



**ST. PAUL'S HOSPITAL MILLENNIUM MEDICAL COLLEGE**

**CLINICAL PROFILE AND TREATMENT OUTCOMES OF  
PERINATAL ASPHYXIA IN ST. PAUL HOSPITAL  
MILLENNIUM MEDICAL COLLEGE,  
ADDIS ABABA, ETHIOPIA**

**BY: DR. KALKIDAN GETACHEW (MEDICAL INTERN)**

**A THESIS SUBMITTED TO THE DEPARTMENT OF PUBLIC  
HEALTH, ST. PAUL'S HOSPITAL MILLENNIUM MEDICAL COLLEGE  
IN PARTIAL FULLFILLMENT OF THE REQUIRMENT FOR THE  
DEGREE OF DOCTOR OF MEDICINE**

**AUGUST, 2018**

**ADDIS ABABA, ETHIOPIA**

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## **i. ACKNOWLEDGEMENT**

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## **ii. Summary**

**Background:** Perinatal asphyxia is one of the most common causes of neonatal morbidity and mortality in Ethiopia. It is very important to accurately diagnose perinatal asphyxia as early as possible and to predict the prognosis of the newborn. Given an early diagnosis, it may be possible to minimize unfavorable consequences through prompt application of appropriate treatment and rehabilitation exercises.

**Objective:** The main objective of this study is to identify the clinical profile and describe the treatment outcomes of asphyxiated neonates in Neonatal Intensive Care Units at St. Paul Hospital Millennium Medical College in Addis Ababa, Ethiopia.

**Methods and Materials:** A retrospective hospital based observational study was conducted from September 11, 2017-March, 09, 2018 at NICU department of St. Paul Hospital Millennium Medical college, Addis Ababa, Ethiopia. All case files of neonates with birth asphyxia during the study period were under study. On top of that, a checklist was used to obtain data from each patient's records and another checklist to identify the availability of equipment. Finally, data was cleaned, coded and entered using Epi info version 3.5.1 and analyzed using SPSS Version 21 Statistical Package. Descriptive analysis was used to identify the clinical profile and treatment outcomes of perinatal asphyxia.

**Conclusion** The treatments given for neonates with birth asphyxia is statistically significant and needs to be delivered immediately and carefully

**Key words:** Clinical profile, Perinatal, Treatment out comes, Newborn, Asphyxia, Neonatal Intensive Care Unit, St. Paul Hospital Millennium Medical College

### iii. ABBREVIATIONS AND ACRONYMS

|             |                                                         |
|-------------|---------------------------------------------------------|
| AAP.....    | American Academy of Pediatrics                          |
| ACOG.....   | American College Of Obstetrician and Gynecologists      |
| ANC.....    | Anti Natal Care                                         |
| APGAR.....  | Airway, Pulse rate, Grimace, Appearance and Respiration |
| GA.....     | Gestational Age                                         |
| HI.....     | Neonatal hypoxia- ischemia                              |
| HIE.....    | Hypoxic Ischemic Encephalopathy                         |
| LMP.....    | Last Menstrual period                                   |
| MAS .....   | Meconium Aspiration Syndrome                            |
| MDG .....   | Millennium Development Goal                             |
| MSAF.....   | Meconium stained amniotic fluid                         |
| NE.....     | Neonatal encephalopathy                                 |
| NICU.....   | Neonatal Intensive care Units                           |
| NICUs.....  | Neonatal intensive care units                           |
| PA .....    | Perinatal asphyxia                                      |
| PHI.....    | Pregnancy induced hypertension                          |
| PMR.....    | Perinatal Mortality Rate                                |
| PROM.....   | Prolonged rupture of membrane                           |
| RDS.....    | Respiratory distress syndrome                           |
| SPHMMC..... | St.Paul Hospital Millennium Medical College             |
| WHO.....    | World Health Organization                               |

## List of Tables

|                                                                          |    |
|--------------------------------------------------------------------------|----|
| Table 1: sociodemographic data of the study population                   | 13 |
| Table 2: Demographic Information the Neonates                            | 14 |
| Table 3: Antepartum risk factors                                         | 14 |
| Table4:Intrapartum risk factors                                          | 16 |
| Table 5: Management and treatment outcome                                | 18 |
| Table 5.Association between treatment out come<br>and perinatal asphyxia | 20 |

# List Of Figures

|                                                |    |
|------------------------------------------------|----|
| Fig 1.Distributions of instrumental deliveries | 16 |
| Fig 2.Distribution of mode of delivery         | 17 |
| Fig 3.Distribution of outcome of the neonate   | 19 |

## Table of Contents

|                                                                                                         |    |
|---------------------------------------------------------------------------------------------------------|----|
| 1. Introduction .....                                                                                   | 9  |
| 1.1. Back ground .....                                                                                  | 9  |
| 1.3. Significance of the study .....                                                                    | 11 |
| 2. Literature Review .....                                                                              | 11 |
| 2.1 Global situation .....                                                                              | 12 |
| 2.2 Sub-Saharan situation .....                                                                         | 12 |
| 2.3 Ethiopian Situation.....                                                                            | 13 |
| 3. Objectives.....                                                                                      | 13 |
| 3.1. General Objective .....                                                                            | 13 |
| 3.2. Specific Objectives .....                                                                          | 14 |
| 4. Materials and methods.....                                                                           | 14 |
| 4.1 Study design and period .....                                                                       | 14 |
| 4.2. Study Area.....                                                                                    | 14 |
| 4.3. Source population .....                                                                            | 14 |
| 4.4. Study population.....                                                                              | 14 |
| The study populations were all case files of neonates with birth asphyxia during the study period. .... | 14 |
| 4.5.Inclusion Criteria .....                                                                            | 15 |
| 4.6. Exclusion criteria .....                                                                           | 15 |
| ➤ Infection .....                                                                                       | 15 |
| 4.7. Sample size.....                                                                                   | 15 |
| 4.8. Sampling methods and procedures .....                                                              | 15 |
| 4.9. Variables of the study .....                                                                       | 16 |
| 4.10. Operational definition of terms .....                                                             | 16 |
| 4.11. Data collection techniques .....                                                                  | 17 |
| 4.12. Data processing and analysis .....                                                                | 17 |
| 4.13. Ethical considerations .....                                                                      | 18 |
| 4.14. Dissemination of results .....                                                                    | 18 |
| 5.Result and discussion .....                                                                           | 18 |
| 5.1Sociodemographic data of the study population .....                                                  | 18 |
| 5.2 Demographic Information the Neonates:.....                                                          | 19 |

|                                                                |    |
|----------------------------------------------------------------|----|
| 6.The clinical profile of perinatal asphyxia .....             | 19 |
| 6.1 Ante partum risk factor .....                              | 19 |
| 6.2 Intrapartum risk factor .....                              | 21 |
| 6.3Postpartum risk factor .....                                | 21 |
| 7.Management and treatment outcome of perinatal asphyxia ..... | 21 |
| 8.Discussion .....                                             | 26 |
| 9.Conclusion.....                                              | 27 |
| 8.Recommendation.....                                          | 27 |
| 9.Limitation and strength .....                                | 28 |
| References .....                                               | 29 |
| Annexes.....                                                   | 31 |
| Data Extraction Tool.....                                      | 31 |

# 1. Introduction

## 1.1. Back ground

The ACOG, AAP definition of birth asphyxia which is designed for use in hospital-based settings includes existence of 3 factors: Metabolic or mixed acidemia ( $\text{pH} < 7$ ) which is determined by umbilical cord arterial blood samples; APGAR score of  $< 3$  for longer than 5 min; neurological manifestations; and multisystem organ dysfunction while World Health Organization defined birth asphyxia as “the failure to initiate and sustain breathing at birth. The first 1 min after birth is called the “golden minute” so If new-born is unable to breathe spontaneously at birth it results birth asphyxia[1,14]. Perinatal asphyxia results from compromised placental or pulmonary gas exchange. A variety of maternal, obstetric, and neonatal conditions predispose the fetus and newborn to asphyxia that can occur before, during, or after birth. This disorder can lead to hypoxia (lack of oxygen) and hypercarbia (increased carbon dioxide levels) in the blood. Ischemia refers to blood flow to cells or organs that is insufficient to maintain their normal function. Hypoxic-ischemic encephalopathy (HIE) is an important cause of permanent damage to CNS tissues that may result in neonatal death or manifest later as cerebral palsy or developmental delay.

Globally, perinatal asphyxia has been accounted 23% of early neonatal deaths annually. It is the third most common cause of Neonatal death after preterm birth (28%), and severe infection (26%). Hence, post asphyxia hypoxic –Ischemic encephalopathy is one of the major impact factors among survivors. Evidence shows that the serious complication of perinatal asphyxia is occulted approximately between 1-6 infants/1000 live term births while the incidence of perinatal asphyxiated cases accounts 2-9 /1000 live birth making it the most common causes of neonatal death in world. About 20-30% of infants with HIE die in the neonatal period, and  $\approx$  33-50% of survivors are left with permanent neurodevelopmental abnormalities (cerebral palsy, mental retardation). The greatest risk of adverse outcome is seen in infants with severe fetal acidosis ( $\text{pH} < 6.7$ ) (90% death/impairment) and a base deficit  $> 25$  mmol/L (72% mortality). Furthermore, it was estimated about one million disabled survivors regarding long term neuro-developmental injury as such Cerebral palsy [3]. In low and middle income countries, still the burden of neonatal morbidity and mortality rate is very high due to intrapartum asphyxia. Moreover, there was no enough number of skilled professional who attended at delivery rooms. However, more than 60 million babies delivered

outside health facilities [2]. A research finding shows that an estimated neonatal deaths due to intrapartum asphyxia was 814,000 and 1,000,000 in still birth/year[2,3].

The perinatal mortality rate of Ethiopia was among the highest in Sub-Saharan Africa. In the last decades, it was unable to show the reduction of perinatal mortality at hospital and around all health settings. Hence, there was no well documentation and relevant evidence/researches to show the existing problems. Some of evidence shows that the trend of perinatal asphyxiated related death rate has been 90/1000 total births in Hospital and 40/1000 in community settings respectively. . Even though there was a significant reduction of Neonatal mortality rate due to significant decline of late neonatal mortality there has been unacceptability high rate of perinatal deaths due to perinatal asphyxia [4]. However, still there is no enough study on both determinants and causes of perinatal mortality in the country [5]. Thus, the aim of this study is to identify the clinical profile and outcome of asphyxiated neonates at a Neonatal Intensive Care Units at SPHMMC in Addis Ababa, Ethiopia this will help in targeting and scaling up of the proven interventions for preventing the identified risk factors associated with BA.

## **1.2. Problem statement**

Four million babies are born with asphyxia each year. According to statistics by WHO, in developing countries 3% of infants (3.6 million babies) suffer from moderate to severe asphyxia, of whom 23% (840,000) die which equates to nearly 1 million neonatal deaths per year and in countries with high neonatal mortality rates the death rate is 8 times that of countries with low NMRs and almost the same number suffer from the associated consequences. The prevalence of birth asphyxia is increasing; in 1990s the incidence of asphyxia was reported as 5.4/1000 live births while in the 2006 the ACOG reported 25–73/1000 live births in developed countries an incidence of 1-6/1,000 live births, and birth asphyxia (23%) represents the third most common cause of neonatal death and 5-10/1000 live births in developing countries with 24–29% of neonatal deaths up to 99% of these deaths occurred in LMIC. Africa accounts for 11% of the world's population but more than 25% of the world's new-born deaths. Of every 4 children who die in Africa, one is a newborn. Due to these neonatal deaths have remained stagnant globally. In Ethiopia NMR accounts 29/1000 live birth. A large proportion of this death occurs during the first 48 h after delivery and there is still a small decline. From babies born in sub-Saharan 280,000 deaths occur due to birth asphyxia during first day of life. Usually hospital data shows a very high percentage of deaths due to asphyxia since complicated births are more likely to come to hospital. Birth asphyxia

is one among top three causes of new-born deaths next to infections and complications of preterm birth which together account for 88% of newborn deaths in Africa of which birth asphyxia accounts 24% and 22% developed complication of asphyxia and it is still the fifth largest cause of under-five mortality. In Ethiopia BA accounting 23% of 29/1000 live birth neonates mortality. According to 2011 Ethiopian demographic and health survey (EDHS), the infant mortality has declined by 39% over the 15-year period, from 97 deaths per 1,000 live births to 59 deaths per 1,000 live births[6]. However, it was noted that the significant decline in infant mortality was mainly due to more decline in post neonatal mortality than early neonatal mortality (54% vs 24%)[4].

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

The purpose of this study is to assess the clinical profile and describe the treatment outcome of asphyxiated neonates at a Neonatal Intensive care Units at SPHMMC over 6month. The final findings of this study will provide health care providers and other concerned bodies a base line information and clues to improve, develop and implement strategies, programs and policies to improve the effective management of perinatal asphyxia. Strategies to address neonatal survival require a multifaceted approach that encompasses health-related and other measures [7]. However, still the NICU lacks facilities for blood gas analysis, mechanical ventilation, patient monitor, perfusers, and parenteral nutrition [8]. In Ethiopian Medical Universities, specifically SPHMMC in Addis Ababa, a number of studies have been done regarding neonatal death and admission to NICU. Thus, this study will definitely contribute and fill some gap with regard to understanding the underlying reasons of treatment outcomes of perinatal asphyxia and outlying management based strategies to prevent its occurrence. So this study can be used as a complement to other researches in tackling the problem and neonatal mortalities and morbidities associated with it in the locality.

## **2. Literature Review**

## 2.1 Global situation

Globally birth asphyxia persists to be a major clinical problem [14] and one of the common and leading causes of perinatal and neonatal mortality and morbidity even in developed countries despite developments in neonatal care, diagnosis and treatment. Four million babies are born with asphyxia each year.

On four-year research done in Turkey 9.7% of infants were diagnosed with asphyxia. Neonatal mortality rate was about 15.2% in asphyxiated infants. Resuscitation was performed in 94.7% of stage III patients and mechanical ventilation need and mortality were most frequent in stage III. The study indicates intrapartum risk factors as prominent risk factors, and emergency cesarean sections were the most frequent risk factor. 10% of patients had intrapartum risk factors for asphyxia, 67.7% antepartum risk factors and 25.9% postpartum risk factors. And stated that negative outcomes due to birth asphyxia can be reduced by preventing intrauterine and postpartum conditions, which may lead to emergency cesarean sections, improving postnatal patient care, and training assistant health staff [17].

In a descriptive study conducted at the Cirena Neonatology Unit at Hospital Universitario del Valle in 2008, perinatal asphyxia prevalence was 19%, and the most frequent pathology in the mother being hypertensive disorder associated with pregnancy (36.1%). The highest mortality was evident in patients with Sarnat III hypoxic ischemic encephalopathy (71.4%) [18].

On another research done in Italy, reported mortality rate is about 20% in full-term asphyxiated infants, while the incidence of neurological impairments in survivors is estimated to be of about 25%. Multiple factors have been shown to influence the prognosis of HIE and the rate of adverse developmental outcomes, including cognitive impairment, sensory-motor impairments or death, varies with the severity of HIE. In children under 3 years of age, this rate is nil for mild, 32% for moderate and almost 100% for severe forms of HIE. In fact, mild forms of HIE are associated with better intellectual, educational and neuropsychological outcomes when compared with severe forms. However, more subtle cognitive deficits and behavioral alterations have been revealed through long-term evaluations, even in mild forms of HIE. On the other hand, moderate forms of HIE show a wide range of outcomes that are not easily predictable in neonatal period [20].

## 2.2 Sub-Saharan situation

According to statistics by WHO, in developing countries 3% of infants (3.6 million babies) suffer from moderate to severe asphyxia, of whom 23% (840,000) die which equates to nearly 1 million neonatal deaths per year [1,15].

On a descriptive cross sectional observational study done at Braithwaite Memorial Specialist Hospital (BMSH), Nigeria the incidence of perinatal asphyxia was 63/1000 live births giving a prevalence of 29.4%. The study showed an overall case fatality rate of 16.6% and stated that lack of ANC, CPD and breech presentation as a major contributory factors [22].

A research done on Treatment outcome of Neonatal Asphyxia at National Hospital in Dar es Salaam, Tanzania 21.1% suffered from neonatal asphyxia. Of those 20% had mild birth

asphyxia; 37.5% had moderate birth asphyxia; and 42.5% had severe birth asphyxia. During the study all (100%) neonates with severe birth asphyxia died. In moderate birth asphyxia, 60.0% were discharged home and 40.0% died. In mild asphyxia, 75.0% were discharged home and 25.0% died[22].

A retrospective institutional based study on Perinatal Risk Factors Associated with Birth Asphyxia among neonates at country referral hospital, Kenya 29.1% had birth asphyxia and 70.9% were normal. According to the study Sequence of birth asphyxia varies from no ill effects to multiorgan complications and death. This could vary depending on severity and duration of asphyxia. There are numerous risk factors that can be linked to sequence of birth asphyxia and they may vary from one context to another. Socio-demographic: risk factors of birth asphyxia included mother's age, education level and parity. The study recommends that more care to be given to younger mothers at the time of delivery because they are thrice at risk of birth asphyxia compared to older mothers. In addition, community health workers should be trained for emergency obstetric care, basic newborn care including preliminary resuscitation measures to provide skilled birth attendance and encourage early recognition and referral for early interventions[21].

## **2.3 Ethiopian Situation**

A retrospective research done on Reasons for admission and neonatal outcome in the neonatal care unit of a tertiary care hospital in Addis Ababa lists asphyxia (16.2%) as the most common primary diagnoses at admission to the neonatal care unit next to prematurity with respiratory problem (36.6%) and neonatal sepsis (22.7%). In the research high case fatality was observed among neonates with the diagnosis of prematurity with respiratory problem (40.5%) and asphyxia (40.0%) & Under multivariate analysis, diagnosis of asphyxia was an independent predictor of mortality[8].

In the study done at Dilchora Referral Hospital, in Dire Dawa, Eastern Ethiopia Prevalence of birth asphyxia was 2.5% of live births over 3 years which was almost close to the national prevalence 29/1000 live births and 11% of Neonates were died due to birth asphyxia after resuscitation[15].

The study on a prospective investigation of stillbirths and early neonatal deaths that was conducted for a six month period (from June 1<sup>st</sup> to November 30<sup>th</sup> 2012) among inborn at Tikur Anbessa Hospital states intrapartum related perinatal asphyxia as one of the most common causes of death (27.8%) following prematurity related complications (31.4%) and followed by all congenital anomalies (22.9%) and infection (11.47%). However, still it needs great emphasis in order to prevent asphyxia and to improve the survival of preterm babies in Hospital and round the country[14].

## **3. Objectives**

### **3.1. General Objective**

- To assess the clinical profile and treatment outcome of perinatal asphyxia among neonates at Neonatal Intensive care Unit SHMMC.

## 3.2. Specific Objectives

- To assess the clinical of perinatal asphyxia among neonates at Neonatal Intensive care Unit SPHMMC
- To determine the treatment outcome of perinatal asphyxia among neonates at Neonatal Intensive care Unit SPHMMC
- To determine association between the clinical profiles and with the treatment outcome

## 4. Materials and methods

### 4.1 Study design and period

A retrospective hospital based observational study was employed from September ,11, 2017-March, 09, 2018.

### 4.2. Study Area

This study was conducted in NICU department of St. Paul Hospital Millennium Medical college in Addis Ababa, Ethiopia. SPHMMC is the second largest hospital in Ethiopia. It has 350 beds sees an annual average of 300,000 and has a catchment population of more than 5 million. The hospital has 1200 clinical and non-clinical staff. SPHMMC one of the famous public teaching hospitals which located in a capital city of Ethiopia, Addis Ababa. It has many departments but specifically Neonatal Intensive Care Unit (NICU) that has been functional in last decades. The department provides service for both babies who born inside the institute and outside the health settings. This department incorporated with various activities as such resuscitation, incubators, radiant warmer, phototherapy unit, and exchange transfusion equipment. The unit provides service 24-hours a day. Nurses, intern doctors, pediatric resident doctors, and pediatricians work in this unit. Also, radiologic investigations, including ultrasound, computed tomography scan, and X-ray, are available in the hospital as are laboratory tests (including hematological, biochemical, and body fluid analyses) [8].

### 4.3. Source population

The source population of the study was all delivery records (babies delivered) at SPHMMC admitted to NICU from September 11, 2017-March, 09, 2018.

### 4.4. Study population

**The study populations were all case files of neonates with birth asphyxia during the study period.**

#### 4.5. Inclusion Criteria

- Gestational age greater than equal to 28 weeks
- Birth weight >1000 g
- When babies are unable to breathe at birth or after birth by its own effort with APGAR score at 5<sup>th</sup> min <7.

#### 4.6. Exclusion criteria

- No maternal or fetal measurement parameters properly
- Born in other health facility and admitted to NICU
- Presence of major congenital malformation
- Maternal analgesia
- Prematurity
- Infection
- Metabolic disorders

#### 4.7. Sample size

Based on the registry record at the NICU around 300 neonates were admitted over the past 6 months; To calculate the sample size a single population proportion formula,  $[n = (Z \alpha/2)^2 p (1-p) / d^2]$ , was employed. For this study p value of birth asphyxia 0.294 will be used from a study at specialist hospital in Port Harcourt, Nigeria which is believed to be comparable to our setup. In addition, 95% confidence level (Z) with margin of error 5% (d= 0.05) were used. Hence, the sample size ( $n_o$ ) was calculated as

$$n_o = (Z\alpha/2)^2 p (1-p) / d^2 \\ = (1.96)^2 (0.294)(0.706) / (0.05)^2 = 319$$

the finite population correction will be calculated as

$$N = n_o / (1 + n_o/N) \\ = 319 / (1 + 319/130) = 92.36 \approx 92$$

#### 4.8. Sampling methods and procedures

The sampling technique best suited for this research is simple random sampling method among 130 neonates which are admitted with the diagnosis of perinatal asphyxia to select the charts.

APGAR score will be one of the criteria used to define birth asphyxia in this study, due to unavailability of blood gas analysis in babies delivered in the hospital. APGAR scoring will be consisted of five physical sign: color, heart rate, reflex irritability, muscle tone, respiratory effort. In our study Birth asphyxia will be defined when babies are unable to breathe at 5<sup>th</sup> min after birth and APGAR score <7 at 5<sup>th</sup> min. Newborn babies who are admitted into Neonatal Intensive care Unit with APGAR score <7 at 5<sup>th</sup> min. Moreover, Anti Natal care follow up at least once in her last pregnancy, Gestational age will be based on LMP and fundal height measurement.

#### 4.9. Variables of the study

##### **Dependent variable:**

-Treatment Outcomes of Perinatal Asphyxia

##### **Independent variables:**

**Demographic characteristics;** Age, sex, marital status of mothers, religion of mothers, Educational status and occupation.

##### **Clinical profile of BA:**

**Antepartum risk factors:** Multiple gestation, preeclampsia / eclampsia, maternal drug use, oligohydramnios, maternal bleeding, smoking, maternal infection, polyhydramnios, maternal chronic hypertension, maternal age over 35 years, maternal convulsive disease, maternal diabetes.

**Intrapartum risk factors:** cesarean section, premature delivery, amniotic fluid with meconium, cord prolapse, prolonged birth, abruptio placenta, premature rupture of membranes, abnormal presentation, chorioamnionitis, placenta Previa, birth trauma, large for gestational age (LGA).

**Postpartum risk factors:** Respiratory distress syndrome (RDS), meconium aspiration syndrome, congenital heart disease, congenital anomaly.

#### 4.10. Operational definition of terms

##### **An Apgar score**

is a method of rapidly assessing the general state of a baby immediately after birth. It is measured at one minute and five minutes after delivery.

##### **Asphyxia**

Is a life-threatening condition in which oxygen is prevented from reaching the tissues by obstruction of or damage to any part of the respiratory system, especially when the Apgar score is below .

**An infant**

Is a child from one month to one year of age.

**A neonate**

Is an infant at any time during the first four weeks of life. The word is particularly applied to infants who are new born or during their first week of life.

**Resuscitation**

Is the revival of a person who appears to be dead. It depends upon the restoration of cardiac and respiratory functions (Oxford Concise Edition Medical Dictionary, 2003).

**Prenatal**

Defines the period occurring around the time of birth (5 months before and 1 month after). The perinatal period commences at 22 completed weeks (154 days) of gestation (the time when birth weight is normally 500 g).

**Treatment outcome**

Discharged

Death

**Moderate asphyxia**

If the 5 min APGAR score is 4-6, or required stimulation and oxygen administration before a cry

**Severe asphyxia**

Is when the score is 0-3

#### 4.11. Data collection techniques

The data was collected through record review using pre-tested structured check lists. The pre-test was done among neonates with perinatal asphyxia and who has been admitted prior to the study period at the NICU, SPHMMC. In order to check the quality of the check list samples were taken and checked for completeness. Prior to analysis, data was cleaned, coded, checked for normality, completeness, and entered into SPSS Version 21 Statistical Package. Descriptive analysis was used to identify the clinical profile and treatment outcomes of perinatal asphyxia.

#### 4.12. Data processing and analysis

Descriptive analysis was used to identify the clinical profile and treatment outcomes of perinatal asphyxia. All collected data was entered to SPSS version; was coded, and cleaned for completeness and consistency; finally was analyzed. Frequency, percentage and chi-square test of significance with 95% confidence level was used to find association the clinical

profile and treatment outcome of perinatal asphyxia. value less than 0.05 at 95% confidence interval will be considered as statistically significant.

#### 4.13. Ethical considerations

Ethical clearance was obtained from the Research review board, St. Paul Hospital Millennium College, Addis Ababa, the research was in accordance to guideline of college will not include any interventional methods that may be an issue of ethicality. Thus an official letter was obtained that will help through the process. Permission was obtained from the college academic provost and department head.

#### 4.14. Dissemination of results

The finding of the research was presented to the department of public health in St. Paul Millennium Medical College, and the final report will be submitted to the Department. Dissemination of the result will also be made to department of Pediatrics in SPHMMC

### 5.Result and discussion

#### 5.1 Sociodemographic data of the study population

The mean age of the mothers seeking health delivery services was  $26.2 \pm 5.14$  years. Those aged more than 30 years comprised of 14(15.2%). 75(81.4%) of the neonates were babies born of mothers aged less than or equal 30 years. Only 3(3.3%) mothers were above the age of 35. The youngest mother was aged 17 years while the eldest was aged 39 years. Higher proportions (88.0%) of the mothers were married. This was followed by those who were divorced at 6.5% while the rest were single (5.4%). All mothers had a regular ANC follow up. The ethnicity, religion, education status of the mothers was not recorded on the charts of the neonates (Table 1).

**Table 1: sociodemographic data of the study population, 2018 G.C**

| Sociodemographic factor |       | Frequency | Percentage |
|-------------------------|-------|-----------|------------|
| Age of the mother       | 15-20 | 12        | 13.0       |
|                         | 21-25 | 36        | 39.1       |
|                         | 26-30 | 27        | 29.3       |

|                       |              |    |       |
|-----------------------|--------------|----|-------|
|                       | 31-35        | 14 | 15.2  |
|                       | 36-40        | 3  | 3.3   |
|                       | Cumulatively | 92 | 100.0 |
| <b>Marital status</b> | Married      | 81 | 88.0  |
|                       | Single       | 5  | 5.4   |
|                       | Divorced     | 6  | 6.5   |
|                       | Cumulatively | 92 | 100.0 |

## 5.2 Demographic Information the Neonates:

During the study period (September ,11, 2017 -March, 09, 2018), 92cases of the new born babies fulfilled the inclusion criteria. Out of these 92, male neonates were 59 (64.1%) and females were 33 (35.9%). With regard to birth weight, 70(76.1%) of the neonates weighted 2500-3999gms and (18.5%) of the neonate's weight 1500-2499gms.

There was a relatively higher proportion of the newborns whose birth ages were term (57.6%) compared those who were post term (4.3%).

Table 2:- Demographic Information the Neonates.

| Demography                   | Category     | Frequency | Percentage |
|------------------------------|--------------|-----------|------------|
| <b>Gender of the neonate</b> | Female       | 33        | 35.9       |
|                              | Male         | 59        | 64.1       |
|                              | Cumulatively | 92        | 100.0      |
| <b>Birth weight</b>          | 1000-1499g   | 3         | 3.3        |
|                              | 1500-2499g   | 17        | 18.5       |
|                              | 2500-3999g   | 70        | 76.1       |
|                              | ≥ 4000 g     | 2         | 2.2        |
| <b>Birth Age</b>             | Term         | 53        | 57.6       |
|                              | Post Term    | 4         | 4.3        |

## 6.The clinical profile of perinatal asphyxia

### 6.1 Ante partum risk factor

Multiple gestation 5(5.4%). pregnancy induced hypertension is 9(9.8%). Maternal drug use is 17(18.5%).Oligohydramnios/polyhydramnios and maternal diabetes are both each

1(1.1%).Antepartum hemorrhage 5(5.4%).Maternal infection and mothers above the age of 35 are each 3(3.3%).

Table 3.Antepartum risk factors

| Antepartum risk factors        |            | Frequency | Percentage |
|--------------------------------|------------|-----------|------------|
| Multiple gestation             | Twin       | 4         | 4.3        |
|                                | Triplet    | 1         | 1.1        |
|                                | cumulative | 5         | 5.4        |
| Pregnancy induced hypertension |            | 9         | 9.8        |
| Maternal drug use              |            | 17        | 18.5       |
| Polyhydramnios/oligohydramnios |            | 1         | 1.1        |
| Maternal diabetes              |            | 1         | 1.1        |
| Antepartum hemorrhage          |            | 5         | 5.4        |
| Maternal Infection             |            | 3         | 3.3        |

There was no significant association seen between all the antepartum risk factors and PNA  
Unlike a study done in Turkey and Cirena NICU unit.

## 6.2 Intrapartum risk factor

Cesarean section is 28(30.4%). Antepartum hemorrhage is 5(5.4%) and amniotic fluid stained meconium was found to be 32(34.8%). Cord prolapse and chorioaminotitis had the same number being 3(3.3%) each. PROM and CPD was 14(15.2%) and 5(5.4%) respectively.

Table 3. Intrapartum risk factor

| Intrapartum risk factor | Frequency | Percentage |
|-------------------------|-----------|------------|
| Cesarean section        | 28        | 30.4       |
| APH                     | 5         | 5.4        |
| MSAF                    | 32        | 34.8       |
| Cord prolapse           | 3         | 3.3        |
| Chorioaminotitis        | 3         | 3.3        |
| PROM                    | 14        | 15.2       |
| CPD                     | 5         | 5.4        |
| LGA                     | 33        | 35.9       |

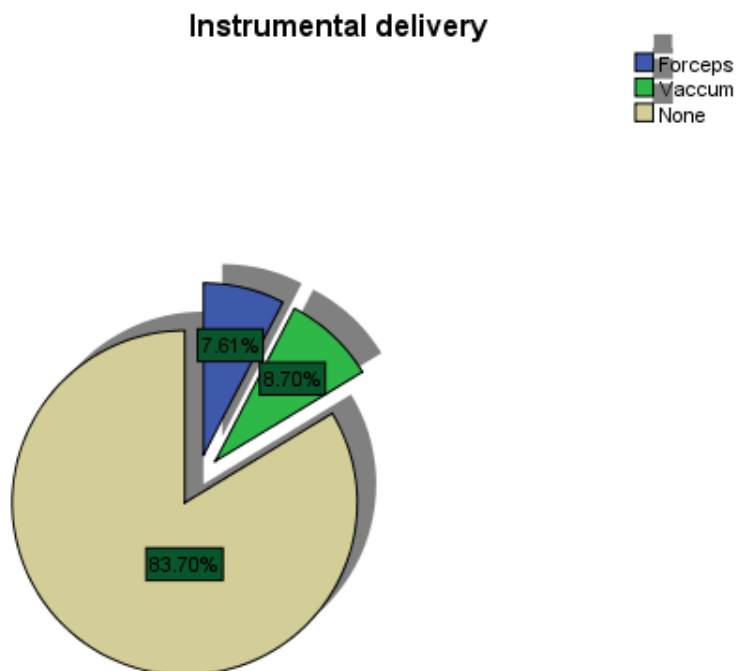


Figure 1 .Distributions of instrumental deliveries

None of the intrapartum risk factors had significant association with perinatal asphyxia that coincides with a research done in Turkey and BMSH,Nigeria

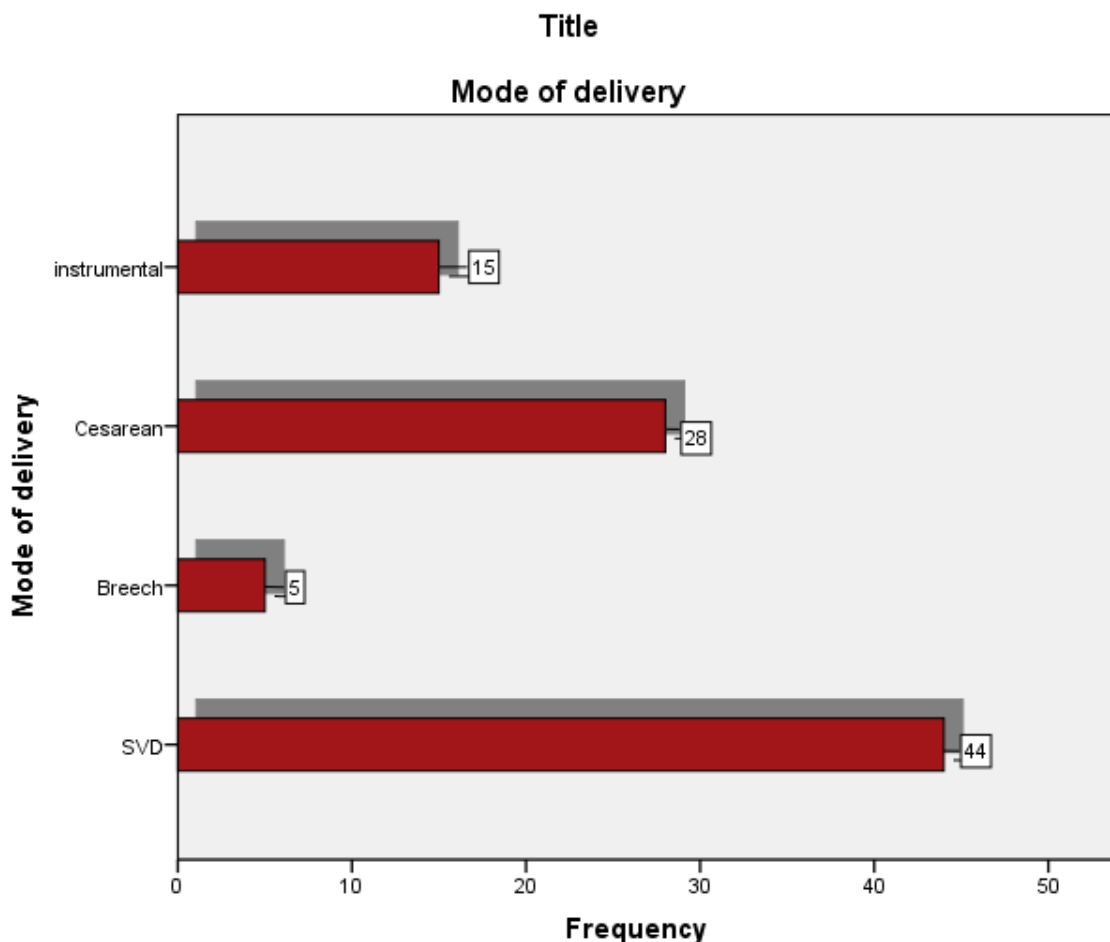


Figure 2.Distribution of mode of delivery

### 6.3 Postpartum risk factor

Respiratory distress syndrome was 44(47.8%) and 32(34.8%) neonates with perinatal asphyxia had meconium aspiration syndrome. The other common postpartum risk factors are congenital anomalies and congenital heart diseases but aren't assessed here since they are used as exclusion criteria.

But there was no significant association of both with perinatal asphyxia( $p=0.383$  and  $p=0.322$  respectively)

## 7. Management and treatment outcome of perinatal asphyxia

Resuscitation was done for 75(81.5%) of the neonates. 39(42.4%) of neonates were put in radiant warmers. Blood transfusion was given for only 4(4.3%) neonates. Intranasal oxygen and CPAP was given for 41(44.6%) and 47(51%) of neonates with PNA respectively. IV fluids were given for 75(81.5%) of the neonates and 41(44.6%) neonates were treated using anticonvulsants.

Out of the 92 neonates who had perinatal asphyxia who received the above treatment 62(67.4%) were discharged with improvement while the rest of 32 neonates die

Table 4. Management and treatment outcome

| Management& treatment outcome |            | Frequency | Percentage |
|-------------------------------|------------|-----------|------------|
| Resuscitation                 |            | 75        | 81.5       |
| Radiant warmer                |            | 39        | 42.4       |
| Oxygen supplement             | Intranasal | 41        | 44.6       |
|                               | CPAP       | 47        | 51.1       |
| Blood transfusion             |            | 4         | 4.3        |
| IV fluid                      |            | 75        | 81.5       |
| Anticonvulsant                |            | 41        | 44.6       |
| Outcome                       | Discharge  | 62        | 67.4       |
|                               | Death      | 30        | 32.6       |

Outcome of the neonate

■ Discharged  
■ Death

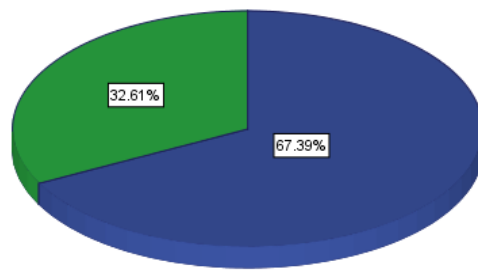


Figure 3. Distribution of outcome of the neonate

| Stages of PNA | Out come of aneonate |           |
|---------------|----------------------|-----------|
|               | Death                | Discharge |
| PNA stage 1   | 18                   | 1         |
| PNA stage 2   | 35                   | 17        |
| PNA stage 3   | 9                    | 12        |
| Cummlative    | 62                   | 30        |

Table 5.Association between treatment out come and stages of perinatal asphyxia

Of the 19(20.7%) neonates who had PNAI,18 where discharged and only one had died. PNAII where 52(56.5%) of which 35 got discharged and 17 had death. The remaining 21(22.8%) had stage PNAIII where 12 of them died and the rest 9 got discharged. And there was significant association between the stages and out comes of PNA ( $p=0.02$ ) But in a research done in Cirena neonatology hospital the highest mortality was evident in patients with PNAIII hypoxic ischemic encephalopathy (71.4%).

## 8. Discussion

The study's objective was to evaluate the clinical profile that includes socio-demographic, antepartum, intrapartum and postpartum risk factors of Birth asphyxia in the NICU of SPHMMC. Socio-demographic risk factors were mother's age and marital status. Antepartum risk factors of birth asphyxia included multiple gestation, PIH, maternal drug use, oligohydramnios/polyhydramnios, APH, maternal infection, maternal age above 35 and maternal DM while intrapartum risk factors were mode of delivery, premature delivery, MSAF, cord prolapse, APH, PROM, Chorioamnionitis, and abnormal presentation. Postpartum risk factors are only RDS AND MAS.

**Social-Demographic:** - Risk factors of asphyxia of birth asphyxia in this study indicated that maternal age has no association with perinatal asphyxia. This finding is not inconsistent with the research done in Kenya that reported younger mothers have 3x increased chance of having a neonate with perinatal asphyxia. This could be due to the methodology used or due to the sample size used or the nature of setting where the study was conducted.

Gestation even though it merged as a risk factor in other studies there was no association shown in this study ( $p = < 0.0917$ ). The other aspect is marital status of mothers which most of the mother whose babies had PNA were married and there was no association found in the study. There were two times more male neonates with PNA than female neonates but no association found between the existence of perinatal asphyxia and being male ( $p = 0.144$ ).

### Antepartum risk factors

In the antepartum risk factors that are mentioned above the frequently occurred risk factor in neonates with perinatal asphyxia is maternal drug use 17(18.5%) followed by PIH and multiple gestation but there was no significant association seen between all the antepartum risk factors and PNA prevalence.

### Intrapartum risk factor

Of the 92 neonates with perinatal asphyxia 34.8% of them had MSAF followed by 30.4% who are delivered by cesarean delivery and so on but none of the intrapartum risk factors had significant association with perinatal asphyxia.

### Postpartum risk factor

Out of the 92 neonates under the study 32(34.8%) had Meconium aspiration syndrome and 28(30.4%) neonates had respiratory distress syndrome but there was no significant association of both with perinatal asphyxia ( $p = 0.383$  and  $p = 0.322$  respectively).

## **Management and treatment outcome**

In our study, there were 300 neonates admitted to the NICU over the 6 month of study period and of that 130 of the neonates were diagnosed with different stages of perinatal asphyxia while the 92 neonates were included in our study. Out of the 92 neonates 75(81.5%) were resuscitated but in the study there was no significant association ( $p=0.058$ ). Anticonvulsant was given for 41(44.6%) of the neonates and there was significant association ( $p=0.0001$ ). There was a significant association between the antibiotics given and oxygen supplement ( $p=0.0001$  and  $0.012$  respectively). 39 neonates were put on a radiant warmer and there was a significant association with perinatal asphyxia.

Out of the 92 neonates under study mortality was 30(32.6%) which is higher than the research done in Turkey which was 15.2% Dilchora that is 11 %. In BMSH, Nigeria mortality was 14.%. Of the 19(20.7%) neonates who had PNAI, 18 were discharged and only one had died. PNAII where 52(56.5%) of which 35 got discharged and 17 had death. The remaining 21(22.8%) had stage PNAPIII where 12 of them died and the rest 9 got discharged. But in a research done in Cirena neonatology hospital the highest mortality was evident in patients with PNAPIII hypoxic ischemic encephalopathy (71.4%).

## **9. Conclusion**

In conclusion perinatal asphyxia has ante partum, intrapartum and postpartum risk factors; thus it is not statistically significant in this study. Rather there was very high association between the treatment given and PNA. Treatments such as antibiotics, IV fluid, radiant warmer and anticonvulsant were significant in the study.

There is an immediate need to develop strategies for identification and management of birth asphyxia by involving all pathways to survival, including women, families, communities, community health workers, health professionals and policy makers. And giving the appropriate treatment immediately decreases the mortality rate of neonates due to BA while improving the outcome.

## **8. Recommendation**

Proper attention should be given for neonatal mortality by addressing and providing adequate information because prevalence of birth asphyxia was 30% in study area. This may increase mortality and morbidity rate of neonates.

Treatment wise we should be careful in managing a neonate with perinatal asphyxia since it has a very high association with the outcome we need to address all possible risk factors fast and treat with the appropriate management. There is an immediate need for the hospital to develop strategies for early identification and management of factors associated with birth asphyxia by involving stakeholders. on care of young mothers.

Proper documentations of data need to be practiced and the responsible part need to be trained and thought the correct ways to document and keep the important information's on the chart.

## **9.Limitation and strength**

### **Among strength of this research, some includes**

- Simple random sampling was used
- The study tried to assess the possible risk factors for perinatal asphyxia and the association between the treatment given with the outcome
- A check list that has all the necessary information was used to collect data

### **The limitations of this research:**

- It was a retrospective hospital based study with small sample size which has inherent sampling bias that makes it difficult to generalize the findings to larger populations.
- Secondary data from charts were used which has incomplete recording and some charts were missing
- Datas where not completely documented in some of the charts
- Data collection and entry was done by the investigator
- Limited literatures
- Logistic regression between the variables was not analyzed as all the risk factors was not assessed

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## **Annexes**

### **Data Extraction Tool**

1. Maternal age in completed years : \_\_

2. Maternal educational states:

1. Illiterate
2. Completed primary school
3. High school
4. Higher level education

3. Maternal address:

1. Addis Ababa
2. Out of Addis Ababa

4. Parity: \_\_\_\_

5. Period of gestation in completed weeks \_\_\_\_

6. Antenatal care

0. No ☐

1. Yes ☐

7. If yes how many ANC Visits, \_\_\_\_

8. Maternal drug

Antibiotics 0. No \_\_\_\_, 1. Yes \_\_\_\_

Steroids 0. No \_\_\_\_, 1. Yes \_\_\_\_

HAART 0. No \_\_\_\_, 1. Yes \_\_\_\_

Diazepam 0. No \_\_\_\_, 1. Yes \_\_\_\_

Analgesia (narcotics) 0. No \_\_\_\_, 1. Yes \_\_\_\_

Blood transfusion 0. No \_\_\_\_, 1. Yes \_\_\_\_

9. Risk factor during pregnancy

Any Infection 0. No \_\_\_\_, 1. Yes \_\_\_\_

Pre-eclampsia 0. No \_\_\_\_, 1. Yes \_\_\_\_

Hypertension 0. No \_\_\_\_, 1. Yes \_\_\_\_

RH -ve mother 0. No \_\_\_\_, 1. Yes \_\_\_\_

Maternal O blood group 0. No \_\_\_\_, 1. Yes \_\_\_\_

Oligohydramnios 0. No \_\_\_\_, 1. Yes \_\_\_\_

Polyhydramnios 0. No \_\_\_\_, 1. Yes \_\_\_\_

Maternal diabetes 0. No \_\_\_\_, 1. Yes \_\_\_\_

10. Obstetric risk factors

Cephalopelvic disproportion 0. No \_\_\_\_, 1. Yes \_\_\_\_

Antiparum hemorrhage 0. No \_\_\_\_, 1. Yes \_\_\_\_

Grad III meconium stained amniotic fluid 0. No \_\_ 1. Yes \_

Malpresentation 0. No \_\_\_\_, 1. Yes \_\_

Cord prolapse 0. No \_\_\_\_, 1. Yes \_\_\_\_

Abruptio placenta 0. No \_\_\_\_, 1. Yes \_\_\_\_

11. Duration of labor in completed hours \_\_

12. Duration rupture of membranes in completed hours \_\_\_\_

13. Instrumental delivery: 0. No \_\_\_\_, 1. Yes \_\_\_\_

14. Non-reassuring fetal heart pattern: 0. No \_\_\_\_, 1. Yes \_\_\_\_

15. Number of fetal outcome

1. Singleton\_\_\_\_,

2. Twins\_\_\_\_,

3. Triplet \_\_\_\_

16. Mode of delivery

1. SVD\_\_\_\_,

2. Breech\_\_\_\_,

3. Instrumental delivery (forceps\_\_\_\_, vacuum\_\_\_\_),

4. Elective Caesarean delivery: No \_\_\_\_, Yes \_\_\_\_

5. Emergency caesarian delivery: No \_\_\_\_, Yes \_\_\_\_

17.1 If yes for instrument or cesarean, what was the indication

18. Apgar score:

1stmin\_\_\_\_,

5thmin \_\_\_\_

10thmin \_\_\_\_

19. Resuscitation:

Upper air way cleaning 0. No \_\_\_\_, 1. Yes \_\_\_\_

Bag mask ventilation 0. No \_\_\_\_, 1. Yes \_\_\_\_

Intubation 0. No \_\_\_\_, 1. Yes \_\_\_\_

20. diagnosis at admission to NICU (specify)

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21. Congenital anomalies detected 0. No \_\_\_\_, 1. Yes \_\_\_\_

22. Temperature at admission. \_\_\_\_ \_\_\_\_ . \_\_\_\_

Hypothermia after admission \_\_\_\_ \_\_\_\_ . \_\_\_\_

23. Resuscitation at admission: 0. No \_\_\_\_, 1. Yes \_\_\_\_

24. Antibiotic started: 0. No \_\_\_\_, 1. Yes \_\_\_\_

25. Direct Blood transfusion: 0. No \_\_\_\_, 1. Yes \_\_\_\_

26. Exchange blood transfusion. 0. No \_\_\_\_, 1. Yes \_\_\_\_

27. Oxygen administered

with cannula 0. No \_\_\_\_, 1. Yes \_\_\_\_

with CPAP 0. No \_\_\_\_, 1. Yes \_\_\_\_

28. Treatment out come :Discharge

:Death