

## ORIGINAL ARTICLE

## Outcomes of Neonates with Perinatal Asphyxia at a Tertiary Academic Hospital

Md. Maniruzzaman Bhuiyan<sup>1</sup>, Mostafa Sharif Mohammad<sup>2</sup>**Abstract :**

*Perinatal asphyxia causes about 0.92 million newborn death annually world wide and it is about 21% of the neonatal mortality in Bangladesh which is second to death due to severe infections and its related death. The Retrospective observational study was done to evaluate the outcome of perinatal asphyxia in Neonatal Intensive Care Unit (NICU) of Holy Family Red Crescent Medical College Hospital from October 2013 to December 2014. Total 327 asphyxiated neonates full filling the inclusion criteria admitted in NICU (both in born & out born, term and preterm). Out of these 59% male patients and 41% female term, 22% of the asphyxiated patient term unit and 77% preterm. Total deaths among these were 27. Out of these 2 deaths belongs to term units also had some associated neonatal infections and 25 deaths belongs to preterm who had also some other complications related to prematurity. The study results show that predictors of survival were mode of delivery, place of birth and resuscitation at birth. Elective caesarean section was associated with improved outcomes. The study confirms that perinatal asphyxia remains a significant problem at HFRCMCH. The high overall survival and survival after NICU admission provide a benchmark for further care.*

**Introduction:**

Perinatal asphyxia, neonatal asphyxia, or birth asphyxia is the 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<sup>1</sup>. Hypoxic damage can occur to most of the infant's organs (heart, lungs, liver, gut, kidneys), but brain damage is of most concern and perhaps the least likely to quickly or completely heal. In more profound cases, an infant will survive, but with damage to the brain manifested

as either mental, such as developmental delay or intellectual disability, or physical, such as spasticity. Though there is no exact definition of Perinatal Asphyxia which is accepted clinically but according to the World Health Organization ,Birth asphyxia is defined as "failure to initiate and sustain breathing at birth."-now it is well accepted globally.

Perinatal asphyxia causes about 0.92 million newborn death annually world wide and it is about 21% of the neonatal mortality in Bangladesh which is second to death due to severe infections and its related death. It is the most preventable cause of cerebral injury during perinatal period.(National neonatal guidelines-BD). It happens in 2 to 10 per 1000 newborns

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that are born at term and more for those that are born prematurely.

So perinatal asphyxia if not managed early and properly, it may cause death of the neonate which exerts a great on health system As a whole.

An infant suffering severe perinatal asphyxia usually has poor color (cyanosis), perfusion, responsiveness, muscle tone, and respiratory effort, as reflected in a low 5 minute Apgar score. Extreme degrees of asphyxia can cause cardiac arrest and death<sup>3</sup>. If resuscitation is successful, the infant is usually transferred to a neonatal intensive care unit.

According to the WHO, there are about four million newborn develop birth asphyxia and these babies depending on the severity may develop severe consequences like cerebral palsy, epilepsy, developmental delay, so not only the mortality, morbidity due to birth asphyxia also a great concern to the family, society and to the nation also<sup>4</sup>. So early or proper care like Neonatal intensive care in NICU is very much helpful to reduce the morbidity and mortality of neonates. The aim of the study that is to observe the outcome of the management of these asphyxiated neonates after establishing NICU at HFRCMCH.

Taking into account that neonatal deaths account for almost 40% of deaths of children under 5, it is apparent that Millennium Developmental Goal 4 (aiming at a two-thirds reduction in under-5 mortality by the year 2015 from a baseline in 1990) can only be met by substantially reducing neonatal deaths. Perinatal asphyxia is the fifth largest cause of under-5 deaths (8.5%) after pneumonia, diarrhoea, neonatal infections and complications of preterm birth<sup>5</sup>.

This observational descriptive study was done to determine the overall turnout of neonates in NICU and frequency of neonatal asphyxia in relation to sex, term and delivery procedures available in a tertiary academic hospital.

#### **Materials and method:**

A retrospective cross sectional observational study was conducted from October 2013 to December 2014 at the NICU of Holy Family Red Crescent Medical College Hospital, Dhaka to manage birth asphyxiated neonates at this institution and to assess the immediate outcome in relation to age at admission and place of delivery in asphyxiated babies. Both inborn and outborn neonates after admission to NICU were received and resuscitated by a senior resident trained in neonatal resuscitation and recognized neonatal intensive care protocol. 327 neonates were included in the study, both term and preterm neonates with the history of delayed cry and managed in NICU.

#### *Inclusion criteria*

1. History of delayed cry at birth. 2. APGAR score <7 at 5 minutes of life. 3. Needs resuscitation for more than 10 minutes 4. Neonates with gestational age >34 weeks and weighing >1500 gm were included. 5. Both inborn and outborn neonate were included

#### *Exclusion Criteria*

1. Preterm with <34 weeks of gestation and/or birth weight <1500 gm. 2. Congenital abnormalities of cardiovascular, central nervous system, respiratory system or dysmorphic babies. 3. Respiratory depression due to intracranial bleeding.

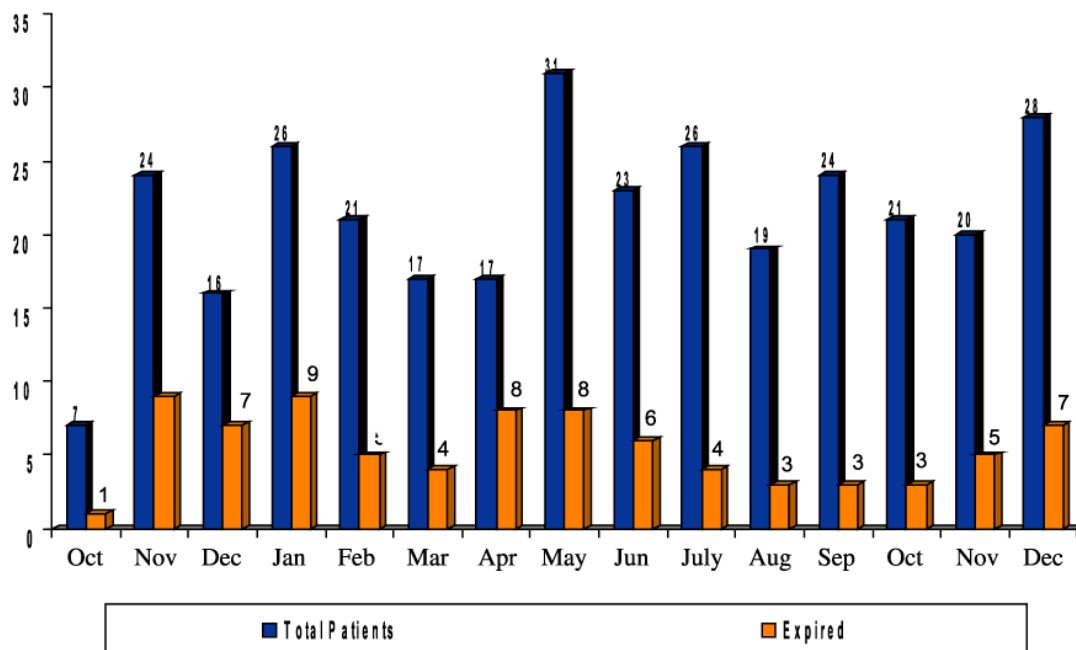
NICU records provided additional information about newborn like age at presentation, gestational age, birth weight, sex, clinical features stages of birth asphyxia and subsequent outcome. After consent and enrollment their detailed history including peri-natal history, Apgar score, resuscitation measures, problems and outcome were recorded on a pre-designed study proforma. Short term outcome was measured after 7 hours as clinically improved, developed neurological disability (Hypoxic Ischaemic Encephalopathy stage II or III) or death.

### Results:

Total 327 asphyxiated neonates full filling the inclusion criteria admitted in NICU (both in born & out born, term and preterm). Out of these 59% male patients and 41% female term, 22% of the asphyxiated patient term unit and 77% preterm. Total deaths among these were 27. Out of these 2 deaths belongs to term units also had some associated neonatal infections and 25 deaths belongs to preterm who had also some other complications related to prematurity.

**Table-I:** Overall turnout of NICU and Perinatal Asphyxia in one year

Months	Male	Female	LUCS	NVD	Term	PreTerm	Total
October -2013	03	04	07	00	1	06	7
November -2013	11	13	22	02	3	21	24
December -2013	11	05	13	03	4	12	16
January -2014	17	09	25	01	4	22	26
February -2014	10	11	14	07	1	20	21
March -2014	11	06	14	03	2	15	17
April -2014	11	06	12	05	3	14	17
May -2014	22	09	24	07	10	21	31
June -2014	15	08	20	03	5	18	23
July -2014	12	14	21	05	3	23	26
August -2014	13	06	14	05	5	14	19
September -2014	14	10	20	04	7	17	24
October -2014	10	11	18	3	6	15	21
November -2014	11	9	17	3	7	13	20
December -2014	23	5	19	9	12	16	28
<b>Total</b>	<b>194</b>	<b>133</b>	<b>267</b>	<b>60</b>	<b>75</b>	<b>252</b>	<b>327</b>
<b>Perinatal Asphyxia</b>					26	70	96



### Discussion:

Birth asphyxia is defined by the WHO "the failure to initiate and sustain breathing at birth"<sup>4</sup>. The national neonatology forum of India has defined birth asphyxia as "gasping and ineffective breathing or lack of breathing at one minute after birth"<sup>2</sup>

Regarding the definition according to American College of Obstetricians and Gynaecologists and the American Academy of Paediatrics, a neonate is labeled to be asphyxiated if the following conditions are fulfilled:

- (1) Umbilical cord arterial pH < 7;
- (2) Apgar score of 0 to 3 for longer than 5 minutes;
- (3) Neurological manifestations (e.g., seizures, coma, or hypotonia);
- (4) Multisystem organ dysfunction, e.g., cardiovascular, gastrointestinal, haematological, pulmonary, or renal system.

Risk factors seen in different studies were post maturity, low birth weight, and eclampsia<sup>6</sup>. According to a study conducted at Neonatal Unit of King Chulalongkorn Memorial Hospital, Thailand inappropriate antenatal care, post-maturity, vacuum extraction, male sex, prolapsed cord and 1 and 5-minute low Apgar scores, (p < 0.0001) were significant risk factors for hypoxic ischaemic encephalopathy (HIE).

Outcome of birth asphyxia depends on apgar score at 5 minutes, heart rate at 90 seconds, time to first breath, duration of resuscitation arterial blood gases and acid-base status at 10, and 30 minutes of age<sup>7</sup>. It is measured as short-term (early) and long-term outcome.

Perinatal asphyxia remains a common problem at HFRCMCH (96/327), but the mortality was low after establishing NICU. The neonatal mortality due to perinatal asphyxia can be remarkably reduced by prompt, effective neonatal resuscitation with NICU support. Failure to attend for follow-up may be due to

socio-economic factors and the low level of education of patients' parents or guardians. The study results show that predictors of survival were mode of delivery, place of birth and resuscitation at birth. Elective caesarean section was associated with improved outcomes.

This was a retrospective study that relied on data from attending staff, with possible inaccuracies and loss of data. This study describes the incidence of perinatal asphyxia as defined by a 5-minute Apgar score <6, and there are insufficient data to comment on the incidence of moderate to severe HIE or on morbidity after discharge.

The study confirms that perinatal asphyxia remains a significant problem at HFRCMCH. The high overall survival and survival after NICU admission provide a benchmark for further care. There is a need to obtain adequate data for long-term follow-up, as this was not possible with the existing resources.

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