HARAMAYA UNIVERSITY

DIRECTORIATE FOR POSTGRADUATE PROGRAMS

NEONATAL HYPOTHERMIA AND ASSOCIATED FACTORS AMONG NEONATES ADMITTED TO NEONATAL INTENSIVE CARE UNITS OF PUBLIC HOSPIT ALS IN JIGJIGA TOWN, EASTERN ETHIOPIA

MPH THESIS

BY

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School: **Public Health**

Program: **Epidemiology**

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HARAMAYA UNIVERSITY, HARAR, ETHIOPIA

Neonatal Hypothermia and Associated Factors among Neonates Admitted to Neonatal Intensive Care Unit of Public Hospitals in Jigjiga Town, Eastern Ethiopia

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I hereby certify that I have read and evaluated this Thesis entitled "Neonatal Hypothermia and Associated Factors among Neonates Admitted to Neonatal Intensive Care Units of Public Hospitals in Jigjiga Town, Eastern Ethiopia" prepared under my guidance by Abdulahi Ahmed Duale. I recommend that it be submitted as fulfilling the thesis requirement.

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ABBREVIATIONS AND ACRONYMS

ANC: Ante Natal Care

AOR: Adjusted Odds Ratio

APGAR: Appearance, Pulse, Grimace, Activity, Respiratory

EDHS: Ethiopia Demographic Health Survey

CI: Confidence Interval

ENBC: Essential Newborn Care

FMOH: Federal Minister of Health

LBW: Low Birth Weight

NICU: Neonatal Intensive Care Unit

SDG: Sustainable Development Goal

SPSS: Statistical Package for Social Science

WHO: World Health Organization

ABSTRACT

Background: Neonatal hypothermia is a global public health problem contributing to neonatal morbidity and deaths especially in low and middle-income countries. High neonatal hypothermia had reported from the countries with the highest neonatal death. More than 1.1 million neonatal deaths occur in sub-Saharan Africa mainly as neonatal hypothermia and so, improving newborn survival through appropriate thermal care is a major priority in child health policy today.

Objectives: To assess the magnitude of neonatal hypothermia and associated factors among neonates admitted to neonatal intensive care units in Public Hospitals in Jigjiga Town, eastern Ethiopia from April 01 to August 30, 2023.

Methods: An institution-based cross-sectional study conducted among randomly selected 377 participants admitted to neonatal ICUs at Public Hospitals in Jigjiga Town, eastern Ethiopia.

Data were collected from participants using pretested-structured questionnaires through face-to-face interview and record-review. Data were entered using Epi-Data version 3.1 and analyzed using SPSS version 25. Descriptive statistics were conducted to describe the participants. Independent variables with P-value<0.25 during the bivariate analysis were considered to multivariate binary logistic regression analysis to determine factors significantly associated with neonatal hypothermia. Adjusted odds ratio (with 95% CI) was used to report the association and the statistical significance was declared at P–value<0.05.

Results: A total of 377 participants participated in this study, yielding response rate of 100%. **P**revalence of neonatal hypothermia among neonates attending NICU at public hospitals was 237(64.1%) (95% CI: 59.2%, 68.9%) in the study area. In this study, delivered at night-time [AOR=2.78(1.71, 4.96)], mother age of less than 25 years [AOR=1.99(1.20, 3.31)], maternal illiteracy [AOR=2.28 (1.37, 3.78)], lack ANC visits[AOR=2.47(1.23, 4.96)], neonatal birth-weight [AOR=3.38(2.04, 5.59)] and being delivered at-most 37 weeks gestational age and less [AOR=2.44(1.22, 4.88)] were factors associated with the higher odds of neonatal hypothermia.

Conclusions: Neonatal hypothermia remains a prevalent and preventable neonatal health issue in the study area. Interventions should focus on promoting early skin-to-skin contact, ensuring thermal care during operative deliveries and night-time births, and improving antenatal care coverage to reduce hypothermia-related complications.

Keywords: Magnitude, neonatal hypothermia, associated factors, Jigjiga town, Ethiopia

1. INTRODUCTION

1.1. Background

Neonatal hypothermia is defined as a progressive drop in a newborn's body temperature below 36.5°C, which can result in adverse clinical effects ranging from mild stress to death(Tewodros, 2015). Neonatal period is the most dangerous time for a child's survival. It is a leading cause of neonatal morbidity and death (WHO, 2013).

Newborns are at risk of hypothermia because of their large surface area for small body mass. Evidence show when preventive intervention is not applied shortly after delivery, newborns core and skin temperature can fall at a speed of around $^{0.1oc\ to\ 0.3oc}$ per minute (Mullany *et al.*, 2010). Premature and Low Birth Weight (LBW) babies are at high risk to develop hypothermia and these are highly permeable skin that increase epidermal water loss, deficient subcutaneous fat with less insulation, deficient stores of brown fat, immature central thermoregulation, poor caloric intake and poor oxygen consumption due to related pulmonary problems (FMOH, 2014).

Hypothermia is not direct cause of neonatal morbidity and mortality but increases the newborn's metabolic requirements and related with hypoglycemia, hypoxia, and ultimately severe infections and newborn deaths (Lunze Karsten, 2012). Premature newborns and LBW babies less than 2,500 grams, hypothermia cause metabolic deterioration and death as these babies' ability to keep their body temperature at the normal range affected easily (Scalone *et al.*, 2018).

The burden of hypothermia remains questionable despite the reasons predisposing neonates to hypothermia are simply preventable. Besides, it is highly prevalent in Sub-Saharan Africa (SSA) including Ethiopia (Onalo, 2013). Study showed that risk factors of neonatal hypothermia are poverty, home delivery, and lack of skin-to-skin contact with caregiver, LBW, prematurity, bathing babies in an hour, of birth, and lack of Health Care Worker's knowledge of thermal care(Scalone *et al.*, 2018).

The WHO has included thermal care as a component of essential newborn care among a package/bundle of basic interventions recommended universally for all babies to decrease neonatal mortality. Ethiopia also applies the principle of skin-to-skin contact with the mother and Starts

breastfeeding within the first hour after birth to prevent hypothermia that is recommended by WHO (WHO, 2013). Achieving sustainable development goal 3, of ensuring healthy lives and promoting well-being for all ages, also requires a substantial reduction in newborn mortality. Although addressing neonatal hypothermia might help facilitate this goal, it has so far been a neglected challenge (Okomo *et al.*, 2015). Studies conducted at many hospitals included only local surveys on a single hospital.

1.2. Statement of the Problem

Neonatal hypothermia is a worldwide public health problem and a major cause of significant morbidity and death in the developing nations with low resource settings(Kumar *et al.*, 2010). Worldwide estimated four million newborns die within the first four weeks of life, which accounts for 2/3 of all deaths in the first year of life and 40% of under-five deaths (Kumar *et al.*, 2010; Demisse *et al.*, 2017), in Ethiopia neonatal mortality reported 29 deaths per 1,000 live birth, remained stable since the 2016 (CSA, 2016). Abnormally low body temperature (hypothermia) is a worldwide issue across all climates (McCall *et al.*, 2018).

Global burden of hypothermia at hospital level was in the range of 32% to 85% even in tropical environments (Karsten *et al.*, 2013). A study conducted from low and middle income countries show that prevalence neonatal hypothermia immediately after birth at 1st, 2nd and 4th hour using axillary temperature was 47.5%, 46.4% and 37.2% respectively (Delavar, M. *et al.*, 2014).

A systematic review in SSA showed the prevalence of hypothermia was high given that 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 (Onalo, 2013). Different studies showed that death 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(Okomo *et al.*, 2015).

The prevalence of hypothermia is also very high in Ethiopia. Evidence from northern Ethiopia show prevalence of hypothermia was 69.8 %(Tewodros, 2015), from eastern Ethiopia and southwestern Ethiopia revealed that the prevalence was 66.3% and 50.3% respectively (Bayihna, Wubet Alebachew *et al.*, 2019; Gebresilasea, 2019). Another study from southwestern Ethiopia showed that hypothermia is 4th leading cause of neonatal admission and the 5th leading cause of death (Seid

SAI *et al.*, 2019). Other studies conducted in different part of Ethiopia (Gonder and Bahirdar) showed high burden of hypothermia (Demisse *et al.*, 2017; Tarekegn, 2018).

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. Precautionary steps routinely include ensuring a warm delivery room; drying immediately after birth, especially the head; wrapping in pre warmed dry blankets (with head); pre-warming surfaces; and eliminating draughts (McCall *et al.*, 2018). So, assessing prevalence of neonatal hypothermia and related factorsof neonates admitted to NICU in jigjga public hospitals is the core aim of this study.

1.3. Significances of the Study

Hypothermia related problem begins at the delivery and postnatal ward and most of the problems were easily preventable with low cost. A better understanding of the prevalence and associated factors of neonatal hypothermia in this fragile group of population was 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. The identification of possible factors for the onset of neonatal hypothermia in delivery ward would 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 primary beneficiaries of the study were Jigjiga public hospitals.

The purpose of this study was determined the prevalence of neonatal hypothermia and associated factors of newborns admitted to neonatal intensive care units(NICU) of Jigjiga public hospitals.

1.4. Objectives of the Study

1.4.1. General objective

To assess the prevalence of neonatal hypothermia and associated factors among neonates admitted at neonatal intensive care units of public hospitals in Jigjiga Town, eastern Ethiopia from April 01 to August 30, 2023.

1.4.2. Specific objectives

- ✓ To determine the prevalence of neonatal hypothermia among neonates admitted at neonatal intensive care units at public hospitals in Jijjiga Town, eastern Ethiopia
- ✓ To identify associated factors of neonatal hypothermia among neonates admitted at neonatal intensive care unit at public hospitals in Jijjiga Town, eastern Ethiopia

2. LITERATURE REVIEW

2.1. Magnitude of Neonatal Hypothermia

Neonatal hypothermia is a global health problem in neonates born both at hospitals (prevalence range, 32% to 85%) and homes (prevalence range, 11% to 92%), even in tropical environments (Lunze *et al.*, 2013). A study conducted in Iran showed that the high prevalence of neonatal hypothermia was identified among 522 healthy full term newborn in a Baby Friendly Hospital in Babol; that is 84.5% were hypothermic immediately after birth, 85.1% 1 hour after birth, and 86.6% 2 hour after birth and 81.8% 4 hour after birth based on WHO classification of hypothermia (Delavar, M. *et al.*, 2014)). A study conducted in Pakistan reported that out of 300 neonates admitted to the neonatal unit, 144 (49.5%) developed hypothermia (Ali *et al.*, 2012).

A large population based study conducted in southern Nepal (n = 23,240) reported that 21,459 (92.3%) had low body temperature < 36.5°C, among hypothermic babies 47.4% were on the range of mild hypothermia and 48.7% of babies were moderate hypothermia and only 833 (3.9%) babies had measures below 34.0°C and only 23 (0.1%) had one or more measures in the severe hypothermia range (<32.0°C). Almost half (48.6%) of all babies had one or more measures in the moderate or severe hypothermia range (Mullany *et al.*, 2010). Another study within this country also showed that 10% of the babies (n = 2342) were hypothermic, observed with temperatures of < 35.0° (Mullany *et al.*, 2010).

A study in referral university hospitals in Tehran, Islamic Republic of Iran showed out of 900 neonates (452 males and 448 females), 53.3% were hypothermic immediately after birth, 13.6% on admission to the NICU, and 2.7% 1 hour after admission, 0.5% 2 hours after admission and 0.3% 4 hours after admission (Zayeri *et al.*, 2012). Another study conducted in Bangladesh on total of 2310 babies between 0 and 680 h of age showed 34% (785) of the neonates had hypothermia (Akter *et al.*, 2013).

The prevalence of hypothermia is high in Africa, especially in sub-Sahara Africa; Study from Johannesburg, South Africa suggests that the neonatal hypothermia was 21 % during admission (Thwala, 2010). Study from Uganda showed that out of 300 newborns 83% developed hypothermia

on admission with a rectal temperature of less than 36°C at 1 hour of delivery and neonatal hypothermia within 90 minutes postpartum was 79 % (Byaruhanga *et al.*, 2011).

A cross-sectional study conducted in Zimbabwe reported that 85% of newborns had hypothermia at admission with mean axillary temperature of 34.3ºc (Kambarami & Chidede, 2010). A similar study conducted in Nigerian newborns aged 0 to 648 hours, revealed that out of 150 neonates 93(62%) had hypothermia and out of this, 47.3% were Mild hypothermic and 52.7% were moderate hypothermic (Tinuade *et al.*, 2012). Another study conducted in Nigerian intensive care unit showed that out of 111 babies, 75(67.6%) were hypothermic and the prevalence of hypothermia was high among preterm infants and LBW babies (Ogunlesi *et al.*, 2012).

Another study in East Africa, Nairobi, Kenya, shows that the prevalence of neonatal hypothermia was 27% among 533 low birth weight babies on admission (Simiyu, 2009). Study in Tanzania, Muhimbili Medical Centre Neonatal Care Unit reported that out of 1,632 babies 366 (22.4%) had hypothermia on admission, and 13% of hypothermic neonates had severe hypothermia, with body temperature below 32 ºc on admission (Manji & Kisenge, 2003). Hospital based study in Ethiopia showed that the prevalence of hypothermia on admission was high and almost more than half of the new born (53%) had hypothermia on admission (Lunze *et al.*, 2013). Another study conducted in northwest Ethiopia reported that neonatal hypothermia in the study area was found to be 69.8 %(Seyum, T. & E. Ebrahim, 2015)The study conducted in Bahir Dar, FelegeHiwot Referral Hospital, showed that out of 43 neonates that had a temperature recorded at admission 29 (67%) were hypothermic(Fulton, 2013).

2.2. Factors Associated with Neonatal Hypothermia

Neonatal hypothermia is related to a many risk factors that can be categorized in to five main groups; environmental factors, physiological factors, behavioral factors and socio demographic factors and contextual factors (Karsten *et al.*, 2013). Environmental factors include geographical area, time of the year (seasons) and other related factors. Initially, neonate's body temperature is primarily associated with their mother's body temperature and it associated to environmental temperature in which the neonate is born, as well as time of the year (seasons).

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(Aliona & Redmond, 2014).

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 (Kumar *et al.*, 2010).Behavioral risk factors are considered to be 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 (Onalo, 2013).

Socioeconomic factors contribute to neonatal hypothermia. Socially mothers are either young or inexperienced or multiparouswho caring 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 (Karsten *et al.*, 2013). Birth context related factors such as mode of birth and place of birth are also contributing factors of neonatal hypothermia (Demisse *et al.*, 2017).

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(Karsten *et al.*, 2013). On a Study conducted in Nepal was revealed that of neonatal hypothermia was more observed in low temperature of the delivery room ≤27.5oC (61.5%) than in those with temperature >27.5oC (38.5%). The study show that at 4 h after birth shows temperature of postnatal room below 27oC (P<0.01) and delivery room <27 oC (P < 0.01) were significant predictors of neonatal hypothermia(Delavar, M., Z. *et al.*, 2014).

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 (Zayri AK *et al.*, 2012).

A systematic review of several studies in a resource limited environment shows that the intuitive association of environmental temperatures with the cold seasons. A study done in India showed, with an overall hypothermia prevalence of 17%, showed environmental temperature differences between summers (14.8%) to winter (21.5%). The study conductedin 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 reported 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 summer (Karsten *et al.*, 2013).

A cross sectional study done in north west Ethiopia show that newborn 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) (TewodrosSeyum 2015).

2.2.2. Physiologic factors

The study done in Iran on healthy term neonates for one-year period by recording their temperature immediately after birth, at 1hr, 2hr, and 4hr. The result indicated that hypothermia was 41.2%, 47.5%, 46.4% and 37.2% at the respective hours. (Delavar, M., Z. *et al.*, 2014). A 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 (Miller & HLa, 2011). Study held in Iran determined that premature newborns had almost two times more likely being hypothermic when compared to term neonates (Zayri AK *et al.*, 2012).

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 (Onalo, 2013).

A 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 >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). 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)(Tinuade *et al.*, 2008).

A study conducted in Uganda showed that low-birth-weight was significant risk factors for early neonatal hypothermia at admission (P=0.000) (Tinuade *et al.*, 2009). Study in south west Ethiopia neonates whose had low birth weight (<2500gm) during admission were almost 4 times more likely to be hypothermic when compared with those normal birth weight (>2500 gm) (AOR = 3.61, 95% CI: 2.10, 6.18) (Gebresilasea, 2019. 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{Seyum, 2015 #244).

.A study conducted in Eastern part of Ethiopia those newborns who were born to mothers having obstetric complications were 2.4 times more likely to be hypothermic when compared to those born to mothers without 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)(Bayihna, Wubet Alebachew *et al*., 2019).

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 (WHO, 2013). Study conducted in Southern Nepal revealed that the prevalence of skin to skin contact was 41 %(Mullany *et al.,* 2010).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) (Seyum, T & E. Ebrahim, 2015).

A 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 (AOR = 2.87,95% CI: 1.48, 5.57). 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) (Bayihna, Wubet Alebachew *et al.*, 2019).

A 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 (Mullany *et al.*, 2010). 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) (Onalo, 2013).

A study conducted in Uganda showed that, lack of breastfeeding were a significant risk factors for neonatal hypothermia during admission (P=0.028) (Tinuade *et al.*, 2009). Another study done in Gonder, Ethiopia those new-born for whom EBF was not initiated within one hour were eight times more likely to develop hypothermia when compared to those who have started breast feeding within 1 hour (AOR=7.58, 95%CI: 3.61, 15.91) (Seyum, T & E. Ebrahim, 2015).

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 (WHO 2013). 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)(Bayihna, Wubet Alebachew *et al.*, 2019).

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 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 (WHO, 2013).

2.2.4. Sociodemographic 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 diseases(Scalone *et al.*, 2018)). California study shows that hypothermia had no associations with maternal age, parity, educational status and occupational status (Miller & HLa, 2011).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 (Delavar, M. *et al.*, 2014).

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 norm thermic and hypothermic newborns and in Ethiopia factors like ethnicity, religion, parity, educational and occupational status was not associated to incidence of hypothermia (Bayihna, Wubet Alebachew *et al*., 2019).

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. Iranian study revealed that neonatal hypothermia in women who had gave birth via SVD was lower hypothermia when compared to those gave birth with episiotomy ($P < 0.01$).

According to this literature review, the prevalence of hypothermia was high in all over the world especially in Africa including Ethiopia. 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

The conceptual framework is adapted from various published literatures and contextualizes factors into socio-demographic, physiologic, contextual, behavioral and environmental factors.

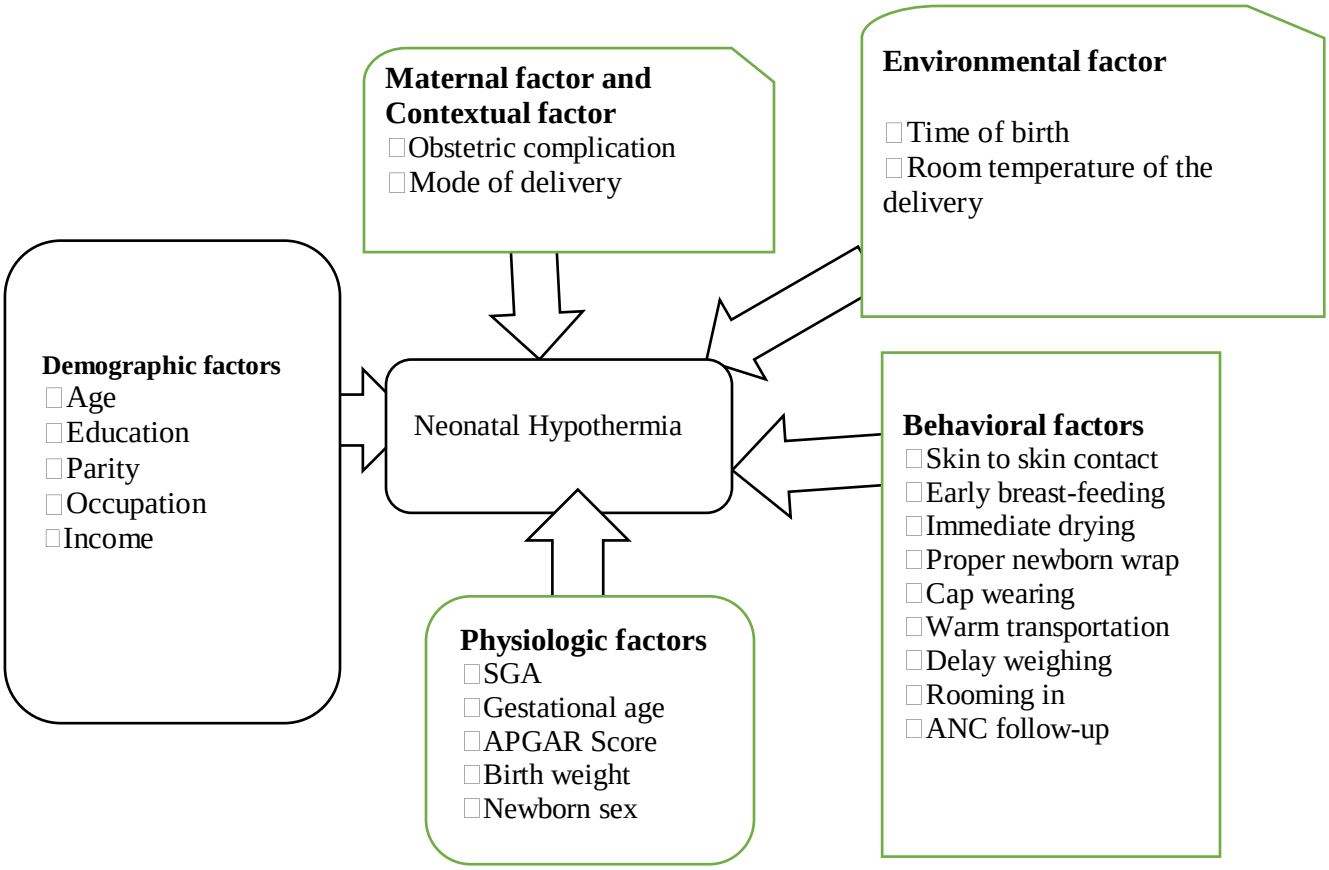

Figure 1: Conceptual framework for the study on Neonatal hypothermia and associated factors adapted from different literatures

3. METHODS AND MATERIALS

3.1. Study Setting and Period

The study was conducted in Jigjiga town public hospitals. Jigjiga is the capital city of Somali region which is found at the distance of 626km away from Addis Ababa, the capital city of Ethiopia. According to 2015 central statistics agency, it is estimated that the total populations of Jigjiga city administration are 426,122 out of which 85,650 are in reproductive age group. The city has 20 Kebeles, constituting 17,001 households, in the city there are one general hospital and one referral hospitals, one primary hospital and there are three health centers, and eight clinics.

Specific areas that the study was done in public hospitals namely, Sheik Hassan Yaberre Jigjiga University Referral Hospital (SHYRH), the teaching hospital of Jigjiga University was established in 2017. It's the only referral hospital in Somali region, it offers services at general and specialty levels, the hospital has a total of 342 beds and it gives services to over 7690 hospitalized patients, 38,523 outpatients' 3434 delivery, and nearly 9270 emergency cases each year. It offers services at general and specialty levels including Internal Medicine, Pediatrics and Child Health, NICU, Surgery, Gynecology& Obstetrics, ENT (Ear, Nose and Throat), Neurology, Psychiatry, Ophthalmology, Dermatology, Dentistry, Radiology, Pathology, Laboratory and Pharmacy services. The neonatal intensive care unit of the Hospital has 13 beds; it offers diagnostic, and treatment service for approximately 1100 babies per year.Karamarda hospital is the oldest general hospitals in the region it serves for all populations from all over Somali region specifically Fafan zone. Currently, it has over 110 beds in a broad range of services to over 13,120 outpatients, 3,980 hospitalized patients, 2,320 delivery services and 4,356 emergency cases annually. The study was conducted from April 1 to August 30, 2023.

3.2. Study Design

Institution-based cross-sectional study design was employed.

3.3. Population

3.3.1. Source population

All neonates admitted at NICU public hospital in Jigjiga Town, Ethiopia fromJanuary1/2021 to January1/2023

3.3.2. Study population

All neonates admitted at NICU in selected public hospital in Jigjiga Town from January1/2021 to January1/2023

3.4. Inclusion and Exclusion Criteria

3.4.1. Inclusion criteria

Records of all neonates admitted at NICU from January1/2021 to January1/2023.

3.4.2. Exclusion criteria

Chart with incomplete documentation (no maternal or fetal measurement parameters).

3.5. Sample Size Determination and Sampling Procedures

3.5.1. 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, margin of error between the sample and population=5%, standard normal distribution value at 95% CI, and Z α/2=1.96.

$$\frac{n = (Za/2)^2 \times p(1-p)}{d2}$$

$$\frac{(1.96\times1.96)^2\times0.663(1-0.663)}{0.0025}=343$$

Whereas, 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 α/2=1.96 for 95% confidence interval

p=Prevalence of neonatal hypothermia

by adding 10 response rate

Sample size determination for the second objective

To determine the required sample size for the second specific objective of this study different factors which are significantly associated with the outcome variable is used with the following assumption; 95% confidence level and power of 80% using Epi info version 7.2 software with 10% for non-response rate. The sample size was calculated and maximum sample size was taken for the final required sample size (Table 1).

Table 1: Neonatal hypothermia and associated factors of neonates admitted at neonatal intensive care unit of public hospitals in Jigjiga Town, eastern Ethiopia

Associated factors	Proportion of neonatal hypothermia		Power (%)	AOR (95% CI)	Sample size before 10%NR	Sample size with 10%	Reference
	Exposed	Non-exposed					
Early initiation of breast feeding	79.6%	20.4%	80	3.72 (2.07,6.65)	100	110	(Bayiha, Wubet Alebachew *etal*.,2019)
Birth weight	73.4%	26.6%	80	2.26(1.27, 4.03)	340	374	

The required sample size was determined by taking the maximum sample size obtained from the first specific objective (377) and second specific objective (110) and (374) estimation results. Thus, desired sample size obtained from first factor is maximum and considered (n=377).

3.5.2. Sampling procedures

Systematic random sampling technique was used to obtain charts of neonates, the "Kth" value was calculated by dividing the total number of neonates admitted to NICU within the last two years, to the required sample size (i.e. K=N/n=3810/343=11). The first chart was selected by lottery method. Data were collected from first chart selected by lottery method and continue in similar pattern until the desired number of samples was obtained.

3.6. Data Collection Methods

Data were collected through face-to-face interview using pre-tested-structured questionnaire consisting four parts; socio-demographic factors, physiological factors, behavioral factors, and environmental factors. Data were collected by four health workers holding BSc degree nurse and two public health experts master's degree were supervised the overall data collection.

3.7. Study Variables

3.7.1. Dependent variable

Neonatal hypothermia

3.7.2. Independent variables

Sociodemographic factors

- ✓ Age
- ✓ Educational status
- ✓ Parity

Behavioral factors

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

Birth contexts factors

- ✓ Mode of delivery

Environmental factor

- ✓ Time of birth
- ✓ Room temperature of the delivery room

3.8. Operational Definitions

Hypothermia: an axillary temperature of less than 36.5 °c

Cold-stress (mild hypothermia): an axillary temperature of 36.0 to 36.4 ℃

Moderate hypothermia: an axillary temperature of 32.0 to 35.9 ℃

Severe hypothermia: an axillary temperature of < 32.0 ℃

Normo thermic: an axillary temperature of 36.5 to 37.5 ℃

Hyperthermia: An axillary temperature of > 37.5 ℃

Admission temperature: The first temperature obtained from neonates at admission to NICU

Inborn: a new born who delivered from the study hospital

Out-born a newborn who delivered other than the study hospital

3.9. Data Quality Control

To keep data quality, supervisor and data collectors were trained 3 days on how and what information they should collect from the targeted data sources. Data extraction forms were checked prior to data collection. Pretest was done in degahbur General hospital on 5% of sample size. After pretesting necessary corrections of the checklist were made. During data collection period, Completeness of the collected data was checked supervisors and investigator gave daily and prompt feedback. Beside the investigator carefully entered and thoroughly clean the data before the commencement of the analysis.

3.10. Data Processing and Analysis

After checking for incompleteness and inconsistencies, data were entered using Epi*Data* version 3.1 and analyzed using Stata 16. Descriptive statistics were used to summarize the participants (frequency and percentage, mean, media, range and IQR were used accordingly). Bivariate and multivariate logistic regression analyses were conducted used to identify association of each independent variable and dependent variable and identify significant risk factors for the neonatal hypothermia. Independent variables with P-value≤0.25 in the bivariate analysis were considered for multivariate binary logistic regression analysis to control for possible confounders. Adjusted Odds ratios with 95% CI was used to report association and significance was declared at P<0.05. Model fitness was checked by Hosmer and Lemeshow goodness of a fit test.

3.11. Ethical Clearance

The study was carried out after secured ethical clearance and approval from Institutional Health Research Ethics Review Committee of Haramaya University College of Health and Medical Sciences, School. Official letter of co-operation was written to Somali Regional Health Bureau (SRHB) and circulated similar letter to hospital, and obtained from permission from health facility head. Informed, voluntary, written, and signed consent obtained from each hospital head, study participant and confirmed by signature. Confidentiality and privacy was kept accordingly. All protocols of **covid -19** prevention and control strictly followed.

3.12. Information Dissemination

The results of the study was disseminated to governmental and nongovernmental organizations to provide information about neonatal hypothermia and associated factors among neonates admitted to NICU at public hospital in Jijjiga Town. In addition, the findings of the study was submitted to Haramaya University, College of Health and Medical Sciences School of Graduate Studies and then the copies of the report was provided to Somali Regional Health bureau and their public hospitals and Town health office. Last but not the least, efforts was made to present the study findings on national/international scientific conferences and prepare manuscript for publication on scientific peer-reviewed journal.

4. RESULTS

4.1. Characteristics of Participants

4.1.1. Sociodemographic characteristics

A total of 370 patient records were analyzed in this study yielding the response rate of 98%. One hundred seventy (40.3%) of the mothers were in the age group of 15-24 years. More than half, 221(59.7%) of the mothers were urban residents (Table 2).

Table 2: Sociodemographic characteristics of participants in Jijjiga town, eastern Ethiopia, 2023 (n=370)

Characteristics		Frequency	Percent
Age of mother (in year)	<25	149	40.3
	≥25	221	59.7
Residence area	Rural	142	38.4
	Urban	228	61.6

4.1.2. Neonatal Characteristics

All neonates (100%) involved in the study were dried by status, immediately dried within 1 hour, dry covered their body and changed their body dry covered material as well as had skin to skin contact with their mothers. More than half, 208(56.2%) of the neonates were Male. More than two-third, 231(62.4%) and 228(61.8%) of the neonates had low-birth weight and normal Apgar score, respectively. Almost all, 368(95.5%) and very few, 67 (18.1%) of the neonates were single-tone and preterm birth, respectively (Table 3).

Table 3: Neonatal characteristics of participants in Jijjiga town, eastern Ethiopia (n=370)

Characteristics		Frequency	Percent
Type of prewarmed towel	Hospital own	167	45.1
	Mother own	203	54.9
Time of drying	Before cord-cut	159	43.0
	After cord-cut	211	57.0
Where baby dried on	Mother abdomen	223	60
	Elsewhere	147	40
Drying towel owner	Hospital	151	40.8

	Mother	219	59.2
Covered baby (by hat)	Yes	217	58.6
	No	153	41.4
Sex of neonate	Male	208	56.2
	Female	162	43.8
Birth weight (gram)	<2500	231	62.4
	≥2500	139	37.6
APGAR Score	≥7	228	61.6
	<7	142	38.4
Gestational age (in weeks)	>37	226	61.1
	≤37	144	38.9
Type of birth	Single	368	95.5
	Twin/Triplet	2	0.5
SGA	No	222	60.0
	Yes	148	40.0
Neonatal health problem	Yes	177	47.8
	No	193	52.2
Neonate resuscitation	Yes	167	45.1
	No	203	54.9

4.1.3. Maternal reproductive and environmental characteristics

One-hundred ninety-nine (53.8%) and 190(51.4%) of the neonates were delivered at nighttime and through spontaneous vaginal delivery, respectively. More than two-third, 250(67.1%) of the neonates' mothers were multiparous and almost all (60.8%) had at least one ANC visit (Table 3).

Table 4: Maternal reproductive and environmental characteristics of participants in Jijjiga town, eastern Ethiopia (n=370)

Characteristics		**Frequency**	**Percent**
Room Temperature	≥35 c0	195	52.7
	<35 c0	175	47.3
Delivery time	Day	171	46.2
	Night	199	53.8
Mode of delivery	SVD	190	51.4
	CS/ IVG	180	48.6
Parity	Multipara	250	67.1
	Primipara	120	32.4
ANC attendance	Yes	225	60.8

	No	145	39.2
If yes, ANC visit (n=359)	1-2	230	64.1
	3-4	129	35.9
Type of obstetric problems (complications)	HDP	121	32.7
	APH	97	26.2
	Uterine rupture	40	10.8
	Other	112	30.3

4.2.Prevalence of Neonatal Hypothermia

The prevalence of neonatal hypothermia among neonates attending NICU at public hospitals was 169(45.7%) (95% CI: 59.2%, 68.9%) in the study area(Figure 2)

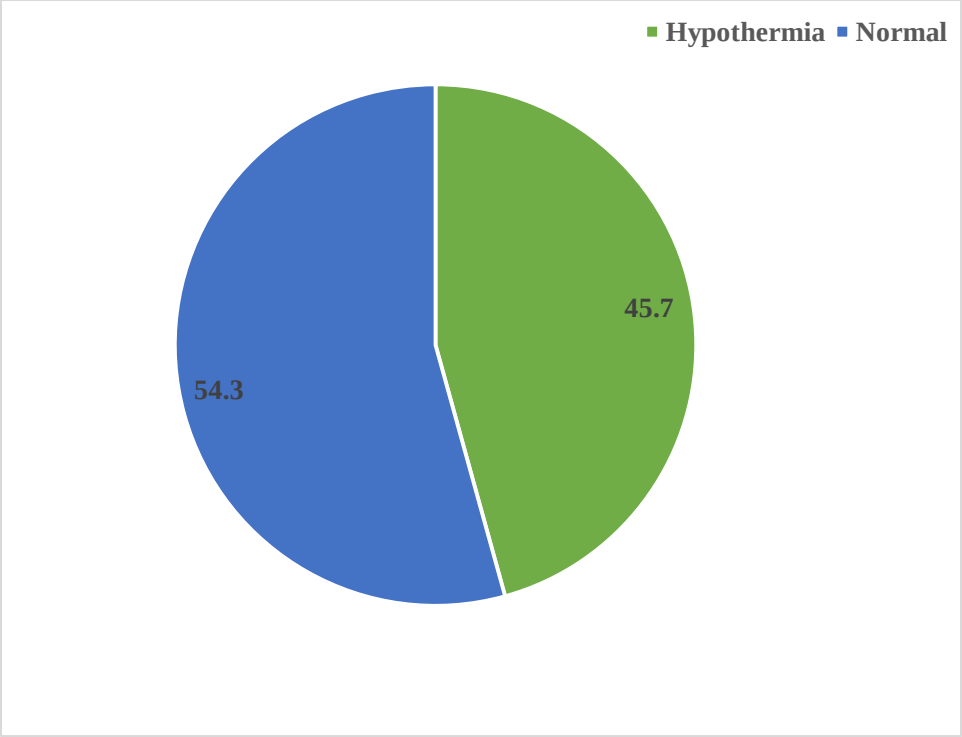

Figure 2: Prevalence of Neonatal Hypothermia among neonates attending NICU at public hospitals in Jijjiga town, eastern Ethiopia, 2023 (n=370)

4.3. Factors Associated with Neonatal Hypothermia

In the bivariable analysis, time of birth, having no skin to kin contact within 1 hour after delivery, birth weight, small gestational age and neonatal resuscitation during at birth were associated with neonatal hypothermia of neonates admitted to NICU at P-value≤0.001. Mode of delivery, covering head of neonate by hat, where baby dried, ANC visit and APGAR score was associated with neonatal hypothermia of neonates admitted to NICU at P-value≤0.01 and gestational age was associated with neonatal hypothermia of neonates admitted to NICU at P-value<0.05 while other variables were not significant but considered for multivariable analysis model at P-value<0.25 (Table 5).

had six times

Table 5: Bivariable logistic regression of associated factors of neonatal hypothermia neonate attending NICU at public hospitals in Jijjiga town, eastern Ethiopia, 2023

Associated factors			**Neonatal Hypothermia**		**COR (95% CI)**	**P-Value**
			Yes (%)	**No** (%)		
Delivery time		Night	113(57.7)	83(42.3)	3.11(2.01, 4.78)	0.000
		Day	53(31)	118(69.)	1	
Mode of delivery		CS/IVD	52(28.9)	128(71.1)	3.94(2.55, 6.09)	0.103
		SVD	117(46.8)	73(29.2)	1	
Where dried a newborn	Elsewhere		61(38.4)	98(61.6)	1.60(1.10, 2.56)	0.015
	Mother's abdomen		108(51.2)	103(48.8)	1	
Age of the mother		<25	75(50.3)	74(49.7)	1.36(0.90, 2.07)	0.140
		≥25	127(57.5)	94(42.5)	1	
Initiation of BFwithin1hr		Yes	102(64.1)	98(35.9)	1	0.79
		No	103(64.0)	67(36.0)	1.44(0.95, 2.19)	
Skin-to-skin contact		Yes	120(32.4)	49(13.2)	1	0.000
		No	58(15.8)	143(38.6)	6.03(3.84,9.48)	
Parity		Primiparous	54(45)	66(55)	0.960.62, 1.48)	0.85
		Multiparous	115(46)	135(54)	1	
ANC visit		Yes	88(52.1)	81(48)	1	
		No	137(68.2)	64(32)	1.97(1.29, 3.00)	0.021

Sex of newborn	Male	123(64.4)	68(35.6)	0.99(0.65, 1.49)	0.96
	Female	114(63.7)	65(36.2)	1	
Birth weight	<2500	122(52.8)	109(47.2)	2.19(1.41, 3.38)	0.000
	≥2500	47(33.8)	92(66.2)	1	
APGAR score	<7	44(27.3)	117(72.7)	3.95(2.54, 6.16)	0.014
	≥7	125(60)	84(40.1)	1	
Gestational age (in weeks)	<38	78(54.2)	66(45.8)	1.75(1.15, 2.76)	0.009
	≥38	91(40.3)	135(59.7)	1	
	No	105(52.2)	96(47.8)	1	
Child resuscitation	Yes	110(65.8)	57(34.1)	2.37(1.55, 3.62)	0.000
	No	122(57.3)	91(42.7)	1	

Note: COR= Crude Odds Ratio, HDP: Hypertensive disorder of pregnancy, APH: Ante partum Heammorgea, OL: Obstructed Labour, SVD: Spontanous Vaginal Delivery, CS: Ceserian delivery, IVD: Instrumental vaginal delivery, GA: Gestational age,

In the adjusted analysis, the odds of neonatal hypothermia were three times [AOR=3.118(2.01, 4.78)] higher among newborn babies delivered at night compared to those delivered at daytime. The odds of neonatal hypothermia were two times [AOR=3.94(2.55, 6.09)] higher among neonates who born C-section and IVD compared to SVD. The odds of hypothermia were higher [AOR=1.97(1.29, 3.00)] whose mothers had at least one ANC visit compared to those whose mothers had at least three ANC visit. The odds of neonatal hypothermia were four times [AOR=4.49(2.51, 7.84)] higher Neonates who had no skin-to-skin contact within 1 hour after delivery. The odds of neonatal hypothermia were three times [AOR=2.19(1.41, 3.38)] higher among neonates whose birth weight was less than 2500 grams compared to those whose weight was ≥2500 grams. The odds of neonatal hypothermia were two times [AOR=1.75(1.15, 2.76)] higher among neonates delivered at most at 37 weeks' gestational age compared to those whose delivered at most at more than 37 weeks' gestational age. The odds of neonatal hypothermia were two times [AOR=2.37(1.55, 3.62)] higher among neonates.

Table 6: Multivariable logistic regression of factors associated with neonatal hypothermia neonate in NICU at public hospitals in Jijjiga town, Ethiopia, 2023

Associated Factors		Neonatal Hypothermia		AOR (95% CI)	P-Value
		Yes (%)	No (%)		
Time of birth	Night	113(57.7)	83(42.3)	3.27(2.00, 5.36	**0.001**
	Day	53(31)	118(69.)	1	
Mode of delivery	CS/IVD	52(28.9)	128(71.1)	4.65(2.82, 7.65)	**0.000**
	SVD	117(46.8)	73(29.2)	1	
Where dried a newborn	Elsewhere	61(38.4)	98(61.6)	1.77(1.07, 2.96)	0.969
	Mother's abdomen	108(51.2)	103(48.8)	1	
Age of mother (year)	<25	75(50.3)	74(49.7)	1.989(1.197, 3.305)	0.039
	≥25	127(57.5)	94(42.5)	1	
Parity	Primiparous	54(45)	66(55)	0.84(0.49, 1.42)	0.31
	Multiparous	115(46)	135(54)	1	
ANC visit	Yes	88(52.1)	81(48)	1.788(1.07, 2.96)	**0.032**
	No	137(68.2)	64(32)	1	
Initiation of BFwithin1hr.	Yes	102(64.1)	98(35.9)	1	0.053
	No	103(64.0)	67(36.0)	1.40(0.85,2.31)	
Skin-to-skin contact	Yes	120(32.4)	49(13.2)		**0.000**
	No	58(15.8)	143(38.6)	4.49(2.51,7.84)	
Sex of newborn	Male	123(64.4)	68(35.6)	1.11(0.68,1.80)	0.67
	Female	114(63.7)	65(36.2)		
Birth weight	<2500	122(52.8)	109(47.2)	2.05(1.22, 2.44)	**0.03**
	≥2500	47(33.8)	92(66.2)	1	
APGAR score	<7	44(27.3)	117(72.7)	3.95(2.54, 6.16)	**0.000**
	≥7	125(60)	84(40.1)	1	
Gestational age (in weeks)	≤37	78(54.2)	66(45.8)	1.46(0.883, 2.41)	0.14
	≥38	91(40.3)	135(59.7)	1	
Child resuscitation	Yes	110(65.8)	57(34.1)	2.76(1.67,4.57)	**0.000**
	No	122(57.3)	91(42.7)		

Note: AOR= Adjusted Odds Ratio, HDP: Hypertensive disorder of pregnancy, APH: Ante partum Heammorgea, OL: Obstructed Labour, SVD: Spontanous Vaginal Delivery, CS: Ceserian delivery, IVD: Instrumental vaginal delivery, GA: Gestational age,

5. DISCUSSION

In this study, we investigated the prevalence of neonatal hypothermia and associated factors among neonates admitted to NICU at public hospitals in Jijjiga Town of Somali Regional State, eastern Ethiopia. Accordingly, prevalence of neonatal hypothermia among neonates admitted to NICU at public hospitals in Jijjiga Town of Somali Regional State, eastern Ethiopia was 45.7%. In this study, being delivered at nigh time, mode of delivery, where dried a newborn, Parity, lack of kin-to-skin contact after delivery, ANC visits, neonatal birth-weight, gestational age at the birth and neonatal resuscitation were factors associated with the higher neonatal hypothermia among neonates.

In this study, nearly half of neonates admitted to NICU of public hospitals in Jijjiga town of Somali region in eastern Ethiopia had neonatal hypothermia, which implies the higher prevalence of neonatal hypothermia among neonates in the study area. This finding was lower than the findings of studies conducted in Iran (53.3% neonatal hypothermia) (Zayeri *et al.*, 2012), Pakistan (49.5% neonatal hypothermia)(Ali *et al*., 2012), Nigeria (62% neonatal hypothermia) (Tinuade *et al.*, 2012), the finding was lower than the studies done in Iran, 84.5% hypothermia (Delavar, M. *et al.*, 2014),Nepal, 92.3% hypothermia (Mullany *et al.*, 2010), Uganda, 83% hypothermia (Byaruhanga *et al.*, 2011), Zimbabwe, 85% hypothermia (Kambarami & Chidede, 2010), Nigeria, 67.6% hypothermia (Ogunlesi *et al.*, 2012)and Ethiopia, 69.8 % hypothermia(Seyum, T. & E. Ebrahim, 2015), and Ethiopia (53% hypothermia (Lunze *et al.*, 2013) and 67% hypothermia (Fulton, 2013). However, the findings was higher than studies conducted in Bangladesh (34% neonatal hypothermia) (Akter *et al.*, 2013), South Africa (21% neonatal hypothermia) (Thwala, 2010), Kenya (neonatal 27% hypothermia)(Simiyu, 2009) and Tanzania (22.4% hypothermia) (Manji & Kisenge, 2003)

The differences of level of neonatal hypothermia observed across the studies could be explained by the differences in the methodological differences such as the study settings, study periods, demographic characteristics of participants, sample sizes and inclusion/exclusion criteria used across the studies and the time duration when neonatal hypothermia measured across studies. For, instance, few of studies measured neonatal hypothermia within first few hours of neonatal births while other studies were conducted in the tertiary hospitals were advanced NICU, and obstetric cares were given

to the neonates and their mothers while some other studies were collected secondary information recorded at NICU units of public hospitals using secondary data/patients medical records.

In this study, neonatal hypothermia was three folds higher among neonates delivered at night-time compared to those delivered at the day-time and this finding is similar with the study done in and northwest Ethiopia(TewodrosSeyum 2015) and supported by studies conducted in Nepal (Delavar, M., Z. *et al*., 2014), Iran (Zayri AK *et al.*, 2012) and India (Karsten *et al.*, 2013). The higher risk of hypothermia at night-time could be explained by lower ambient temperatures during the night, which increase heat loss in neonates immediately after birth. In addition, night-time deliveries are often characterized by reduced availability of skilled staff, limited resources, and delayed initiation of essential thermal care practices such as immediate drying, skin-to-skin contact, and early breastfeeding. These factors together create conditions that make neonates more vulnerable to hypothermia when delivered at night.

In this study, neonatal hypothermia was two folds higher among neonates whose mothers aged less than 25 years and this could be explained by the facts that the more maternal age of neonate was matured, the more likely to the mothers have health education and counseling, more likely to attend healthcare services, more likely care the neonates , and undertake preventative and curative cares for the fetus and neonates, which in turn improve their and their newborn health status and hence, the less likely their neonate faced hypothermia. The finding was also supported by studies done in Ethiopia(Bayihna, Wubet Alebachew et al., 2019).

In this study neonatal hypothermia was two times higher among neonates whose mothers had never attended ANC visit compared to those whose mothers had at least one ANC visits during last pregnancy and this finding was similar with the studies conducted in Sub-Saharan Africa that reported the lack of ante natal care (ANC) during pregnancylead to neonatal hypothermia (Onalo, 2013), California, USA (Miller & HLa, 2011) and Iran(Delavar, M. Z. *et al.*, 2014).
In this study, neonatal hypothermia was three times higher among neonates whose birth weight was less than 2500 grams compared to those whose weight was 2500 grams and above and this finding was similar with studies done in Sub-Saharan Africa(Onalo, 2013), Nigeria(Tinuade *et al.*, 2008), Uganda(Tinuade *et al.*, 2009) and Ethiopia(Bayihna, Wubet Alebachew *et al.*, 2019).

Neonates who had no skin-to-skin contact within 1 hour after delivery had a 3.1 times higher odds of hypothermia compared to those who had skin-to-skin contact. Skin-to skin contact enables the newborn to achieve and maintain thermal control, better temperature gains, and lesser morbidity. This finding is comparable to the studies con ducted in Addis Ababa, Tigray and Gondar (Seyum and Ebrahem, 2015; Demissie et al., 2018, Tasew et al.,2018)

In this study, neonatal hypothermia was two times higher among neonates who delivered at most at 37 weeks gestational age compared to those who delivered at most at more than 37 weeks gestational age and this findings was similar with the studies conducted inSub-Saharan Africa(Onalo, 2013), Nigeria(Tinuade *et al.*, 2008), and Uganda(Tinuade *et al.*, 2009).

Another variable that showed significant association in this study was neonatal resuscitation. The odds of hypothermia were2.9 times higher in neonates having CPR than those who had not. Heat loss is a particular problem at resuscitation. Keeping infants sufficiently warm immediately after birth, especially during resuscitation, is difficult. A similar finding was reported from studies conducted in Etthiopia, Bangladesh and Iran (Zayeri 2017; Akter 2013; Demissie et al., 2018)

6. CONCLUSIONS AND RECCOMMENDATIONS

6.1. Conclusions

The prevalence of neonatal hypothermia among neonates attending NICUs at public hospitals was high in the study area. In this study, delivering at the night time, mode of deliver, no skin-to- skin contact after delivery, antenatal visit, neonatal birth weight and gestational age and neonatal resuscitation were factors significantly associated with neonatal hypothermia.

6.2. Recommendations

Health Professionals

- ✓ It is recommended to practice warm resuscitation for those neonates who need resuscitation
- ✓ It is better to give priority for provision of the thermal care provision during the night time delivery, providing antenatal care services, educating mothers on thermal care especially youth mothers and, preterm and low birth weight neonates in the thermal protection.

Hospitals

- ✓ It is recommended to give attention to preterm neonate on thermal care and provide intensive care on separate room especially in night time that adjusted the temperature for preterm babies.
- ✓ It is better to give more focus and priority for provision of the thermal care provision during the night time birth, offering adequate antenatal care service and educating mothers on thermal care especially for young mothers and, preterm and low birth weight in the thermal protection.

6.3 Limitation Of the study

- ✓ **Cross-Sectional Design:** The use of a cross-sectional approach limits the ability to establish causal relationships between identified factors and neonatal hypothermia. It captures associations at a single point in time but cannot determine temporality or causality.
- ✓ **Use of Secondary Data:** Data were collected through record reviews of medical records, which may be incomplete, inaccurate, or inconsistent. This might lead to information bias and affect the reliability of the findings.
- ✓ **Limited Generalizability:** The study was conducted in public hospitals within Jigjiga town, focusing on neonates admitted to NICUs. The findings may not be generalizable to neonates in community settings, private hospitals, or other regions with different health system or demographic characteristics.
- ✓ **Potential Selection Bias:** Since the study sample consisted of admitted neonates, it may over-represent more critically ill infants or specific subgroups, which could bias the prevalence estimates and associated factors.
- ✓ **Unmeasured Confounders:** Variables such as cultural practices, detailed environmental conditions (beyond the delivery room temperature), and maternal health factors (e.g., nutritional status, infections) were not included, which could confound the associations observed.
- ✓ **Limited Data on Behavioral Practices:** The study relied on existing medical records, which may not comprehensively document behavioral and care practices (e.g., thermal care protocols, breastfeeding initiation), thereby limiting insights into some behavioral risk factors.
- ✓ **Timing of Data Collection:** Since data extraction was based on records from January 2021 to January 2023, temporal variations such as seasonal effects or changes in hospital policies over time may influence the findings but were not specifically analyzed.

7. REFERENCES

Akter, Parvin, & Yasmeen. (2013). Admission hypothermia among neonates presented to Neonatal intensive care unit. *J Nepal Paediatr Soc, 33*(3), 166-171.

Ali, Mirza, Qadir, Ahmed, Bhatti, & Dema. (2012). Neonatal hypothermia among hospitalized high risk newborns in a developing country. *Pak J Med Sci, 28*(1), 49–53.

Aliona, & Redmond. (2014). Hypothermia in the newborn an exploration of its cause, effect and prevention. *British Journal of Midwifery, 22*(8), 395-400.

Bayihna, Dheresa, Minuye, & Demis. (2019). Neonatal hypothermia and associated factors within six hours of delivery in eastern part of Ethiopia: a cross-sectional study. *BMC Pediatrics, 19*(252).

Bayihna, Dheresa, Minuye, & Demis. (2019). Neonatal hypothermia and associated factors within six hours of delivery in eastern part of Ethiopia: a cross-sectional study. *BMC Pediatrics, 19*, 252.

Byaruhanga, Bergstrom, & Okong. (2011). Neonatal hypothermia in Uganda: Prevalence and risk factors. *J Trop Pediatr, 51*(4), 212–215.

CSA. (2016). Ethiopia Demographic and Health Survey (EDHS) 2016: Key Indicators Report, Central Statistical Agency Addis Ababa, Ethiopia. The DHS Program ICF Rockville, Maryland, USA

Delavar, Akbarianrad, Mansouri, & MY. (2014). Neonatal Hypothermia and Associated Risk Factors at Baby Friendly Hospital in Babol, Iran. *Ann Med Heal Sci Res, 4*(2).

Delavar, Mansouri, & Yahyapour. (2014). Neonatal hypothermia and associated risk factors at baby friendly hospital in babol, iran. *Annals of medical and health sciences research. 2014;4(2):S99-S103, 4*(2), S99-S103.

Delavar, Mansouri, & Yahyapour. (2014). Neonatal hypothermia and associated risk factors at baby friendly hospital in babol, iran. *Annals of medical and health sciences research, 4*(2), S99-S103.

Demisse, Gizaw, & Tigabu. (2017). Patterns of admission and factors associated with neonatal mortality among neonates admitted to the neonatal intensive care unit of University of Gondar Hospital, Northwest Ethiopia. *Dove Press journal. 2017;8:57-64., 8*, 57-64.

FMOH. (2014). *Ethiopian Federal Minstery of Health National NICU Nurses Training Participants Manual*.

Fulton. (2013). Improving neonatal mortality in an Ethiopian referral hospital. *BMJ Qual Improv Reports*, 1-4.

Gebresilasea. (2019). Prevalence and factors associated with neonatal hypothermia on admission to neonatal intensive care units in Southwest Ethiopia – A cross-sectional study. *PloS one, 14*(6).

Kambarami, & Chidede. (2010). Neonatal hypothermia levels and risk factors for mortality in a tropical country. *Cent Afr J Med, 49*(9-10), 103-106.

Karsten, Dean, & Davidson. (2013). The global burden of neonatal hypothermia: systematic review of a major challenge for newborn survival. *BMC Midicine, 11*(24).

Kumar, Shearer, Kumar, & Darmstadt. (2010). STATE-OF-THE-ART Neonatal hypothermia in low resource settings : a review. *J Perinatol. Nature Publishing Group, 29*(6), 401–412.

Lunze, Bloom, Jamison, & Hamer. (2013). The global burden of neonatal hypothermia: systematic review of a major challenge for newborn survival. *BMC Med, 11*(1), 24.

Lunze Karsten. (2012). Thermal protection of the newborn in resource limited environments. *J Perinatol, 32*, 317–324.

Manji, & Kisenge. (2003). Neonatal hypothermia on admission to a special care unit in Dar-es-Salaam, Tanzania: a cause for concern. *Cent Afr J Med, 49*(3), 23-27.

McCall, Halliday, Vohra, & Johnston. (2018). Interventions to prevent hypothermia at birth in preterm and/or low birth weight infants (Review). *Cochrane Database of Systematic Reviews, 2*.

Miller, & HLa. (2011). Hypothermia in very low birth weight infants: distribution risk factors and outcomes. *Journal of Perinatology, 31*, S49–S56.

Mullany, Katz, Khatry, Steven, LeClerq GL, Darmstadt, *et al.* (2010). Incidence and seasonality of hypothermia among newborns in southern Nepal Luke. *Arch Pediatr Adolesc Med, 164*(1), 71-77.

Ogunlesi, Ogunfowora, & Ogundeyi. (2012). Prevalence and risk factors for hypothermia on admission in Nigerian babies <72 h of age. *J Perinat Med, 37*(2), 180-184.

Okomo, Kassama, Lawn, Zaman, & Kampmann. (2015). Neonatal admissions, quality of care and outcome: 4 years of inpatient audit data fromThe Gambia's teaching hospital. *Paediatr Int Child Health. 2015;35(3):252–64., 35*(3), 252–264.

Onalo. (2013). Neonatal hypothermia in sub-Saharan Africa : A review. *Niger J Clin Pract, 16*(2).

Scalone, Samoggia, & Alessandra. (2018). Neonatal mortality, cold weather, and socioeconomic status in two northern Italian rural parishes. *Creative Commons, 39*(1820–1900), 525-560.

Seid SAI, Ahmed, Akuma, & Reta. (2019). Causes and factors associated with neonatal mortality in Neonatal Intensive Care Unit (NICU) of Jimma University Medical Center, Jimma, South West Ethiopia. *Dove Press Journal, 10*, 39-48.

Seyum, & Ebrahim. (2015). Proportion of neonatal hypothermia and associated factors among new-borns at Gondar University teaching and Referral hospital, Northwest Ethiopia: a hospital based cross sectional study.

Seyum, & Ebrahim. (2015). Proportion of Neonatal Hypothermia and Associated Factors among New-borns at Gondar University Teaching and Refferal Hospital, Northwest Ethiopia: A Hospital Based Cross Sectional Study. *Gen Med, 03*(04), 1-7.

Simiyu. (2009). Morbidity and mortality of low birth weight infants in the new born unit of Kenyatta National Hospital, Nairobi. *East Afr Med J, 81*(7), 367-374.

Tarekegn. (2018). Proportion and factors of death among preterm neonates admitted in University of Gondar comprehensive specialized hospital neonatal intensive care unit, Northwest Ethiopia. *Springer Nature, 11*, 867.

Tewodros. (2015). Proportion of Neonatal Hypothermia and Associated Factors among New-borns at Gondar University Teaching and Refferal Hospital, Northwest Ethiopia: A Hospital Based Cross Sectional Study. *General Medicine (los angel), 3*(4).

Thwala. (2010). The quality of neonatal inter-facility transport systems within the Johannesburg metropolitan region. *Available from: Http:/handle/10539/11031.*, 1-75.

Tinuade, Folashade, Bolanle, Fetuga, Durotoye, & Olanrewaju. (2009). Point-of-admission hypothermia among high-risk Nigerian newborns. *BMC Pediatrics, 8*(40).

Tinuade, Ogunlesi, Folashade, Adekanmbi, Fetuga, Durotoye, *et al.* (2008). Point-of-admission hypothermia among high-risk Nigerian newborns. *BMC Pediatrics, 8*(40).

Tinuade, Olusoga, Folashade, BMF, & DMO. (2012). Point-of-admission hypothermia among high-risk Nigerian newborns. *BMC Pediatr, 8*, 40.

WHO. (2013). *World Health Organization Guidelines for the management of common childhood illnesses. Pocket book of hospital care for children under 2 years*.

Zayeri, Kazemnejad, Ganjali, Babaei, & Nayeri. (2012). Incidence and risk factors of neonatal hypothermia at referral hospitals in Tehran, Islamic Republic of Iran. *East Mediterr Heal J, 13*(6), 1308–1318.

Zayri AK, Ganjali, Babaei, & Nayeri. (2012). Incidence and Risk factor of neonatal hypothermia at referal hospital in Tehran, Islamic Republic of Iran. *Eastern Mediterranean health journal, 13*.

8. APPENDICES

8.1. Informed Voluntary Consent form for the Heads ofHospital

1. Introduction: My name is **Abdilahi Ahmed Duale,** I am the principal Investigator of a study to be conducted in yourhospitalfor my Master's degree at Haramaya University, the 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.

2. The study title: Prevalence of neonatal hypothermia and associated factors among neonates admitted to NICU in jigjiga public hospitals,Eastern Ethiopia 2023.

3. Purpose of the study: the study finding will be used as baseline data, evidence and input to develop future quality improvement projects so jigjiga public hospitals will have benefited for this study, and also governmental and non-governmental organizations will be used this study finding for designing proper implementation and evaluation on reduction of neonatal morbidity and mortality.Moreover, the aim of this study is to write a thesis as a partial requirement for the fulfillment of a Master's Program in Epidemiology for the principal investigator

4. Procedure and duration:The data will be collected through record review using pre-tested structured checklist, which consists of four parts; socio demographic characteristics, physiological factors, behavioral factors, and environmental factors. Medical registration number (MRN) of all admitted neonates to the NICU from January 1/2021 to January1/2023.

will be sorted then Systematic random sampling will be applied to select the charts of neonates. Finally, necessary information of neonates will be collected by reviewing from their medical records.

5. Risks and benefits: The risk of participating in this study is very minimal, but only taking few minutes from mothers'/care givers' 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

6. 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 community 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 participants to the research.

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

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

Address of the principal investigator:

Name: Abdilahi Ahmed (MPH, Epidemiology Candidate)

Phone number: +251933231151

E-mail: abdilahi.ahmed222hh@gmail.com

Health Research Ethics Review Committee (IHRERC) at office phone 0254662011 or P.O.Box 235, Harar, Ethiopia].

9. Declaration of informed voluntary consent:

I have read this information sheet. I have clearly understood the purpose of the research, the procedures, the 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 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 answer any question that they do not want. I am also informed that the school has the 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 school's premises. Therefore, I declare my voluntary consent on behalf of _____ management to allow this study to be conducted in the school with my initials.

Name and Signature of Head of the participant_____ _____ Date _____

Name and Signature of the Principal Investigator: _____ Date _____

8.2. English version Questionnaires

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/Night time

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

No	**Variable**	
3	Mode of delivery	SVD Instrumental assisted delivery Cesarean section

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 /No
	4.2	Type of drying material uses for drying propose?	Pre warmed Hospitals Own Towel Non pre warmed Hospital Own Towel Pre warmed Mothers Own Towel Non pre Warmed Mothers Own Towel
	4.3	The newborn dried	Before cord cut After cord cut
	4.4	Where newborn dried	Mother abdomen/chest On the table Baby couch Pre heated incubator Radiant warmer Other specify_____
5	**Wrapping related care**		
	5.1	The first drying towel changed by new dry towel for covering baby?	Yes /No

	5.2	The changed towelprewarmed	Yes/ No
	5.3	The baby body with dry/pre warmed towel including the head and limbs covered	Yes/ No
	5.4	Dry/Prewarmed towel prepared by	Hospital Family
6	Newborn covered by hat		Yes/ No
7	The newborn placed on mother abdomen after birth for skin to skin contact		Yes/ No

8	**Weighing the newborn related care**		
	8.1	The newborn	Yes/No
		measuring weight is delayed for at least one hour	
	8.2	When the time of weighing the newborn, thenewborn body was covered by cloths	Yes/ No

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	_____ in year
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	Newborn started breast-feeding within 1 hour of delivery?	A. Yes B. No
17	Was the newborn held in direct contact with its mother's skin during intra-facility (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	A.Yes B.No	Q. 20
	19.2	Type of obstetric complication	A.Preeclampsia/eclampsia B.Ante partum hemorrhage C.Uterine rupture D.PROM/Sepsis E. Obstructed/prolonged labor F. Post-partum hemorrhage	

			G. Other specify_____	

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)	
22	Sex of the newborn	.A.MaleB. Female
23	Birth weight in grams	
24	APGAR score?????	WHEN
25	Gestational age at birth (week)?	How measured
26	Type of pregnancy	A.Single B.Multiple C. Other
27	Small for gestational age	A.Yes B. No

9. CURRICULUM VITEA (CV)

1. PERSONAL INFORMATION

Full Name: - ABDILAHI AHMED DUALE

Sex: - Male

Date of birth: -November 05, 1994

Place of birth: - Lafaisa, Awbarreworeda, Somali, Ethiopia

Marital status: - Married

Citizenship: - Ethiopian

Mobile Phone: + *(+251)933231151 /0912008865*

E-mail: ***abdilahi,ahmed222hh@gmail.com***

Place of residence: - jigjiga, Somali Region, Ethiopia

2. SUMMARY OF QUALIFICATIONS

Having more than 4 years' experience as a **Public Health Emergency, Nutrition, WASH and Clinical Officer Professional in** different levels of positions and responsibilities. My experience includes **MHNT-Medical Officer** at **International Medical Corps-Guji Field office** at LibanWoreda, **Nutrition Officer** and **WASH Officer at Awbarreworeda**and **Family Health Coordinator at Kabri-bayahWoreda Health Office, Nutrition/ CMAM Officer at Save The Children-Ethiopia Jigjiga Field Office, BabileWoreda Somali Region, Head of Health Center at lafaisa& Clinician at Lafaisa health center, Awbareworeda**from where I have obtained the required skills and qualifications that makes me fit for the position. I am up to date on all the latest **Nutrition,Health, Sexual and Reproductive Health, WASH, GBV and Covid-19, Protection Training & manuals, guidelines; policies and strategies.**

I am highly responsible, intelligent, and investigative; and communicate well with supervisors, the public, and employees. I have Good report writing, budget management & staff management and development skills. In addition to this some of my professional qualifications that I have been acquainted during my working experience with **Government institutions and INGOs** are:

- Proven practical experience in program management and excellent training facilitation skills
- Quick learner extremely motivated and dedicated to getting the job done right.
- Ensure that gender issues are properly addressed during the process of the project planning and implementation
- Ability to effectively integrate with stake holders through strong communication skills working for impact

- Highly organized with good time management skills
- Good community mobilization skills
- Good project management skills
- Knowledge in monitoring and evaluation of projects.
- Expertise in Psychosocial support, child protection & GBV protection principles.
- Proficiency in computer applications and ability to use software including Statistical software
- Passionate, strongly dedicated and highly committed to work for the improvement of the poor community

3. ACADEMIC QUALIFICATION

MPH in Epidemiology at Haramaya University (pending)

B.Sc. Degree in Public Health Officer from Jigjiga University, 2014-2018

4. PROFESSIONAL EXPERIENCE

From January 12, 2022– July 20, 2022

IMC -Ethiopia-Guji Field Office, LibanWoreda

Position: MHNT-Health Officer

Responsibilities:

- ✓ *Planning, implementing and monitoring of the implementation of the Community Management of severe Acute Malnutrition with regard to the Organizational Goals & Objectives.*
- ✓ Lead and supervisor MHNT Team Assigned woreda
- ✓ In charge of technical quality implementation and delivery of the mobile health and Nutrition services in the assigned Woreda.
- ✓ Facilitate admission of the patient at the OTP, and SC.
- ✓ Support the HEWs on prevention and response of major diseases under surveillance and in severe acute malnutrition case management and follow-up (e.g., referral to SC) according to national guidelines.
- ✓ Daily implementation of o**utreach EPI, health education, screening, OTP**, as per the guideline of Oromia RHB and WHO mobile health and Nutrition teams.
- ✓ Provide supervision, technical assistance and **capacity building to health extension workers and Health workers in health facilities.**

- ✓ Daily dispensary and drug supply management.
- ✓ Ensure at all times adequately equipped and supplied with the necessary drugs for provision of treatment under curative services, nutritional and clinical requirements at the catchment health
- ✓ Conduct planning and promotion of awareness creation on nutrition and preventative health care issues in the community.
- ✓ Day to day documentation of people provided with health education, vaccinated children, screened children and mothers, children admitted to OTP, and all provided services accordingly
- ✓ Compile weekly and monthly reports and share with team members, Field office health response coordinator and Woreda health offices.

November 10, 2020– December 30, 20221 Awbarreworeda

Position: WASH Focal person and Health Officer (Physician)

Responsibilities:

- Provide training for health workers on **WASH** related activities
- Community mobilization and education on **hygiene and Sanitation**
- Supervises health workers during Covid-19 vaccine campaign
- Delivering Health Education on prevention of **Gender Based Violence**
- Providing health education on **Sexual and Reproductive Health**
- Ensure Gender Based Violence Issues
- COVID-19 Contact tracing and follow up at woreda level
- Support Woreda administration on **provision of safe water supply**
- Providing **Treatment for patients** with chronic disease at NCD OPD
- Providing **Psychosocial suppor**t and **treatment** (**Chemotherapy**) for patients with **Mental illness**
- Community mobilization and health education about the use of COVID-19 vaccination

April 02, 2020- September 30, 2020 save the Children-Ethiopia, jigjiga -Field Office Babile District

Position: IYCF and CMAM Officer

Responsibilities:

●*I am responsible for coordinating the overall activities of* ***CMAM Officer*** *in the Woreda.*

●*This includes:*

***Planning**, implementing and monitoring of the implementation of the **Community Management of severe Acute Malnutrition** with regard to the Organizational Goals & Objectives.*

- *Provided technical supports the Woreda health desk and woreda's health facilities*
- *Organized and facilitated woreda level performance review meetings.*
- *Organized sensitization seminars at woreda level.*
- *Conducted community mobilization events at different levels.*
- *Prepared project reports on monthly and quarterly bases.*
- Represented the Organization at woreda level relevant meetings

September 10, 2018– March 30, 2020 AwbarreWoreda Health Office, Fafan Zone, Somali Region

Position: Family Health Coordinator and Health Officer (Physician)

Responsibilities:

- **Coordinating** Maternal and Child health and nutrition Department (**MCH**).
- Planning Annual, Quarterly, monthly and weekly of the Family Health and Nutrition Sector from Woreda to PHCU.
- Managed the overall Family Health and nutrition activities in Woreda Catchment area
- Coordinate and facilitate training in area of maternal and child health and nutrition in the woreda together with partners (NGOs) working in the woreda.
- Reporting the a health and nutrition activities on monthly
    - ✓ Use of epidemiology related analytical software e.g. Excel, Epi-info, ENA,
    - ✓ DHIS2/Health Information systems, R/STATA essential

6. CERTAFICATE AND TRAINING ATTENDED

TITLE	ORGANIZED BY	DURATION
IYCF Program	UNICEF (Disaster Ready online training)	July 19-July 20 2022
PSEA	IMC-ETHIOPIA	May 25- MAY 30 2022
CMR/IPV	IMC-ETHIOPIA	June 30- July 05 2022
Mh-GAP V.2.0	EFMOH& WHO	December 27,2022- January 05,3022
Mh-GAP (Mental Health Gap Action Program) Revised	Somali Region Health Berau in collaboration with Adama Teaching Hospital	July 25- August 03, 2019
Comprehensive Sexuality Education (CSE)	Engender	September, 2021
Integrated Immunization Program	IFHP With fafan Zone health office	July12-20 2018
HIV/AIDS, Gender Equality & Gender Mainstreaming in health sectors	IFHP with Kabribayah Health Office	June11- 18 ,2020
TOT training on CMAM methodology Revised	SRHB ,Adama	February,2019
Comprehensive ANC/PMTCT&BEMOC	Clinton Foundation	Oct, 2018
Malnutrition (OTP and stabilized center)	Godey Zonal Health Office, somali region.	July 02,2018
Health **Extension** package	Dollo Zone health office	Aug 04,2018
Surveillance on weekly and immediate reportable disease.	WHO with SRHB	Sept, 2018

7. Technical Skills

Computer Proficiency: Computer proficiency in Microsoft Word, Excel and PowerPoint, data based management, Internet operation, Statical Software and hardware trouble shooting.

Motorcycle Driving: Strong Motorcycle drives ability

Language: Proficient Somali, Amharic and English – Excellent in reading writing speaking and listening

8. Interests/Hobbies

Conducting research on issues affecting the vulnerable members of the society such as children, women,

Refuges and IDPs, Content Development, Community service and volunteering.

9. REFERENCES

- Mr. kederShukriomer senior lecturer in jigjig university, department of Water Resource and irrigation engineering
  Phone number 09-61-68-73-05
  Email Engsamawade123@gmail.com
- MrAbdirahmanAshurjigjiga university luctural and Jigjiga University press coordinator.
  Number 0915752676
- HasanAbib staff in jigjiga referral hospital
  Number 0915192126

ATTESTATION: I Mr. Abdilahi Ahmed do here by certify that the above information gives loyally mysituationQualification and experience.

HARAMAYA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

Tittle: Neonatal hypothermia and associated factors among neonates admitted to neonatal intensive care units of public hospitals in jigjiga town, eastern ethiopia

Submitted by:

Abdilahi Ahmed Duale _____ _____

Name of Student Signature Date

Approved by:

1. Name of Major advisor Signature Date

Dr.TesfayeAssebe (PhD, Associate Prof)_____ _____

2. Name of Co-advisor Signature Date

Mr.AddisuBirhanu (Mph, Assistant Prof)_____

3. Research Thematic Area Leader Signature Date

_____ _____ _____

4. Chairman, DGC/SGS Signature Date

_____ _____ _____

5. PGPD Signature Date