

# Birth Asphyxia - Clinical Experience and Immediate Outcomes

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## Abstract

**Background:** To find out immediate outcome of neonates with birth asphyxia and its association with risk factors.

**Methods:** This cross sectional study included all consecutive babies admitted with diagnosis of birth asphyxia . Babies with congenital heart disease, congenital malformations and prematurity were excluded. Biodata and clinical parameters including place of delivery, dai handling, time of arrival in hospital, mode of delivery, grades of hypoxic ischemic encephalopathy, outcome in terms of discharge and death were recorded.

**Results:** Sixty one patients were included in the study. Majority (80.3%) were male. Mothers having regular antenatal checkup were 65.5%. Eleven (18%) babies were home delivered and 50(82%) in hospital setup. In 16.4% babies there was history of dai handling. 60.7% babies were delivered by SVD and 39.3 % by C- section. Majority (83.6 %) presented within 6 hours. Hypoxic ischemic encephalopathy stage I, II and III was seen in 39.3%, 49% and 11.5% respectively. Forty eight (78.7%) babies were discharged and 13(21.3%) died. No evidence of association was found between outcome at discharge and time of arrival at hospital (p value=0.33) and dai handling (p value= 0.114). Significant association was found between outcome at discharge and place of delivery (p value=0 .031) and outcome at discharge and hypoxic ischemic encephalopathy stage (p value=0.000).

**Conclusion:** Asphyxiated newborns have significant short term mortality in association with home deliveries and hypoxic ischemic encephalopathy stage III.

**Key Words:** Birth asphyxia, Hypoxic ischemic encephalopathy, APGAR score

## Introduction

Birth asphyxia is an important and leading cause of mortality and morbidity in neonates.<sup>1-3</sup> Although a lot of research work has been done in this regard, yet there is no universal consensus definition of birth

asphyxia. WHO defines it as "failure to initiate and sustain breathing at birth."<sup>4</sup> Gasping and ineffective breathing at 1 minute after birth is also taken as birth asphyxia.<sup>5</sup> According to American Academy of Pediatrics and a Task force on cerebral palsy birth asphyxia needs the presence of profound metabolic or mixed acidemia (pH < 7) in an umbilical artery blood sample( if obtained), persistence of an Apgar score of 0-3 for longer than 5 minutes, neonatal neurologic sequelae (e.g, seizures, coma, hypotonia) and multiple organ involvement (e.g, kidney, lungs, liver, heart, intestines) .<sup>6</sup>

About 99% of neonatal mortality occurs in low and middle-income countries.<sup>7</sup> In Pakistan neonatal mortality rate is 49/1000 live births accounting for 7% of the global neonatal deaths.<sup>8</sup> Its incidence in the developed countries is low(0.5-1/1000 live births) owing to better perinatal and antenatal care.<sup>9</sup> Sarnat and Sarnat staging system is a useful tool to assess the severity of hypoxia and to classify the degree of hypoxic ischemic encephalopathy (HIE).<sup>10</sup> Many local, regional and international studies have addressed antenatal, intrapartum and postpartum risk factors and their association with neonatal morbidity and mortality.<sup>11,12,13</sup> To decrease the grave consequences of this problem all inculcate preventive measures and advocate early interventions.

## Patients and Methods

This descriptive, cross sectional study was conducted from November 2015 to April 2016 at Bhatti International Teaching (trust) Hospital, Kasur to find out immediate outcome of neonates with diagnosis of birth asphyxia and its association with risk factors. Children included in the study were full term newborns (gestational age 37-42 weeks) with the diagnosis of HIE. Data collection tools consisted of a self-designed questionnaire including maternal and neonatal information. Clinical examination of all the admitted babies for the study was performed and documented at admission, 12 hours, 24 hours, 48 hours, 72 hours and at the time of discharge.

Newborns were labelled as HIE if they have history of delayed initiation of respiration or need for

resuscitation and had evidence of cardiorespiratory and neurological depression (defined as APGAR score < 7 at 5 minutes after birth) . Severity of hypoxia and HIE was graded by using Sarnat and Sarnat staging system at 24 hours of age into stage I, II, or III. The early outcome was recorded at time of discharge as clinical improvement or death. Patients with congenital neuromuscular, cardiovascular and pulmonary disorders, dimorphism, extreme prematurity and those who left against medical advice were not included in this study. Analysis of relationship between different variables was measured with p-value applying chi-square test.p-value of < 0.05 was considered significant. Results were given in graphs and tables.

### Results

Out of 61, majority (80.3%) were male. Their weights ranged from 2 to 3.8Kg. Mothers having regular antenatal checkup were 40 (65.5%) while 21(34.4%) mothers were with no antenatal checkup. A total of 11(18%) babies were home delivered and 50(82%) in hospital setup. In only 10(16.4%) babies there was history of dai handling. 60.7% babies were delivered by SVD and 39.3 % by C- section. As far as hospital arrival is concerned, 51(83.6 %) patients presented within 6 hour and 10(16.4%) patients came later than 6 hours. Hypoxic ischemic encephalopathy stage I, II and III was seen in 24(39.3%), 30(49%) and 7(11.5%) respectively (Table 1). Artificial ventilation was required in 10(16.4%) babies. Forty eight (78.7%) babies were discharged and 13(21.3%)died. No association was found between outcome at discharge and time of arrival at hospital (p value=0 .33)(Table 2) and dai handling (p value= 0.114)(Table 3).

**Table 1: Stages of Hypoxic ischemic Encephalopathy**

Stage	No (%)
Stage I	24(39.30)
Stage II	30(49.20)
Stage III	7(11.5)

**Table 2.Time of arrival and outcome at discharge**

	value	df	Asymptomatic significance (2-sided) p value	Exact sig (2-sided)	Exact sig. (1-sided)
Pearson chi square Fisher's exact test	.913	1	.339	.674	.314

**Table 3.Dai handling and outcome at discharge**

	value	df	Asymptomatic Significance (2-sided) P value	Exact sig. (2-sided)	Exact sig. (1-sided)
Pearson chi square Fisher's exact test	2.491	1	.114	.198	.126

**Table 4.Delivery place and outcome at discharge**

	value	df	Asymptomatic Significance (2-sided) P value	Exact sig. (2-sided)	Exact sig. (1-sided)
Pearson chi square Fisher's exact test	4.665	1	.031	.046	.046

**Table 5. Hypoxic ischemic encephalopathy and outcome at discharge**

	value	df	Asymptomatic Significance (2-sided) p value
Pearson chi square	32.377	2	.000
Lineae by linear association	25.203	1	.000

Significant association was found between outcome at discharge and place of delivery (p value=0 .031)(Table 4). Also significant association was found between outcome at discharge and hypoxic ischemic encephalopathy stage (p value=0.000) (Table 4). Hypoxic ischemic encephalopathy and outcome at discharge also had significant association (Table 5)

### Discussion

A total of 61 patients were included in the study. Their weights were from 2 to 3.8and range 1.8 kg. In Saeed et al 69.7% were between 2.1 to 3 kg,<sup>13</sup> whereas in another study majority of the babies were between 1.5 and 2.5 kg.<sup>12</sup> The difference is due to inclusion criteria of the patients for studies. In our study, male patients were in majority 49(80.3%) which is in correspondence to the other studies with figure of 60%, 64% and 80%.<sup>12,14,15</sup>The association of antenatal checkup and outcome is insignificant(p-value 0.31). The incidence of birth asphyxia was significantly higher in babies of un-booked mothers in other studies.<sup>16,17</sup> The sample

size of our study was small so the association found statistically insignificant.

A total of 50 (82%) newborn were hospital delivered. A comparable figure of 90.5% hospital delivered babies were reported in the study from Services hospital.<sup>15</sup>In our study statistically significant association was found between outcome at discharge and place of delivery (p value= 0.031) and also in other study place of delivery was associated with mortality significantly.<sup>13</sup>In our study no evidence of association was found between outcome at discharge and dai handling (p value=0.114). Babies with HIE were more likely to be delivered by unskilled birth attendants.<sup>18</sup>Failure to have significant association in our study may be attributed to small number of patients in the study. In our study, 60.7% babies were delivered by SVD and 39.3 % by LSCS. It is comparable with the figure from Liaquat University of Medical Health Sciences (LUMHS).<sup>14</sup>But in the study from Services hospital 64.1% delivered by LSCS.<sup>15</sup> This may be due to the fact that hospital is receiving all the difficult referred patients that is depicted by the datum.

As far as hospital arrival is concerned, 51(83.6 %) patients presented within 6 hour and 10(16.4%) patients came later than 6 hours. In another study, 54.3% approached within 6 hours.<sup>14</sup>According to other studies mean age of the asphyxiated patients was 13.8 hours and in an Indian study 71.6% babies arrived within 24 hours.<sup>19</sup> In our study, no association was found between outcome at discharge and time of arrival at hospital (p value= 0.33) in expired babies. However, late presentation is associated with poor outcome in many studies.<sup>12,13,16</sup>The observation may be due to fact that in our study most of HIE stage III babies presented within 6 hours.

Hypoxic ischemic encephalopathy stage I, II and III was seen in 24(39.3%), 30(49%) and 7(11.5%), respectively in this study. These figures are comparable with study done by Vidyasagar.<sup>20</sup> Forty eight (78.7) babies were discharged and 13(21.3%) died. This figure is comparable with other study<sup>15</sup>. A significant association was found between hypoxic ischemic encephalopathy stage and outcome at discharge (p value- .000) that is in accordance with the other studies.<sup>15,21</sup>

## Conclusion

1. Asphyxiated newborns have significant short term mortality in association with home deliveries and hypoxic ischemic encephalopathy stage III.

2. It is required to encourage and facilitate hospital deliveries.

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