለኝ ተረድቻለሁ:: በዚህ መሰረት በጥናቱ ለመሳተፍ ፈቃደኛ መሆኔን ከዚህ በታች በተቀመጠው ፊርማዬ አረጋግጣለሁ::

የጥናቱ ተሳታፊ እናት ፊርማ _____ ቀን _____

የመረጃ ሰብሳቢው ስምና ፊርማ _____ ቀን _____

ስለትብብር እናመሰግናለን::

Annex X: Amharic version of the questionnaire

የመጠይቅ ቁጥር _____

ክፍል አንድ : ጨቅላ ህጻኑ በተወለደ አንድ ሰዓት ውስጥ የጨቅላ ህጻኑ ሙቀት ሊቀንሱ የሚችሉ አካባቢያዊ ተዛማጅ ምክንያቶችን በተመለከተ

ተቁ	ጥያቄዎች	
1	የማዋለጃ ክፍል የሙቀት መጠን ግድግዳ ላይ ካለው መሳሪያ የሚያሳየው ንባብ?	_____
2	ጨቅላ ህጻኑ/ኗ የተወለደበት/ችበት ጊዜ ካጠገቡ√ <input type="checkbox"/> ወይም X) ምልክት ያድርጉ)	ቀን ላይ <input type="checkbox"/> ማታ ላይ <input type="checkbox"/>

ክፍል ሁለት : የጨቅላ ህጻኑ የውልደት ሁኔታን በተመለከተ (ካጠገቡ√ ወይም X) ምልክት ያድርጉ)

ተቁ	ጥያቄዎች	
3	ጨቅላ ህጻኑ/ኗ የተወለደበት/ችበት ሁኔታ	በምጥ (በማህጸን) <input type="checkbox"/> በመሳርያ በመታገዝ በማህጸን <input type="checkbox"/> በቀዶ ጥገና <input type="checkbox"/>

ክፍል ሶስት : ጨቅላ ህጻኑ በተወለደ አንድ ሰዓት ውስጥ የጨቅላ ህጻኑ ሙቀት ሊቀንሱ የሚችሉ ተዛማጅ ምክንያቶችን በተመለከተ የሚደረግለትን እንክብካቤ በማየት የሚሞላ (ካጠገቡ ምልክት ያድርጉ)

ተቁ	ጥያቄዎች	
4	የጨቅላ ህጻኑን/ኗን የማድረቅ ሁኔታ በተመለከተ	
	4.1 ጨቅላ ህጻኑን/ኗን ከተወለደ በኋላ ወዲያውኑ ሰውነቱን ጭንቅላቱን ጨምሮ እንዲደራረቅ ተደርጓል	አዎ <input type="checkbox"/> አይደለም <input type="checkbox"/>
	4.2 ለማደራረቂያ የተጠቀሙት የልብስ አይነት	ቀድሞ በሞቀ የሆሰፒታሉ ፎጣ <input type="checkbox"/> ባልሞቀ የሆሰፒታሉ ፎጣ <input type="checkbox"/> ቀድሞ በሞቀ የእናትየው ፎጣ <input type="checkbox"/> ባልሞቀ የእናትየው ፎጣ <input type="checkbox"/>
	4.3 የጨቅላ ህጻኑ/ኗ ሰውነቱ የተደራረቀለት/ላት	እትብት ከመቆረጡ በፊት <input type="checkbox"/> እትብት ከተቆረጠ በኋላ <input type="checkbox"/>

	4.4	ጨቅላ ህጻኑ/ኗ ሰውነቱ/ቷ የተደራረቀለት/ላት	እናትየው ሆድ/ደረት ላይ <input type="checkbox"/> ጠረጴዛ ላይ <input type="checkbox"/> የልጁ አልጋ ላይ <input type="checkbox"/> ቀድሞ በሞቀ ኢንኩቤተር ላይ <input type="checkbox"/> ማሞቂያ ላይ <input type="checkbox"/> ሌላ ካለ ይገለጽ: _____
5	የጨቅላ ህጻኑን/ኗን ልብስ አለባበስ በተመለከተ		
	5.1	የጨቅላ ህጻኑ/ኗን ሰውነቱ/ቷ የተደራረቀበት የመጀመሪያው ፎጣ በደረቅ ሌላ ፎጣ ልጁን ለማልበስ ተቀይሯል	አዎ <input type="checkbox"/> አይደለም <input type="checkbox"/>
	5.2	የተቀየረው ፎጣ ቀድሞ የሞቀ ነው	አዎ <input type="checkbox"/> አይደለም <input type="checkbox"/>
	5.3	የጨቅላ ህጻኑ/ኗ ሰውነት ጭንቅላቱን/ቷን እና እግሮቹን/ቷን ጨምሮ በደረቅ/ቀድሞ በሞቀ ፎጣ ተሸፍኗል/ላች	አዎ <input type="checkbox"/> አይደለም <input type="checkbox"/>
	5.4	ደረቁን/ ቀድሞ የሞቀውን ፎጣ የተዘጋጀው	በሆስፒታሉ <input type="checkbox"/> በቤተሰብ <input type="checkbox"/>
6	ጨቅላ ህጻኑ/ኗ ኮፍያ ለብሷል/ላች		አዎ <input type="checkbox"/> አይደለም <input type="checkbox"/>
7	ጨቅላ ህጻኑ/ኗ እንደተወለደ/ች እናት ሆድ ላይ ቆዳ ለቆዳ ንክኪ ተደርጓል/ላች		አዎ <input type="checkbox"/> አይደለም <input type="checkbox"/>
8	የህጻኑ/ኗ የክብደት መለካት ሁኔታ በተመለከተ		
	8.1	የጨቅላ ህጻኑ/ኗ ክብደት መለካት ቢያንስ ለ አንድ ሰዓት ቆይቷል	አዎ <input type="checkbox"/> አይደለም <input type="checkbox"/>
	8.2	ክብደት በሚለካበት/በምትለካበት ወቅት ጨቅላ ህጻኑ/ኗ በልብስ ተሸፍኖ/ና ነው?	አዎ <input type="checkbox"/> አይደለም <input type="checkbox"/>

አጠቃላይ መመሪያ ለክፍል 4፣5 እና 6

1. ለምርጫው ጥያቄዎች ከቀረቡት አማራጮች ይምረጡ
2. ከቀረቡት አማራጮች መካከል መልስ ካላገኙ የራሱን መልስ ለመረጃ ሰብሳቢው ይንገሩት ወይም በባዶ ቦታ ይሙሉ

ክፍል አራት:- የእናትየውን አጠቃላይ ሁኔታዎች የተመለከተ

ተ.ቁ	ጥያቄዎች	
9	የእናት እድሜ	-----
10	የመጡበት አካባቢ	ሀ. ከተማ ለ. ገጠር
11	የእናት የትምህርት ደረጃ	ሀ. ማንበብ እና መጻፍ የማይችል ለ. የመጀመሪያ ደረጃ ሐ. ሁለተኛ ደረጃ መ. ዲፕሎማና ከዚያ በላይ
12	የእናት የስራ ሁኔታ	ሀ. የቤት እመቤት ለ. የመንግስት ሰራተኛ ሐ. የግል ተቀጣሪ መ. የግል ስራ _ ሠ. ሌላ ካለ ይገለጽ
13	የቤተሰብ ገቢ ሁኔታ	----- የኢት ብር
14	ስንት ልጆችን ወልደዋል?	ሀ. አንድ ብቻ ለ. ሁለትና ከዚያ በላይ

ክፍል
አምስት :
የእናት

ትየውን ባህርይ የተመለከቱ የጨቅላ ህጻኑን/ኗን ሙቀት መቀነስ ሊያመጡ የሚችሉ ተዛማጅ ምክንያቶችን የተመለከቱ መጥያቄዎች

ተቁ	ጥያቄዎች		የሚዘለሉ
15	የእናት ቅድመ ወሊድ ክትትልን በተመለከተ		
15.1	የቅድመ ወሊድ ክትትል ነበሮት?	ሀ፡አዎ ለ፡አይደለም	ወደ ጥቅ 16
15.2	ለምን ያክል ጊዜ ለክትትል ሄደዋል እስኪወልዱ ድረስ?	_____	

ክፍል ስድስት: ጨቅላ ህጻኑ በሚወለድ ጊዜ እንክብካቤ ሰጭውን ባህርይ በተመለከተ

ተቁ	ጥያቄዎች	

16	ጨቅላ ህጻኑ/ኗ በተወለደ/ች አንድ ሰዓት ውስጥ ጡት ማጥባት ጀምረዋል?	ሀ፡አዎ ለ፡አይደለም
17	ጨቅላ ህጻኑ/ኗ ከማዋለጃ/ከቀዶ ጥገና ክፍል ወደ ድህረ ወሊድ በሚዘዋወሩበት ጊዜ ከእናትየው ጋር የቆዳ ለቆዳ ንክኪ እየተደረገ ነበር?	ሀ፡አዎ ለ፡አይደለም
18	ጨቅላ ህጻኑ/ኗ እና እርሶ በአንድ ክፍል በአንድ አልጋ ላይ ነበራችሁ/ነበሩ?	ሀ፡አዎ ለ፡አይደለም

ክፍል ሰባት ማገናዘቢያ (ከእናትየው የህክምና ማህደር ላይ የሚሞላ) ተፈጥሮአዊ የሆኑ ተዛማጅ የእናትየው ምክኒያቶችን በተመለከተ

ተቀጥሎ	ጥቅም		የሚዘለሉ
19	ከእርግዝናው ጋር የተያያዙ ችግሮች		
19.1	እናትየው ከእርግዝና ጋር የተያያዘ ችግር ነበራት? ካላት ወደ ጥ.ቁ 22.2 ይሂዱ	አዎ <input type="checkbox"/> አይደለም <input type="checkbox"/>	20
19.2	የትኛው ችግር ነው የነበረው?	በእርግዝና ደም መፍሰስ <input type="checkbox"/> በእርግዝና የመጣ ደም ግፊት <input type="checkbox"/> የእንሽርት ውሀ ቀድሞ መፍሰስ/ኢንፌክሽን <input type="checkbox"/> የተወሳሰበ ምጥ <input type="checkbox"/> ከወሊድ ቦኃ ላይ ደም መፍሰስ <input type="checkbox"/> ሌላ ካለ ይገለጽ _____	

ክፍል ስምንት

ተቁ	ማገናዘቢያዎች	
20	የጨቅላ ህጻኑ/ኗ የብብት ሙቀት መጠን በመጀመሪያው ከአንድ እስከ ስድስት ሰዓት ባለው ከወሊድ ቦታ ስንት ነው?	<hr/>
21	የጨቅላ ህጻኑ/ኗ እድሜ የብብት ሙቀት በተለካበት ጊዜ (በሰዓት)	<input type="text"/>
22	የጨቅላ ህጻኑ/ኗ ጾታ	ወንድ <input type="checkbox"/> ሴት <input type="checkbox"/>
23	የጨቅላ ህጻኑ/ኗ ክብደት በግራም	<input type="text"/>
24	አፕጋር ስኮር	<input type="text"/>
25	በተወለደበት/ችበት ቀን የነበረው የእርግዝና እድሜ	<input type="text"/>
26	የእርግዝና ሁኔታ	ነጠላ <input type="checkbox"/> መንታ <input type="checkbox"/> ሌላ ካለ ይገለጽ <input type="text"/>
27	ከተወለደበት የእርግዝናው እድሜ አንጻር እድገት ማነስ	አዎ <input type="checkbox"/> አይደለም <input type="checkbox"/>

11 Biographical sketch

My name is Mahelet Alemayehu Sinshaw. I was born in 1992 in Shashemene town, West Arsi Zone, Oromia region. I have completed my primary school from 1999-2006 and secondary school 2007-2008 in Biftu primary and secondary school. And I have completed preparatory school from 2009-2010 in Shashemene preparatory school. I have done my BSc nursing from Debre Markos University 2014. Then I have been working at Ghandi memorial hospital in Addis Ababa city for four years. After wards in 2018 I joined Addis Ababa University for the master education.