Original Article

Risk Factors for Birth Asphyxia – an Experience from A Tertiary Care Setting

Risk Factors for Birth Asphyxia

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ABSTRACT

Objective: The aim of the study was to identify the risk factors associated with birth asphyxia in newborns.
Study Design: Descriptive cross-sectional study
Place and Duration of Study: This study was conducted at the Neonatology unit of Ayub Medical Teaching Institute over a period of one year from 1st March 2021 to 28th February 2022.
Materials and Methods: All neonates who were admitted with birth asphyxia were included in the study. Data was collected by nonprobability convenience sampling. Patient characteristics and maternal details were recorded on a predesigned proforma. Patients whose maternal history was not available were excluded from the study. Patients with major congenital malformations were also excluded from the study. Data was entered and analyzed using SPSS 26. Significance testing was done using Chi square test. P value of <0.05 was considered significant.
Results: A total of 110 patients were included in our study. These included 60(54.5%) male and 50(45.5%) female patients. Major antepartum risk factors included maternal anemia in 75(68.2%), un-booked status in 83(75.5%), PROM in 38(34.5%) and primiparity in 68(61.8%). Major intrapartum risk factors were prolong labour in 68(61.8%) and obstructed labour in 28(25.5%) patients. A total of 76(69.1%) patients were discharged and 34(30.9%) expired.
Conclusion: Maternal un-booked status, hypertension, prolong rupture of membranes, prolong labour and obstructed labour are associated with poor outcome in patients with birth asphyxia.
Key Words: Asphyxia, Risk Factors, Antepartum, Intrapartum

Citation of article: Bibi S, Gilani SYH, Bibi S. Risk Factors for Birth Asphyxia – an Experience from A Tertiary Care Setting. Med Forum 2022;33(8): 52-55.

INTRODUCTION

Birth asphyxia is considered as the inability to start and maintain respiration at the time of birth leading to impaired oxygenation in the lungs culminating in low oxygen and high carbon dioxide content.[1] American academy of pediatrics includes metabolic acidosis (pH<7) in cord blood, low APGAR Score 0-3 for more than 5 min, neurological involvement like convulsions, and multi organ dysfunction including kidney liver ,lungs, and heart, for labeling the patient as asphyxiated newborn.[2] The consequences of birth asphyxia includes damage to almost all vital organs like heart, liver, lungs and kidneys but the most devastating squeal are due to brain involvement leading to neurocognitive impairment and permanent disability.[3] Recent estimates suggest that an approximately 1 million newborn die every year due to birth asphyxia in the world. Around 2 million babies develop encephalopathy and about 1.2 million suffer from neurocognitive impairment.[4]

Medical research conducted worldwide has identified a number of potential contributors to birth asphyxia including maternal, intrapartum and neonatal risk factors.[5] These comprise antepartum factors including age and educational status of mother, maternal hypertension, primigravida mothers, malposition/ malpresentation, mode of delivery, labour duration etc during intrapartum period and prematurity, birth weight and fetal distress amongst the neonatal conditions.[6] Other risk factors implicated in the etiology of birth asphyxia include cord prolapse, shoulder dystocia, uterine rupture, placental abruption and two newer entities of obesity and previous caesarean section.[7] Literature suggests that the burden of neonatal deaths can be effectively reduced by using interventions in the intrapartum period including labour and delivery, hereby reducing mortality by up-to 79% during this phase.[8]

The present study was conducted to highlight the risk factors associated with birth asphyxia in our region. Identification of risk factors will serve as a basis for devising interventions aimed at ameliorating these risk factors and hence aiming to reduce morbidity and mortality associated with this condition.

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Received: March, 2022
Accepted: May, 2022
Printed: August, 2022

MATERIALS AND METHODS

This descriptive cross-sectional study was conducted in the Neonatology unit of Ayub Medical Teaching Institute over a period of one year from 1st March 2021 to 28th February 2022 after obtaining ethical approval. All neonates who were admitted with birth asphyxia were included in the study. Data was collected using nonprobability convenience sampling. Patient characteristics were recorded on a predesigned proforma. Details about maternal risk factors were obtained from either of the parents and recorded on the proforma. Patients whose maternal history was not available were excluded from the study. Patients with major congenital malformations were also excluded from the study. Data was entered and analyzed using SPSS 26. Significance testing was done using Chi square test. P value of <0.05 was considered significant.

RESULTS

A total of 110 patients were included in our study. These included 60(54.5%) male and 50(45.5%) female patients. Mean age of the participants was 1.39±.86 days. Mean weight of the participants was 2.80±0.56 kg. Mean age of the mothers was 25.00 ±5.60 years.

Table No. 1: Patient characteristics (n=110)

Mean age (days)	1.39±.86 days	
Mean weight(kg)	2.80±0.56 kg	
Mean maternal age (years)	25.00 ±5.60 years	
Gender	**Frequency**	**%age**
Male	60	54.5%
Female	50	45.5%
Gestational age		
Full term	100	90.9%
Pre term	10	9.1%
Mode of delivery		
SVD	63	57.3%
Assisted vaginal delivery	11	10%
Caesarean section	36	32.7%
Place of delivery		
Home	21	19.1%
Private clinic	8	7.3%
Hospital	81	73.6%
Outcome		
Discharge	76	69.1%
Expired	34	30.9%

A total of 100(90.9%) patients were born at full term while 10(9.1%) patients were preterm. A total of 81(73.6%) patients were delivered at hospital, 8(7.3%) at private clinic and 21(19.1%) at home. Major mode of delivery was spontaneous vaginal delivery in 63(57.3%), followed by Caesarean section in 36(32.7%) and assisted vaginal delivery in 11(10%) (Table:1) Major antepartum risk factors included maternal anemia in 75(68.2%), un-booked status in 83(75.5%), PROM in 38(34.5%) and primiparity in 68(61.8%). Major intrapartum risk factors were prolong labour in 68(61.8%) and obstructed labour in 28 (25.5%) patients**.**(Table:2) A total of 76(69.1%) patients were discharged and 34(30.9%) expired. Risk factors were assessed in relation to outcome. There was a statistically significant association of outcome to maternal un-booked status (p=0.002), Prolonged rupture of membranes PROM (p=0.002), maternal hypertension (p=0.03) prolong labour (p=0.001) and obstructed labour (p=0.01**)**(Table:3).

Table 2: Risk factors for birth asphyxia

Antepartum risk factors	**Frequency**	**%tage**
Young maternal age	19	17.3%
Advanced maternal age	12	10.9%
Maternal anemia	75	68.2%
Maternal PIH	25	22.7%
Gestational DM	13	11.8%
Multiple gestation	4	3.6%
Antepartum hemorrhage	5	4.5%
Primigravidity	68	61.8%
Unbooked status	83	75.5%
Maternal fever	23	20.9%
Maternal chronic illness	6	5.5%
Intrapartum risk factors		
PROM	38	34.5%
Prolong labour	68	61.8%
Obstructed labour	28	25.5%

Table No.3: **Risk factors in relation to outcome**

Risk factors		**Discharged**	**Expired**	**P value**
Maternal PIH	Yes	13	12	0.035
	No	63	22	
Booking status	Yes	25	2	0.002
	No	51	32	
Maternal anemia	Yes	49	26	0.212
	No	27	8	
APH	Yes	2	3	0.150
	No	74	31	
PROM	Yes	19	19	0.002
	No	57	15	
Maternal chronic illness	Yes	5	1	0.438
	No	71	33	
Prolong labor	Yes	39	29	0.001
	No	37	5	
Young age	Yes	14	5	0.634
	No	62	29	
Advanced age	Yes	7	s5	0.393
	No	69	29	
Gestational DM	Yes	10	3	0.515
	No	66	31	
Maternal fever	Yes	15	8	0.651
	No	61	26	
Obstructed labor	Yes	14	14	0.011
	No	62	20	

DISCUSSION

Majority of patients in our study were male. Similar results are reported from another study conducted at Hyderabad where 60% of the asphyxiated newborns were male. [9]A number of maternal risk factors was identified in our study in asphyxiated neonates. Parity had a significant association to birth asphyxia in our study. Majority of neonates were born to primigravida mothers. A study from Eithopia reports similar results where primiparous mothers were found to have a three fold higher risk of delivering neonates with birth asphyxia.[10]

Majority of asphyxiated neonates in our study were full term babies with good birth weight. This is in contrast to the results from other studies where low birth weight and preterm delivery were reported to be significantly associated with asphyxia [10,11]This difference may be attributed to different socioeconomic, cultural and genetic factors in different areas. However, another study from a rural area of Pakistan also documented a two fold higher risk of mortality due to birth asphyxia in good sized newborns.[12] Other risk factors identified as contributors to mortality in asphyxiated neonates in this study included maternal anemia, smelly vaginal discharge, prolong labour, maternal fever and maternal illiteracy.[12] Our study also yielded similar results.

A metanalysis from Eithopia identified antepartum hemorrhage, prolonged rupture of membranes, maternal anemia and hypertension, prolong labour, instrumental vaginal delivery, caesarean section and primiparity as potential risk factors for asphyxia in newborns.[13] Similar risk factors were also identified in our study.

Another study also documented significant association of birth asphyxia in primigravida, un-booked patients, home delivery and maternal fever. Mean age of mothers was about 24 years in this study.[14]. Both these findings are comparable to our study. Another study by Lee et al also identified maternal fever as a significant risk factor for birth asphyxia.[15] Another risk factor identified in the previous studies was the delivery conducted by untrained midwives in rural areas.[16] In our study, majority of the births took place in the hospital. However, these included those patients as well who underwent labour trials by the untrained birth attendants and were later referred to hospitals when complications developed.

CONCLUSION

Maternal un-booked status, hypertension, prolong rupture of membranes, prolong labour and obstructed labour are associated with poor outcome in patients with birth asphyxia. All these risk factors are amenable to be eliminated by instituting health awareness programs and implementing good antenatal and perinatal care.

Author's Contribution:

Concept & Design of Study:	Saima Bibi
Drafting:	Syed Yasir Hussain Gilani
Data Analysis:	Sadia Bibi, Syed Yasir Hussain Gilani
Revisiting Critically:	Saima Bibi, Syed Yasir Hussain Gilani
Final Approval of version:	Saima Bibi

Conflict of Interest: The study has no conflict of interest to declare by any author.

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