

ASSESSMENT OF PATTERN OF ADMISSION AND OUTCOME OF NEONATES ADMITTED TO NEONATAL INTENSIVE CARE UNIT AT TIKUR ANBESSA SEPECIALIZED TEACHING HOSPITAL, ADDIS ABABA, ETHIOPIA, 2017.



BY

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**ADDIS ABABA UNIVERSITY**  
**COLLEGE OF HEALTH SCIENCE**  
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**MSC. THESIS**

ASSESSMENT OF PATTERN OF ADMISSION AND OUTCOME OF NEONATES ADMITTED AT NEONATAL INTENSIVE CARE UNIT AT TIKUR ANBESSA SEPECIALIZED TEACHING HOSPITAL, ADDIS ABABA, ETHIOPIA, 2017.

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## **ABSTRACT**

**Background:** *In neonatal period, babies are very susceptible for many disease conditions. This susceptibility will double in neonates who are preterm or low-birth weight. Even if it is so, most of the causes of neonatal morbidity and mortality are avoidable.*

**Objective:** *To assess pattern of admissions and treatment outcome of neonates in Neonatal Intensive Care Unit located at Tikur Anbessa specialized teaching hospital, Addis Ababa, Ethiopia*

**Methodology:** *A hospital based retrospective cross sectional study was conducted at Tikur Anbessa Specialized Teaching Hospital from Dec. – June 2017. A total of 304 neonates were included in the study from NICU of the hospital. The collected data was checked for its completeness manually and then entered and analyzed using SPSS window version 20 statistical software package. bivariate and multivariate logistic regression was done to identify factors that were associated with the final treatment outcome of neonate. The odds ratio with 95% Confidence interval was used to determine the association. A statistical significance was declared at  $p$  value $<0.05$ .*

**Result:** *During the study period a total of 1000 neonates were admitted to NICU. This study considered taking 304 neonates by using correction formula, from this sample of neonate age from 1 up to 3days count 184(60.5%). Regarding sex 172(56.6%) of them were male and the rest 132(43.4%) were female. Majority of the neonates 198(67.8%) were born at term. The leading cause of admission was early onset neonatal sepsis(EONS)which accounts 152(50%) of the total population. About the outcome 253(83.2%) were improved and discharged.*

**Conclusion:** *Neonatal Sepsis was the leading cause of admission in to TASH NICU. Majority of admitted neonates were discharged with satisfactory condition.*

**Keywords:** *neonatal admission, neonatal sepsis, outcome, cause of death*

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## **LIST OF ABBREVIATION**

AAU – Addis Ababa University

CS –Caesarean Section

GA –Gestation Age

KNH –Kenyatta National Hospital

LBW – Low Birth Weight

LGA – Large for Gestational Age

MAS – Meconium Aspiration Syndrome

MDG - Millennium Development Goal

NICU – Neonatal Intensive Care Unit

RDS – Respiratory distress syndrome

SGA - Small for gestational Age

SPSS –Statistical Package for Social Sciences

SVD –Spontaneous Vaginal Delivery

WHO –World Health Organization

## INTRODUCTION

### 1.1 Background

Neonatal period is a period from birth to the first 28 days of life. In this period, newborns are susceptible for many disease conditions. Now a day's neonatal mortality is declining worldwide. The worldwide neonatal mortality rates fall by 47% between 1990 and 2015 from 36 to 19 deaths per 1,000 live births. Over the same period, the number of newborn babies that died within the neonatal period declined from 5.1 million to 2.7 million. <sup>(1)</sup>

A Neonatal Intensive Care Unit (NICU) is a specialized and organized unit of a hospital, which provides broad and persistent care for neonates who are critically ill, preterm with low birth weight (LBW) and need of attention that can benefit from such treatment and care. <sup>(2)</sup>

There are a criteria for NICU admission like birth weight under 1800gm, gestational age under 35wks, need for respiratory support and monitoring , significant cardiac compromise , GI concern and surgical cases, major congenital anomalies, hypoglycemia who are not responding to appropriate management and jaundice requiring IV fluid , phototherapy and exchange transfusion. <sup>(3)</sup>

Not all newborns presented to NICU have similar illness but there are some disease conditions that are common to newborns that need intensive care. Many infection cause similar symptoms like poor feeding , breathing difficult , restlessness, decrease or elevated temperature , unusual skin rash or change in skin color, persistent crying unusual irritability , a marked change in a baby's behavior , such as being sleepy all the time or not sleeping much at all , can also be an indication that something went wrong. <sup>(4)</sup>

The outcome of neonates admitted to NICU depends on their conditions, severities and the management given. <sup>(5)</sup>

The aim of this study is to assess the pattern of admission and outcome of neonate that are admitted in TASH, NICU from sep. 2016 – Feb 2017.

## 1.2 Statement of the problem

Newborns are probably the most susceptible for many disease conditions in the world. Low birth weight (due to prematurity or restricted growth in utero) is also a major contributor of newborn deaths, as well as disability and non-communicable diseases worldwide. <sup>(6)</sup>

Neonates have low immune system, they are prone to infection and most of the illnesses they acquire usually require critical care. Neonatal infection may begin in utero, early in labor or post partum. <sup>(7, 8)</sup>

Newborns especially those born prematurely and of low birth weight can easily become infected with harmful pathogens encountered before, during and after birth. These infections account for nearly 30% of total newborn death globally. <sup>(9)</sup>

Global under-five year mortality rate is 42.5 per 1000 live births, of those deaths, 45% were newborn, with a neonatal mortality rate of 19 per 1000 live births. <sup>(10)</sup> In 2011, neonatal mortality in Ethiopia was 37 per 1000 live births. <sup>(11)</sup> Every year, 120,000 die in the neonatal period. <sup>(12)</sup> On the other hand 320,000 babies are born prematurely each year so the problem still exists. <sup>(13)</sup>

One of the causes of neonatal morbidity is perinatal asphyxia, perinatal asphyxia is a common and serious neonatal health problem and it significantly contributes to both neonatal morbidity and mortality. It has been shown that 99% of these neonatal deaths take place in the developing countries where perinatal asphyxia contributes to almost 23% of these deaths. <sup>(14)</sup>

Information on neonatal morbidity and diagnosis at initial presentation are not generally available specially in our setup. <sup>(15)</sup>

Continuous surveillance on the cases, epidemiology and characteristics of neonatal admission would be very important for planning, implementing and evaluating neonatal health interventions.

### **1.3 Significance of the study**

Since children are the windows hope for the future development and existence of a country, it is a great deal to be concerned about their health and safety. It is very crucial for every institution to know the specific pattern and admission outcome of neonates for appropriate treatment and prevention of future problems.

The results of this study could therefore would be a feedback to neonatal intensive care unit in health care and resource planning for improving outcome and sustainability of the unit.

It can provide a clear picture on; age range of infants admitted, disease pattern, outcome of those admitted and hence demonstrate patient characteristics associated with mortality risk to the policy makers.

It can also be helpful for developing NICU admission and treatment guidelines.

## LITERATURE REVIEW

Neonatal mortality is a major concern in Sub-Sahara Africa and its rates reflect a nation's socio-economic status, efficiency and effectiveness of health care services. Approximately one fourth of all under – five child deaths occur in the neonatal period. There are some literature about pattern of admission and outcomes of neonate in different countries.<sup>(16)</sup>

The Study, which was done in Pakistan, Pattern of admission 1984 neonates, was admitted during study period. Among them 62.1 % were male 17.54% were admitted within 6 hours of their life, & 51.36% within 72 hours of birth. the low birth weight accounted for 55.4% admission , neonatal infection was the major causes of admission 45.21% comprising 30.64% cases of septicemia , 9.82% of pneumonia and 4.73% of meningitis .The other causes of admission were birth asphyxia 18.85%, neonatal jaundice 13.15% , pre term 6.87% , MAS 3.67% ,NEC 2.1%, hemorrhagic disease 2.11% and HMD 1.05%. Pattern of outcome 48.53% were discharged with satisfactory condition 25.5% died and 25.85% left against medical advice (LAMA) and/or discharge on request. Low birth weight (LBW), infection and asphyxia were the major causes of neonatal admission.<sup>(17)</sup>

The study, which was done in India shows that among admitted neonates, male to female ratio was 1.7:1. Low birth weight accounted for 53%(10725) of total admissions, out of which 34% were preterm while 19% were full term small for gestational age(SGA). Major causes of admission were birth asphyxia 36.6%, prematurity with complications 34%, sepsis 14.6%, congenital malformations 5.6%, neonatal jaundice 4.1%, Meconium aspiration syndrome 3.1%, neonatal tetanus 0.5% and miscellaneous 1.5%. Neonates admitted aged less than 24hours were 56% while aged 2-7days 23% and aged 8-28 days 21%. Neonates delivered by spontaneous vaginal delivery were 64% while 36% by cesarean section. Pattern on outcome Out of the total neonatal admissions, 13550 (67%) were discharged in a satisfactory condition, 800 (3.9%) were discharged on request, 670(3.3%) left against medical advice and 5211(25.8%) died. Out of the total neonatal deaths, male to female ratio was 2:1. Main bulk of mortality was observed in first 7 days of life in 4060(88%) and 61% of the died neonates were low birth weight.<sup>(18)</sup>

Study conducted in India show Pattern of admission and outcome 212 neonates (58% males) were admitted during the study period. 17.5% were admitted within 6 hours of birth and 51.4% within 72 hours of birth. Neonatal jaundice, prematurity, infections and birth asphyxia were the major causes of admission. NICU mortality was 8%. The most common cause of death was prematurity followed by birth asphyxia.<sup>(19)</sup>

Another study in Karnataka, India, During the period of study, there were a total of 1041 neonates admitted to the NICU; 762 babies (76%) were inborn; rest (279, 26%) were out born (referred from the other hospitals) . Almost equal percentage of male and female babies were admitted (Male: Female= 605:436). Low birth weight and associate complications was seen in 526 babies (50.6%), remaining babies had normal birth weight. One in every third baby admitted was a pre-term baby (34.5%); remaining 67.6% were term babies. The commonest specific morbid reason for admission was respiratory distress syndrome (n=389; 37.3%) followed by neonatal jaundice (n=143; 13.7%) and Meconium aspiration syndrome (n=143; 13.7%). Respiratory distress syndrome was found more in out born babies (52% total out born babies) compared to inborn ones (32% of total in born), while Meconium aspiration syndrome and jaundice was found more in inborn babies. Antibiotics (561) and oxygen (416) were the common interventions used for the management, while phototherapy was used only for 125 babies (Most of the time multiple therapies were used to manage life threatening morbid conditions).<sup>(20)</sup>

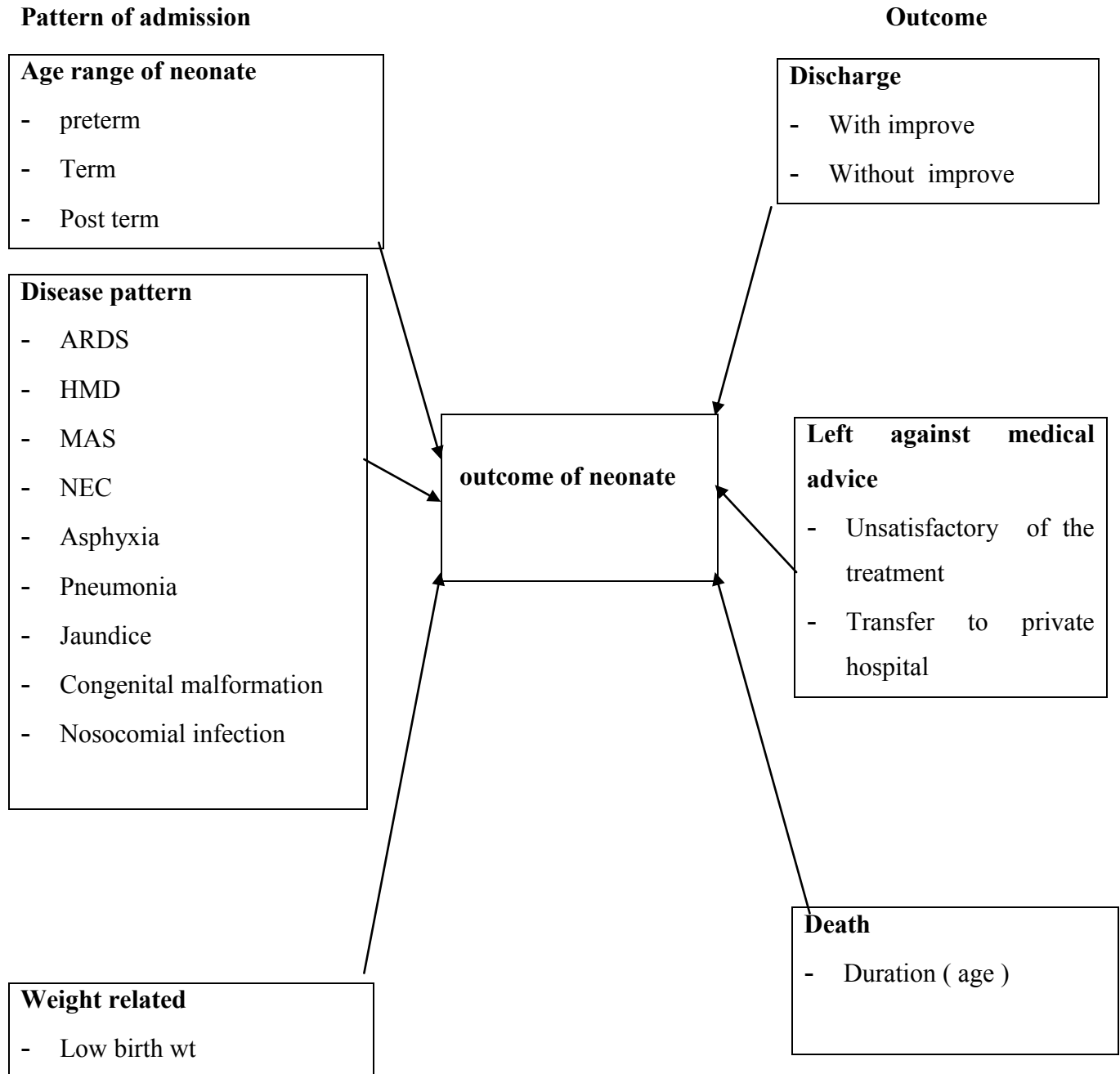
The Study, which was done in South Africa Pattern of admission and outcome 1,573 neonates, were admitted during the study period. Male babies outnumbered females with respect to admissions (57.8%) and deaths (63%). Extremely low birth weight (below 1,000 g) neonates made up 6.1% of admissions. One-third of these neonates weighed 1,000 g-1999 g and was delivered by Caesarean section; 5.4% were born with other forms of assistance such as forceps and vacuum. The most common causes of admission and deaths were neonatal asphyxia (38.2% and 32.9%, respectively), prematurity (23.5%, and 43%) and infection (21% and 9.8%). The main causes for referrals from other health centers were pre-maturity (33.6%), infections (23.5%), and birth asphyxia (9.4%). The overall mortality rate was 13.8% but a higher rate of mortality (23.4%) was recorded among the referred neonates. Almost half (45%) of all deaths were found among the VLBW babies (<1,500 g). Two-thirds (67.7%) of those babies who died, were born prematurely (pre-term or <37 weeks of gestational age). Over half (56.6%) of the deaths occurred within the first three days of admission.<sup>(21)</sup>

The Study which was done in Kenya at 2012 A total of 135 neonates were admitted to the NICU at KNH during the six-month study period (May to November 2011), of those 128 (94.8%) were studied. The main reason for admission to NICU was need for mechanical ventilation by 104 (81.25%) neonates and the need for NICU monitoring in the remaining 24 (18.75%). All the 10 infants who died within initial stabilization period (<4 hours of admission) were aged less than 1 week within a mean age of 2.4 days (S=1.7). This group comprised 4 (40%) males and 6 (60%) females. Only one of these

babies had an APGAR score of above 7 at birth and all 10 babies were asphyxiated at birth and resuscitated after delivery. The causes of death in KNH NICU are the three leading causes of death accounted for 72.6% of all mortality reported in this study. The problems are sepsis, perinatal asphyxia and severe RDS, causing 31.6%, 26.3% and 14.7% of all deaths, respectively. Each of the remaining single causes of death accounted for less than 6% of mortality. Most of the morbidity events were associated with case fatality rates of greater than 60%. All most all babies 111(94.1%) were born in a health facility. Just under half of neonates (45.8%) neonates were delivered through caesarian section. Fifty-six (47.5%) neonates were resuscitated. 47 (39.8%) were in born neonate, 44(37.3%) referral from other hospital and 6 (5.1%) were home born. <sup>(22)</sup>

Another prospective cross sectional study conducted to assess pattern of admission and outcome of neonate at St. Paul's Specialized Hospital, Ethiopia. Results show that from a total of 216neonates, 132(61.1%) were male and 177 (81.9%) were inborn. 114(52.8%) were admitted within the first hours of age. Mode of delivery were spontaneous vaginal delivery (55.6%), cesarean section (38.4%) were born preterm (at gestational age <37 completed weeks ) with 121(56%) at term and nine (4.2%) at post term gestation. 180(85.2%) were of appropriate weight for gestation of age. The most common diagnoses during admission to the neonatal care unit were prematurity with respiratory problem (36.6%), neonatal sepsis (22.7%) and asphyxia (16.2%), Meconium aspiration syndrome (13.9%), (6.0%) were Jaundice. The outcome of this study from the total 216 neonates 50(23.1%) died in the neonatal unit and the remaining 166(76.9%) were discharged were their condition improved. <sup>(23)</sup>

## 2.1 Conceptual frame work



**Figure: 1 A conceptual framework showing the pattern of admission and outcome of neonates**

### **3. OBJECTIVES**

#### **3.1 General objective**

- To assess the pattern of admission and outcome of neonate admitted to neonatal intensive care unit at Tikur Anbessa Specialized Teaching Hospital, Addis Ababa, Ethiopia, from September 2016 to February 2017.

#### **3.2 Specific objective**

1. To assess the characteristics of disease of the neonates admitted into NICU at Tikur Anbessa Specialized Teaching Hospital, Addis Ababa, Ethiopia.
2. To assess the outcome of newborn infants admitted into NICU at Tikur Anbessa Specialized Teaching Hospital, Addis Ababa, Ethiopia.
3. To identify the cause of death of newborn admitted into NICU at Tikur Anbessa Specialized Teaching Hospital, Addis Ababa, Ethiopia.
4. To assess the length of stay of neonate admitted into NICU at Tikur Anbessa Specialized Teaching Hospital, Addis Ababa, Ethiopia.

## **METHODS AND MATERIALS**

### **4.1 The study area**

The study was conducted at Tikur Anbessa specialized Hospital NICU, Addis Ababa Ethiopia from September 2016 to February 2017.

The hospital was established in 1965 E.C and run by ministry of health before it was handed over to Addis Ababa University in 1991 E.C. as a referral hospital. Tikur Anbesa Specialized Hospital provides the appropriate service in the internal medicine, surgical, pediatric, neonatology, gynecological and obstetrics, Oncology and rehabilitation department. The hospital provides a tertiary level referral treatment and is open 24 hours for emergency services. TASH that is with the biggest NICU in the country which have 1 department head and 30 staff nurses , 25 incubator , 13 cribs , 2 functional CPAP and 1 mechanical ventilation but it is not functional.

### **4.2 The study period**

This study was conducted in Tikur Anbessa Specialized Teaching hospital from September 2016 – February 2017 in neonatal intensive care unit.

### **4.3 Study design**

Hospital based retrospective descriptive cross sectional study was conducted to assess the pattern of neonatal admission and outcomes in Tikur Anbesa specialized hospital NICU department.

### **4.4 Source population**

All neonates who came at N ICU of TASH from September 2016 – February 2017

### **4.5 Study population**

All neonates who were admitted at NICU of TASH during the study period.(medical record cards of those neonates were the study units)

### **4.6 Eligibility Criteria**

#### **4.6.1 Inclusion criteria**

- All medical record cards with full information were included.

#### **4.6.2 Exclusion criteria**

- Incomplete cards were excluded from the study.

## 4.7 Measurement variables

### 4.7.1 Dependent variables

Outcomes and causes of death of neonate

### 4.7.2 Independent variables

- Age (gestational age )
- Sex
- Clinical diagnosis
- Length of stay
- Mode of delivery
- Place of birth

## 4.8. Sample Size Determination

The overall minimum sample size was determined using single population proportion calculation formula:

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

Where n= minimum sample size required for the study

Z= standard normal distribution (Z=1.96) with confidence interval of 95% and  $\alpha=0.05$

P=prevalence/ population proportion (p=0.5)

d=is a tolerable margin of error (d=0.05)

$$= 1.96(1.96) (0.5(1-0.5))/0.05(0.05) = 384.16 \Rightarrow n_i = \mathbf{384}$$

To get sample from the total population we used correction formula. The exact sample size therefore was calculated as follows.

$$n_f = \frac{n_i \times N}{n_i + N}$$

Where  $n_i$  = calculated sample size

$n_f$  = exact sample size

N= sample population

$$= (384 \times 1000) / (384 + 1000) = (384000 / 1384) = 277.4 = 277$$

$$= 277 + 10\% \text{ none response rate} = 277 + 27 = \mathbf{304}$$

## 4.9 Sampling technique

Sampling was taken from during the study period the total admission to Neonatal Intensive Care Units at Tikur Anbessa Hospitals. In order to select the sample for study population I used simple random sampling methods.

## 4.10 Operational definitions

**The neonatal period** – refers the day of birth up to 28 days of life.

**Neonatal Intensive Care Unit** - is a specialized section of a hospital that provides comprehensive and continuous care for neonates who are critically ill and preterm with low birth weight (LBW) who can benefit from such treatment.

**Acute Respiratory Distress Syndrome (ARDS)** – is a life threatening medical condition where the lung cannot provide enough oxygen for the rest of the body.

**Meconium Aspiration Syndrome (MAS)** – is the aspiration of stained amniotic fluid, which can occur before, during or immediate after birth.

**Asphyxia** – is a medical condition resulting from deprivation of oxygen to a newborn infant that lasts long enough during the birth process to cause physical harm usually to the brain.

**Neonatal sepsis** – is a type of neonatal infection and specifically refers to the presence in a newborn baby of a bacterial blood stream infection in the setting of fever.

**Prematurity** – is when the baby is less than 37 weeks old at the time of birth.

**Small for Gestational Age (SGA)** – is a term used to describe a baby who is smaller than the usual amount for the number of weeks of pregnancy.

**Large for Gestational Age (LGA)** – is an indication of high prenatal growth rate.

**Death** – is the cessation of all biological function that sustains an organism.

**Outcome**- is something that follows as a result or consequences.

**Surgical patients:** is a patient who requires a medical operation or surgery.

**Medical patients:** is a patient who requires medical care or waiting for medical treatment and care

#### **4.11 Data collection tools and procedure**

Data was collected from neonates' medical record card using a structured data retrieval form, which was adopted from literatures. Data was collected by two trained data collectors and training was given to the collectors prior to data collection time.

#### **4.12 Data quality control and pretest**

The quality of the data was assured by doing pretest in 5% of the sample size prior to the actual data collection in order to check the consistency and validity of the structured data retrieval form at Korea hospital. During the actual data collection time the investigator cross-checked 10% of the data collected from patient's medical record.

#### **4.13 Data entry and analysis procedure**

The data obtained from chart review was edited and the data was entering by using SPSS version 20.2 for windows.

#### **4.14 Ethical considerations**

Ethical clearance letter was obtained from the department of emergency medicine and critical care of Addis Ababa University. Permission was obtained from pediatrics department to conduct this study and to access the medical record. All the collected data were kept confidential and no one except the members of the research team have access to the collected information. All papers of the study were kept in a secured place under lock and computer records kept lock with passwords and the name or other personal information has not been notified in any report.

#### **4.15 Dissemination of results**

The final draft research paper was submitted to the department of Emergency Medicine. The results of the study would be presented to Addis Ababa University, College of health science Department of Emergency Medicine and The findings would also be given to the department of pediatrics and Federal ministry

## RESULT

### Characteristics of neonate admitted to NICU

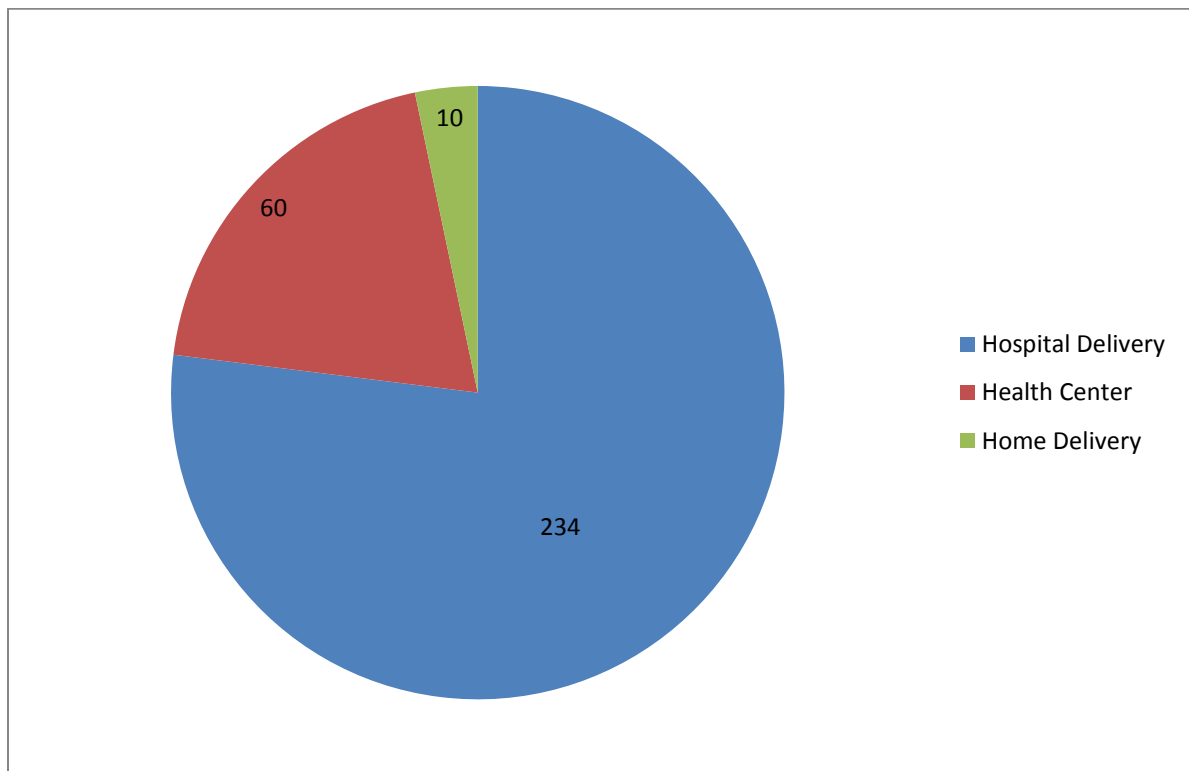
This study considered 304 neonates admitted at NICU of TASH during the study period. From this, age of neonate that ranges from 1- 3 days were about 184(60.5%), and 172(56.6%) of them were male. The lowest frequency was recorded in the gestational age less than 29 weeks, which accounts 198(65%). Regarding their weight minority neonate were blow <1500 gm with a frequency of 14(4.6%). Majority 247(81%) of the neonate were having appropriate weight for gestational age. (See Table 1)

**Table 1 characteristics of neonates admitted to TASH NICU from Sept. 2016 - feb.2017 Addis Ababa, Ethiopia.**

Characteristics		Number	% Percentage
<b>Age</b>	Birth -24hr	59	19.4
	1day – 3days	184	60.5
	4day – 7days	54	17.5
	>7days	7	2.3
<b>Sex</b>	Female	132	43.3
	Male	172	56.6
<b>Gestational Age</b>	<29weeks	3	1.0
	30-33weeks	16	5.3
	34-37weeks	87	28.6
	>37weeks	198	65.1
<b>Weight</b>	500gm-999gm	3	1.0
	1000gm-1499gm	14	4.6
	1500gm-2499gm	81	26.6
	>2500gm	206	67.8
<b>Size of Birth</b>	AGA	247	81.3
	SGA	43	14.1
	LGA	14	4.6

### Place of Delivery, Mode of Delivery, APGAR score and Resuscitation history of Neonates

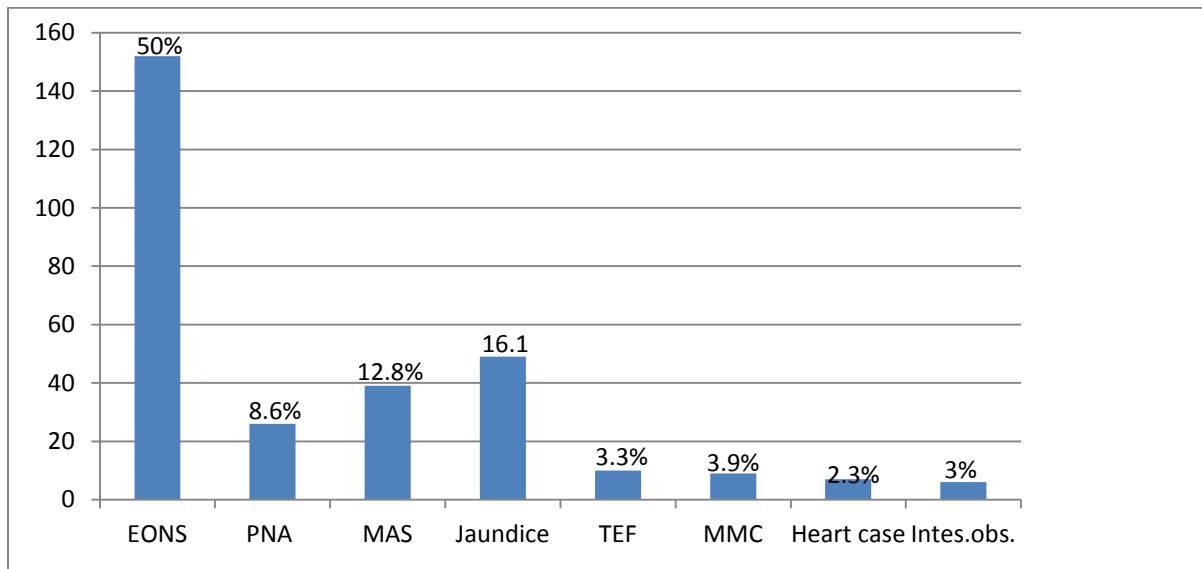
About the Intrapartum history of neonates, around 234(77%) of them were delivered at hospital. Majority 184(60.5%) of the neonate were delivered with SVD mode followed by C/S accounting 104(34.2%) and the rest 16(5.3%) of them were delivered by instrumental delivery. Regarding their APGAR score most 227(74.7%) of the neonates were having score of 8 -10 within the 1<sup>st</sup>, 5<sup>th</sup> and 10<sup>th</sup> min followed by neonates with a score of 5 -7 accounting 49(16.1%) and those whose score is below 5 were at about 6(2%). Out of the total 304 neonate admitted to NICU, in majority 238(78.3%) of them resuscitation was not mandatory, while in 66(21.7%) of the neonates resuscitation was must.



**Fig 2:- Place of delivery of neonates admitted at neonatal intensive care unit of TASH, from Sep 2016-Feb 2017, Addis Ababa, Ethiopia, 2017.**

### Admission diagnosis, Final outcome and cause of death in neonates admitted at NICU of TASH

As it has been evidenced from the charts, type of admission in 273(89.8%) of neonate was medical reason and in 31(10.2%) of neonates it was surgical reason. Early Onset of Neonatal Sepsis (EONS) was the major diagnosis in 152(50%) of neonates, while congenital heart disease was the least 7 (2.3%) observed type of admission diagnosis (see Fig 3). From the total admission, neonates who were discharged to home with satisfactory condition were about 253(83.2%) and those who died were about 38(12.5%) the rest 13(4.3%) were left without medical advice. The three leading cause of death from the admission diagnosis were early onset of neonatal sepsis (n= 38), 14(36.8%), prenatal asphyxia (PNA) 8(21%) and Meconium aspiration syndrome 6(16%) the first second and third respectively. Regarding the length of stay, majority 138(45.4%) of the neonates stayed for 4 -7 days followed by 90(29.6%), 1 -3 days & 60(19.7%), >7days respectively and the rest 16(5.3%) of the neonate stayed for only < 24 hours.



**Fig 3:- Admission diagnoses among neonates at TASH September 2016 to February 2017, Addis Ababa, Ethiopia.**

**EONS:-** Early onset neonatal sepsis, **PNA:-** prenatal asphyxia, **MAS:-** Meconium aspiration syndrome, **TEF:-** Thoraco-esophageal fistula, **MMC:-** Myelomeningocele

## Relationship of variables

### Final outcome of admission versus characteristics of neonate

Statistically significant, association has been seen in some of the independent variables with the dependent one (final admission outcome). There was relationship ( $p=0.038$ ) has been observed between weight of a neonate and final admission outcome, (Neonate whose weight range between 1000-1500gm died more than those whose weight is above 1500gm.) There was also association seen between gestational age and outcome with ( $P=0.029$ ), (Those who are preterm or delivered at gestational age of 30-33wks died more than those who were delivered at term.)

Table2:- Association of characteristics of neonate and outcome of admission sept.2016 to Feb.2017

Variable	Categories	Discharge ( N=259 )	Death ( N=44 )	COR	AOR
Age	<24hr	44(17%)	15(34.1%)	.489(.054-4.397)	.169(.009-3.235)
	1day – 3days	164(63.3%)	20(45.5%)	1.367(.156-11.937)	.579(.032-10.446)
	4day – 7days	45(17.4%)	8(18.2%)	.937(.937-8.865)	.361(.019-7.001)
Sex	Female	113(43.6%)	18(40.9%)	1.118(.584-2.140)	1.155(.561-2.376)
GA	<29weeks	1(0.4%)	2(4.5%)	.090(.008-1.022)	.060(.004-.841)
	30 – 33weeks	10(3.9%)	6(13.6%)	<b>.299(.101-.885)</b>	<b>.142(.039-.513)**</b>
	34 – 37weeks	81(31.3%)	6(13.6%)	2.425(.971-6.060)	1.889(.670-5.323)
Wt	<999gm	1(0.4%)	2(4.5%)	.076(.007-.865)	.038(.003-.577)
	1000 – 1499gm	9(3.5%)	5(11.4%)	<b>.273(.085-.876)</b>	<b>.136(.036-.516)**</b>
	1500 – 2499gm	71(27%)	10(22.7%)	1.077(.496-2.340)	.877(.349-2.200)
Size of Birth	AGA	212(81.9%)	34(77.3%)	1.039(.223-4.848)	1.366(.264-7.080)
	SGA	35(13.5%)	8(18.2%)	.729(.36-3.922)	1.056(.170-6.555)

### Intrapartum History, admission diagnosis and admission outcome

There was a strong ( $p=0.001$ ) association between APGAR Score and final admission outcome ( those neonate with APGAR Score of 8-10 recovered more than those whose APGAR Score was below 8.) There was also association between length of stay and the outcome with ( $p=0.030$ ), (neonate who stayed 1-3days died more than those who stayed less.) Result revealed that there was association between admission diagnosis and the outcome ( $p=0.045$ ), (neonates with a diagnosis of early onset neonatal sepsis were died more than neonate presented with the diagnosis of jaundice.)

Table3:- Association of Intrapartum history, admission diagnosis and outcome

Variable	Categories	Discharge	Death	COR (CI 95%)	AOR
Place of delivery	Home	9(3.5%)	1(2.3%)	1.019(.109-9.493)	.892(.088-9.099)
	Hospital	197(76.1%)	37(84.1)	.603(.242-1.504)	.544(.196-1.511)
Admitted to NICU	TASH	128(49.4%)	23(52.3%)	.795(.169-3.733)	.879(.166-4.653)
	Referred	117(45.2%)	19(43.2%)	.880(.185-4.182)	1.230(.231-6.550)
APGAR	1 <sup>st</sup> 5-7,5 <sup>th</sup> 5-7,10 <sup>th</sup> 5-7	33(12.7%)	16(36.4%)	1.031(.171,6.235)	1.205(.186,7.818)
	1 <sup>st</sup> 8-10,5 <sup>th</sup> 8-10,10 <sup>th</sup> 8-10	205(79.2%)	21(47.7%)	<b>4.881(.843,28.251)</b>	<b>4.695(.756,29.146)**</b>
	1 <sup>st</sup> <5,5 <sup>th</sup> 7-10,10 <sup>th</sup> 7-10	17(6.6%)	5(11.4%)	1.700(.237,12.173)	1.728(.226,13.204)
Admission Dx	RDS	73(28.2%)	28(63.6%)	.061(.008,.462)	.067(.009,.510)
	Prematurity	43(16.6%)	6(13.6%)	.167(.019,1.443)	.573(.043,7.710)
	EONS	138(53.3%)	14(31.8%)	<b>3.943(.699,22.230)</b>	<b>5.677(.930,34.667)**</b>
	PNA	18(6.9%)	8(18.2%)	.900(.143,5.662)	.945(.143,6.241)
	MAS	33(12.7%)	6(13.6%)	2.200(.344,14.079)	2.259(.351,14.559)
	Jaundice	46(17.8%)	2(4.5%)	9.200(1.054,80.286)	8.969(1.022,78.739)
	TEF	2(0.8%)	8(18.2%)	.100(.010,.955)	.101(.010,.968)
	MMC	9(3.5%)	0(0%)	646189945.7(0.000)	699753053.4(0.000)
	Intestinal obst.	8(3.1%)	4(9.1%)	.800(.105,6.104)	.826(0.107,6.355)
Length of stay	Birth -24hr	10(3.9%)	6(13.6%)	.417(.126,1.374)	.300(.082,1.093)
	1day-3days	76(29.3%)	14(31.8%)	<b>1.357(.579,3.180)</b>	<b>1.243(.510,3.032)**</b>
	4days-7days	125(48.3%)	12(27.3%)	2.604(1.095,6.195)	2.143(.869,5.286)

## DISCUSSION

Neonatal sepsis is the leading cause of hospital admission and mortality here in our set up. As a result, knowing the pattern of admission, outcome and cause of death would be essential in bringing change and reduction of burden.

### **Socio demographic characteristics of neonates admitted from Sep 2016 – Feb 2017 in NICU of TASH, Addis Ababa, Ethiopia.**

In this study a six month profile of admission and outcome of neonate treated at NICU of TASH were described. Results showed that male admission outnumbered the female one which was nearly similar to the findings of study conducted in St. Paul<sup>(23)</sup>, Kenya<sup>(22)</sup>, south Africa<sup>(21)</sup> and India.<sup>(20)</sup> This study shows that large numbers of neonate's were admitted during the first 72 hours of life. Which is in agreement with the study conducted in Pakistan<sup>(17)</sup> and India.<sup>(20)</sup> This study revealed that majority of the neonates admitted were delivered at term which is strongly similar with the study conducted in St. Paul's<sup>(23)</sup> and India<sup>(20)</sup>, and this result is not similar with the study conducted in Pakistan<sup>(17)</sup>, Their result shows that majority of admitted neonates were preterm. This difference might be due to difference in set ups and sample size or difference in socio cultural difference of the two settings. Majority of admitted neonates were having appropriate size for gestational age, this study is in agreement with a study conducted in St. Paul's.<sup>(23)</sup> However, this result is not in agreement with the study conducted in India, their result shows that most of their neonates admitted to NICU were delivered being small for their gestational age this difference could be due to socio cultural reason. Current study revealed that majority of neonates admitted at NICU were having weight above 2500gm which is similar with the study conducted in St. Paul's Hospital.<sup>(23)</sup>

### **Clinical profile of neonates admitted from Sep 2016- Feb 2017, at NICU of TASH Addis Ababa, Ethiopia.**

Regarding the place of birth of neonates who were admitted at NICU, current study stated that majority of them were born at hospitals, which was strongly agreed with the study conducted in Kenya.<sup>(22)</sup> In addition, mode of delivery in majority of the neonates was SVD which was in agreement with the study conducted at St. Paul's Hospital<sup>(23)</sup> and in contrast with the study in Kenya, their result

shows the mode of delivery for the majority of the neonates was C/S. This difference might be due to the difference in the study setting or due to some socio economic/ cultural reason. This study showed that resuscitation was necessity for minority of neonates admitted which is in agreement with the results of a study conducted in Kenya <sup>(22)</sup>. Regarding APGAR score, majority of the neonates at the 1<sup>st</sup>, 5<sup>th</sup> & 10<sup>th</sup> were having score ranging from 8 – 10 which is different from the findings of the study conducted in Kenya <sup>(22)</sup>, their result shows that majority of admitted neonates were having APGAR score of less than 7 within the 1<sup>st</sup>, 5<sup>th</sup> & 10<sup>th</sup> minute. This difference might be due to difference in the study population. It has been seen that the major type of admission diagnosis in this study was early onset neonatal sepsis, which was in agreement with the study in Kenya <sup>(22)</sup> and a study in St. Paul's Hospital.<sup>(23)</sup>

### **Management and outcome of neonate admitted from Sep 2016 – Feb 2017 in NICU of TASH, Addis Ababa, Ethiopia.**

This study showed that the length of stay for the majority of neonates admitted in NICU was 1 -3 days which is in agreement with a study conducted in Pakistan <sup>(17)</sup> in which their result shows the length of stay in majority of the neonates was 72 hours or three days. <sup>(23)</sup> This study has revealed that from the total neonatal admission in neonatal intensive care unit (NICU) almost all of them were discharged home with satisfactory condition and the rest few neonates were died, this result was in line with study conducted in Pakistan <sup>(17)</sup> and India. <sup>(19)</sup> The type of diseases that were frequently associated with death in admitted neonates were early onset Neonatal sepsis, prenatal asphyxia and meconium aspiration syndrome respectively which is in agreement with the results of study conducted in Paul's hospital<sup>(23)</sup>, Pakistan <sup>(17)</sup> and Kenya. <sup>(22)</sup>.

## **CONCLUSION**

Early onset neonatal Sepsis was the leading cause of admission at TASH in NICU, followed by neonatal jaundice, Meconium aspiration syndrome and perinatal asphyxia respectively. Resuscitation was mandatory in minority of the cases. Regarding the final admission outcome neonates almost all were discharged home with satisfactory condition. The leading cause of death was early onset neonatal sepsis.

## RECOMMENDATION

### **For health professionals**

- ✓ Should consider Induction in mothers with PROM to reduce neonatal sepsis.
- ✓ Should consider evaluation of obstetrical care is required to identify the cause of perinatal asphyxia.
- ✓ To improve neonatal outcome it is imperative to be vigilant especially during the first 24hrs of life.

### **For Policy makers**

- ✓ design neonatal health programs particularly improving antenatal service, neonatal care and timely referred to tertiary care hospitals.
- ✓ Develop national guide line for the appropriate management and timely intervention.

## **LIMITATION**

Since this study is a retrospective study use of secondary data is an obligation. This limits the quality of data that were collected. The record taking and keeping seems very unsatisfactory and the register books did not contain enough information. some pages were torn out which makes getting full year data very difficult. In patients medical record card some files and information were missing, like occupational status and in some area the complications were not clearly stated.

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## ANNEX

### **Annex I - Personal Information Sheet**

Title of Research: pattern of admission and outcome of neonate among admitted Neonatal Intensive Care Unit at Tikur Anbesa specialized referral hospital in Addis Ababa, Ethiopia.

Institution: Addis Ababa university department of Emergency medicine

Principal Investigator: Meron Alemu (BSc.)

Mobile: +251 913120796

E-mail: meronalemuzenebe@yahoo.com

Advisor: Dr. Muluworke Tefera (Pediatrician)

Co- Advisor: Mebrat Michael

Purpose: The aim of the study is the pattern of admission and outcome of neonate admitted to TASH NICU

Duration: The question that is going to be asked usually takes about 20 minutes.

Benefit of the study: - The results of the study will be used as a basis to improve the quality of care offered to babies admitted good outcome and to NICU.

Risk of the study: - Participating in this study will not have any risk or harm associated with data collection.

Confidentiality: - confidentially will be maintained, no identification will be recorded.

Email: meronalemuzenebe@yahoo.com

Questionnaires ID \_\_\_\_\_

**Annex II – Hospital Consent Form**

This is a study that will be conducted in Tikur Anbessa specialized hospital, the main referral specialty hospitals for treatment of critical , medical , surgical , pediatrics and oncology problems in Ethiopia. The main objective of this study is to assess the pattern of admission and outcome of neonate admitted at NICU department of this hospital. The results of the study will be used as a basis to improve the quality of care offered to babies admitted good outcome and to NICU. The information will be shared among the hospital. Therefore, the hospital’s participation and collaboration is very much helpful in generating the required information and will be very much appreciated.

In this study, data will be collected from the patients’ medical record cards retrospectively. Information regarding any specific personal identifiers like the name of the clients will not be collected and information generated will be disclosed in totality. In addition, confidentiality of any personal information will be maintained throughout the study process and no unauthorized access to the information is allowed.

Finally, the hospitals have all the right to refuse to participate in this study at any time. If you have any questions or need further information regarding the planned study, you are free to get clarification from the principal investigator, from the institution, or through the following address. Meron Alemu, telephone - 0913120796 (principal investigator). Therefore, if you would like to participate in this study, would you please confirm it by signing here? Thank you very much.

Participant Hospital----- principal investigator-----

**Annex III - Data collection sheet**

PATTERNS OF ADMISSION, CARE AND OUTCOME OF NEONATES ADMITTED INTO  
NEONATAL INTENSIVE CARE UNIT (NICU) AT  
TIKURANBESA SPECIALIZED HOSPITAL ADDIS ABABA, ETHIOPIA

**DATA COLLECTION SHEET:**

**PATIENT DATA**

Date .....

Patient ID number..... Study number .....

Age ...                      Sex    1) Female...                      2) Male...

**I. PATTERN FOR ADMISSION**

1. Gestation age in weeks at birth

- A. <29      B. 30- 33      C. 34- 37      D. >37

2. Weight at birth (g)

- A. 500 – 999      B. 1000 – 1499      C. 1500 – 2499      D. >2500

3. Size at birth

- A. Adequate for gestation age (AGA)
- B. Small for gestation age (SGA)
- C. Large for Gestation age (LGA)

4. Mode of delivery

- A. Spontaneous vaginal delivery
- B. caesarian section
- c. Instrumental delivery

6. APGAR score at birth (minutes)

- A. 1st .....
- B. 5th.....
- C. 10th .....

7. Resuscitation done at birth

A. No

B. Yes

8. Place of delivery

A. Home delivery

B. Hospital delivery

C. Health Center

9. Admitted to NICU from

A. Maternity ward from TASH

B. Referred from other hospital

c. Came from home

10. Reasons for admission to NICU

1. ....

2. ....

3. ....

11. Admission diagnosis

1. ....

2. ....

3. ....

12. Length of stay

A. birth up to 24 hr

B. 24 hr – 3 days

C. 4 days – 7 days

D. >7 days

**Part II. NEONATAL OUTCOME**

1. Newborn outcome

- A. Discharged from NICU
- B. Referred to another health facility
- C. Left without medical advise
- D. Death

3. Death occurred after admission

- A. <24 hours
- B. 24 –72 hours
- C. Within first week of life
- D. > first week of life

4. Condition at discharge if different from one at admission

- 1.....
- 2.....
- 3.....

#### **ANNEX IV ASSURANCE FORM**

I, the undersigned, assert that this MSc. thesis is my original work, has not been presented for a degree in any other university and that all sources of materials used for the thesis have been accordingly acknowledged.

Msc candidate: Meron Alemu (**Bsc**) Signature: \_\_\_\_\_ Date \_\_\_\_\_

Advisor:-Dr Muluwork Tefera (**Pediatrician**) Signature:-\_\_\_\_\_ Date \_\_\_\_\_

Sr. Mebrat Michael (**Bsc, Msc, Lecturer**) Signature:-\_\_\_\_\_ Date \_\_\_\_\_