



1. MBBS, FCPS  
Senior Registrar Pediatrics  
Nishtar Medical University Hospital,  
Multan.
2. MBBS, FCPS  
Associate Professor Pediatrics  
Nishtar Medical University Hospital,  
Multan.
3. MBBS, FCPS  
Senior Registrar Pediatrics  
Nishtar Medical University Hospital,  
Multan.
4. MBBS, DCH, FCPS  
Chair Person & HOD Pediatrics  
Nishtar Medical University Hospital,  
Multan.
5. MBBS  
PGR Pediatric  
Nishtar Medical University Hospital,  
Multan.
6. MBBS  
PGR Pediatric  
Nishtar Medical University Hospital,  
Multan.
7. MBBS  
PGR Pediatric  
Nishtar Medical University Hospital,  
Multan.

## RISK FACTORS OF PERINATAL ASPHYXIA AT NISHTAR HOSPITAL MULTAN.

Muhammad Faisal Mehar<sup>1</sup>, Muhammad Azam Khan<sup>2</sup>, Rabia Saleem<sup>3</sup>, Fauzia Zafar<sup>4</sup>, Ali Bakht Naqqash<sup>5</sup>, Sidra Shahid<sup>6</sup>, Rushan Hassan<sup>7</sup>

**ABSTRACT: Objectives:** To determine the antenatal and intrapartum risk factors for perinatal asphyxia among babies delivered by women admitted as emergency obstetric referrals. **Study Design:** Cross-sectional study. **Setting:** Pediatric Unit 1, Nishtar Hospital Multan, Pakistan. **Period:** From May 2017 to April 2018. **Material & Methods:** A total of 150 newborn term babies (and their mothers) with a 1, 5, & 10-minutes Apgar score 4 or less (perinatal asphyxia) were considered for the study. Antepartum and intrapartum risk factors were noted among newborn babies (and their mothers) from socio-demographic characteristics, obstetric complications or labour management. **Results:** Out of 150 neonates, 57(38%) were presented with perinatal asphyxia at the age of 1 minute, 62(41.3%) at the age of 5 minutes and 31(20.1%) neonates were presented at the age of 10 minutes. In these cases, 45(30%) were related to maternal causes, 71(47.3%) to placental causes and 34(22.7%) to fetal cause. **Conclusions:** Early recognition of antepartum and intrapartum risk factors for perinatal asphyxia among emergency obstetric referrals, followed by prompt and appropriate management, may reduce the perinatal deaths from perinatal asphyxia.

**Correspondence Address:**  
Dr. M Faisal Mehar  
Department of Pediatric  
Nishtar University Hospital, Multan.  
drmfaisalmehr@yahoo.com

**Key words:** APGAR Score, Antepartum, Fetal, Intrapartum, Maternal, Neonates, Perinatal Asphyxia.

**Article Citation:** Mehar MF, Khan MA, Saleem R, Zafar F, Naqqash AB, Shahid S, Hassan R. Risk factors of perinatal asphyxia at Nishtar Hospital Multan. Professional Med J 2020; 27(3):487-492. DOI: 10.29309/TPMJ/2020.27.3.3176

**Article received on:**  
23/01/2019  
**Accepted for publication:**  
11/05/2019

### INTRODUCTION

Perinatal asphyxia is a respiratory failure in the newborn, a condition caused by inadequate intake of oxygen before, during and or just after birth. In normal state, infant starts to breathe without any assistance and usually cries after delivery. Within one minute, infants can breathe normally. If infants fail to breathe normally, this condition is known as Birth asphyxia/Perinatal asphyxia.<sup>1,2</sup> According to a survey conducted by the World Health Organization (WHO) in 2005, perinatal asphyxia is one of the leading causes of neonatal deaths within the first week of life.<sup>3</sup> Perinatal asphyxia is a leading cause of mortality and morbidity in neonates in developing countries, with an incidence of 1 to 6 per 1,000 live full-term births.<sup>4</sup> Incidence is usually related to gestational age and birth weight. The incidence is higher in prematures. Incidence in developed countries is 1.0-1.5% and in Pakistan is about 3.3%.<sup>5</sup>

American Association of Obstetrics and Gynecologists defines birth asphyxia when the following criteria are fulfilled: severe metabolic or mixed acidosis (PH. <7.00) obtained on umbilical arterial blood if available, a persistent >5 minutes Apgar score of 03, evidence of neurological involvement altered consciousness tone and seizures, other multi organ involvement.<sup>6</sup> There are two types of asphyxia that are primary apnoea and secondary apnoea. In primary apnoea, the infant is blue but the blood pressure is maintained although the heart rate is falling. This is called blue asphyxia or asphyxia livida.<sup>6</sup> In secondary apnoea, the blood pressure is found extremely low and deteriorating. Peripheral Perfusion is poor and the baby lies limp. At this stage, the infant is white and in the state of shock which is described as asphyxia pallida or white asphyxia.<sup>7</sup>

The American Academy of Pediatrics classified

severe asphyxia when the Apgar score at 1 minute is 0-3 and moderate asphyxia is when Apgar score at 1 minute is 4-6.<sup>6</sup>

Infants who fail to breathe after birth may do so as a result of a deprivation of oxygen and blood supply to the brain before birth (hypoxia-ischemia or asphyxia), or because they have a central nervous system or muscle disease, or because they are systemically ill with infection.<sup>2</sup>

Risk factors of perinatal asphyxia are divided into three categories i.e. maternal, placental and fetal. Maternal factors are Hypertension (eclampsia and pre-eclampsia), pelvic abnormality (cephopelvic disproportion), diabetes mellitus, nephritis, hypotension, infections, uterine tetany (due to excessive oxytocin), maternal hypoxia from cardiac and pulmonary disease.<sup>2</sup> Placental factors are "Abruptio placenta, and placental insufficiency due to toxemia or post-Maturity.<sup>8</sup> Fetal risk factors include "cord prolapsed or compression, abnormal lie or presentation, post-maturity, anemia, infections, cerebral abnormalities, hypoxia due to pulmonary or cardiac problems.<sup>9</sup> Condition of perinatal asphyxia can be assessed by APGAR score. "The condition of infants shortly after birth is recorded using the APGAR score at 1, 5 and 10 minutes.<sup>10</sup>

There are also some other conditions with low Apgar score but these infants are not asphyxiated. It should not be assumed that all babies requiring resuscitation have experienced perinatal asphyxia. Other causes of infants failing to establish respiration at birth include trauma, analgesia and anesthetic agents given to the mother during labor or at delivery, caesarean section, when there is often delay in clearance of lung liquid, meconium aspiration, the very low birth weight infant, problems within the infant e.g diaphragmatic hernia.<sup>11-18</sup>

In Pakistan, the magnitude of the problem is reflected by the fact that mortality data from a large community based prospective study in Lahore showed that nearly 50% of all neonatal deaths in the first week were due to perinatal asphyxia.<sup>19</sup> Both hospital and community based

data from different parts of the country have identified perinatal asphyxia as leading cause of hospital admissions and neonatal mortality.<sup>20-23</sup>

Birth asphyxia is more common in high risk groups (such as mothers with no antenatal care, multiple pregnancies, and breech presentation and home deliveries by untrained personnel).<sup>24</sup>

The present study can-lead out to see that despite lot of efforts being made to reduce maternal and neonatal deaths, why is perinatal asphyxia being seen so often at a teaching hospital.

This study was conducted to determine the risk factors of perinatal asphyxia in patients managed at Nishtar hospital Multan. By identifying these risk factors, we can work aggressively to manage these patients and may decrease the incidence of perinatal asphyxia.

## MATERIAL AND METHODS

This was a cross-sectional study conducted at the Labor room and pediatric unit 1 of Nishtar Hospital Multan, Pakistan. The duration of this study was 12 month, from May 2017 to April 2018.

A total number of 150 newborn term babies (and their mothers) with fetal distress on cardiotocography with low 1, 5 and 10 minutes Apgar score (4 or less) were included in the study. All newborns with trauma, prematurity, any syndromic or dysmorphics, born to mothers who are given GA were excluded from the study. Informed consent of all the patients was taken prior to their inclusion in the study. Before delivery Cardiotocography and Ultrasonography of every patient was done and after delivery Apgar score of every infant was taken. Antepartum and intrapartum risk factors among newborn babies (and their mothers) from socio-demographic characteristics, obstetric complications or labour management were noted.

SPSS (Statistical package for social sciences, USA) version 20.0 was used for data entry and analysis. Frequency and percentages of risk factors were noted.

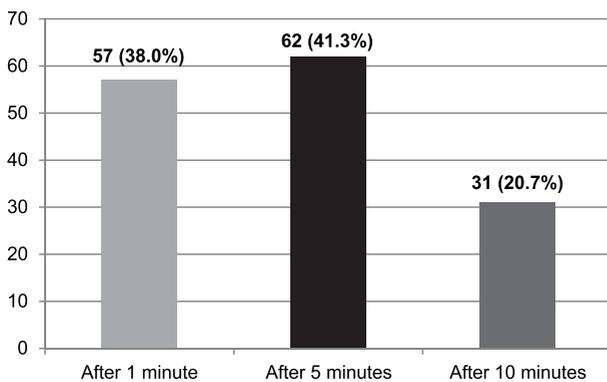
**RESULTS**

Out of 150 neonates, 57(38%) were presented with perinatal asphyxia at the age of 1 minute, 62(41.3%) at the age of 5 minutes and 31(20.1%) neonates were presented at the age of 10 minutes. In these cases, 45(30%) were related to maternal causes, 71(47.3%) to placental causes and 34(22.7%) to fetal cause.

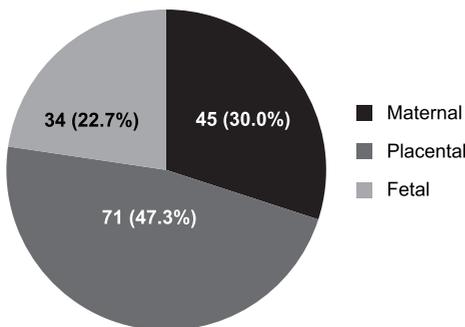
Maternal risk factors found were pregnancy induced hypertension (PIH) (11.33%) followed by oligohydramnios (06%), polyhydramnios (04.66%), diabetes mellitus (04%), eclampsia (02.66%), PROM (02%) and UTI (02%).

The most common placental risk factor was placental insufficiency (28%) followed by abruptio-placenta (18%).

The most common fetal risk factor was IUGR (08.66%) followed by fetal distress (06.66%), MAS(04%) and malpresentations (03.33%).



**Figure-1. Perinatal asphyxia and age of neonates (n=150).**



**Figure-2. Risk Factors of Perinatal Asphyxia.**

Maternal Risk Factors	No. of Mothers
PIH	17 (11.3%)
Oligohydramnios	09 (6.0%)
Polyhydramnios	07 (4.7%)
Diabetes mellitus	06 (4.0%)
Eclampsia	04 (2.7%)
PROM	03 (2.0%)
UTI	03 (2.0%)
Placental Risk Factors	No. of Cases
Placental insufficiency	43 (28.7%)
Abruptio- placenta	28 (18.7%)
Fetal Factors	No. of Cases
IUGR	13 (8.7%)
Fetal distress	10 (6.7%)
MAS	06 (4.0%)
Breech/Malpresentation	05 (3.3%)

**Table-I. Distribution of risk factors (n=150).**

**DISCUSSION**

This research is conducted in labour room and pediatric unit 1 of Nishtar Hospital Multan. The purpose of this research is to assess the risk factors of perinatal asphyxia and how these risk factors are managed in Nishtar Hospital Multan.

In this study 150 patients were taken as a sample. There were 57(38%) neonates who were presented with perinatal asphyxia at the age of 1 minute, 62(41.3%) at the age of 5 minutes and 31(20.1%) neonates were presented at the age of 10 minutes. In these cases, 45(30%) were related to maternal causes, 71(47.3%) related to placental causes and 34(22.7%) related to fetal causes. Maternal risk factors found were PIH (11.33%) followed by oligohydramnios (06%), polyhydramnios (04.66%), diabetes mellitus (04%), eclampsia (02.66%), PROM (02%) and UTI (02%). The most common placental risk factor was placental insufficiency (28%) followed by abruptio-placenta (18%). The most common fetal risk factor was IUGR (08.66%) followed by fetal distress (06.66%), MAS (04%) and malpresentations (03.33%).

Martínez, et al, examined perinatal morbidity and the rate of asphyxia and found that premature placental abruption, which occurred in 11%, was

significantly associated with the development of hypoxic ischemic encephalopathy.<sup>25</sup> It was found that triggers of a prolonged phase, such as abnormal fetal presentations (breech presentation, instrumental delivery, dystocia, persistent occiput posterior presentation, head circumference greater than the 97th percentile), was related to the occurrence of perinatal asphyxia.<sup>25</sup> In a descriptive study at Hospital Universitario del Valle in 2008, perinatal asphyxia prevalence was 19%, and the most frequent pathology in the mother was hypertensive disorder (36.1%).<sup>26</sup> Aslam et al, in their study maternal risk factors for perinatal asphyxia found primigravidae 56.9% Anemia 48% and oligoydramnios in 7.3% cases.<sup>27</sup> Uterine rupture was the underlying cause in 38% of perinatal asphyxia cases among parous women with a previous caesarean.<sup>28</sup>

Obstetric emergencies, including placental abruption, eclampsia, umbilical cord prolapse, uterine rupture, and shoulder dystocia, are the most prominent intrapartum risk factors for HIE.<sup>29,30,31</sup> Incidence of Birth asphyxia is usually related to gestational age and birth weight. The incidence is higher in premature.<sup>2</sup>

Lack of knowledge about fetomaternal health as well as lack of facilities at health centers are thought to be the main reasons of perinatal asphyxia. Health centers are also insufficient according to patients need. Reducing the causes of perinatal asphyxia can save the lives of many neonates. Proper monitoring of fetal movements by CTG can guide the health professionals to take proper steps to save the lives of neonates. Deliveries at proper setups of hospitals can also be helpful to prevent perinatal asphyxia. Well trained midwives and obstetricians can prevent from perinatal asphyxia. Community awareness programs should be conducted about fetomaternal health and birth asphyxia.

## CONCLUSION

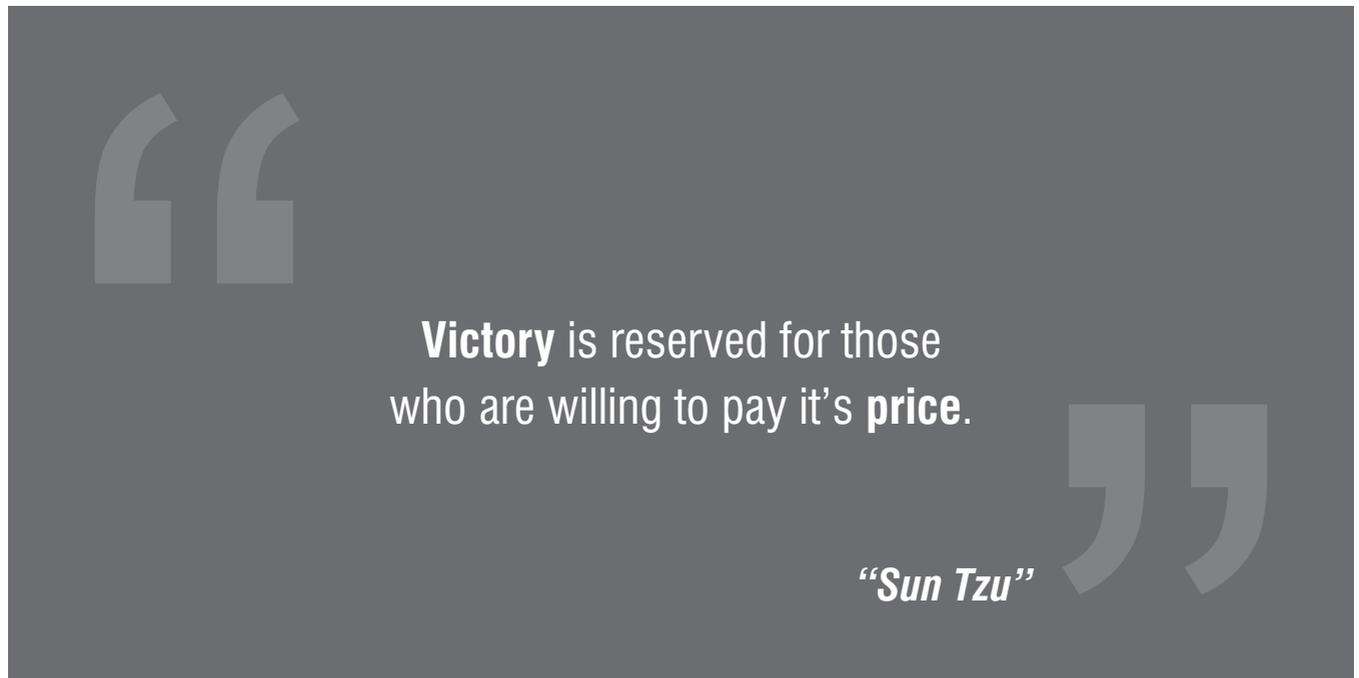
The main reason of perinatal asphyxia is lack of knowledge about fetomaternal health as well as lack of facilities at health centers. Health centers are also insufficient according to patients need. Further studies are needed to evaluate the

frequency and risk factors of perinatal asphyxia.  
Copyright© 11 May, 2019.

## REFERENCES

1. Takazono PS, Golin MO. **Perinatal asphyxia: Repercussions neurological disorders and early detection.** Neuroscience. 2013; 21:108-17.
2. Khan PA. **Neonatology. Basis of Pediatrics.** 9<sup>th</sup> ed. Pakistan: Paramount Books (Pvt.) Ltd. Karachi; 2018; 149-150.
3. Bryce J, Boschi-Pinto C, Shibuya K, Black RE. **WHO estimates of the causes of death in children.** Lancet. 2005; 365:1147-52.
4. De Haan M, Wyatt JS, Roth S, Vargha-Khadem F, Gadian D, Mishkin M. **Brain and cognitive-behavioural development after asphyxia at term birth.** Dev Sci. 2006; 9:350-8.
5. Baker PN. **Problems of the Newborns.** Obstetrics by Ten Teachers. 16<sup>th</sup> ed. India: Hodder Arnold; 1995; 306.
6. **Side lights on infant mortality.** Pak. Paed. 3, 1983; 7:34-36.
7. Khan PA. **Neonatology.** Basis of Pediatrics. 7<sup>th</sup> ed. Pakistan: Farooq Kitab Ghar, Urdu Bazar Karachi; 2008; 139.
8. Almeida MF, Ginsburg R, Anchieta LM. **Neonatal resuscitation: Guidelines for health professionals.** Brazilian Society of Pediatrics, Rio de Janeiro. 2016.
9. Shibuya K, Murray C: **Birth Asphyxia. In The Global Burden of Disease: a comprehensive assessment of mortality and disability from diseases, injuries and risk factors in 1990 and projected to 2020.** Edited by Murray C and Lopez A. Cambridge, MA, Harvard University Press; 1996:429-453.
10. Salafia, CM; Minior, VK; Pezzullo, JC; Popek, EJ; Rosenkrantz, TS; Vintzileos, AM (1995). **"Intrauterine growth restriction in infants of less than thirty-two weeks'. Gestation: Associated placental pathologic features"**. American journal of obstetrics and gynecology 173 (4): 1049-57. Doi: 10.1016/0002-9378(95)91325-4.
11. Kingdom, JC; Kaufmann, P (1997). **"Oxygen and placental villous development: Origins of fetal hypoxia"**. Placenta 18 (8): 613-21; discussion 623-6. doi:10.1016/S0143-4004(97)90000-X.

12. Rani S, Chawla D, Huria A, Jain S: **Risk factors for perinatal mortality due to asphyxia among emergency obstetric referrals in a tertiary hospital.** Indian Pediatr 2012, 49(3):191–194.
13. Lawn JE, Manandhar A, Haws RA, Darmstadt GL: **Reducing one million child deaths from birth asphyxia—a survey of health systems gaps and priorities.** Health Res Policy Syst 2007, 5:4.
14. **GBD 2013 mortality and causes of death collaborators. Global, regional, and national age-sex specific all-cause and cause-specific mortality for 240 causes of death, 1990–2013: A systematic analysis for the Global Burden of Disease Study 2013.** Lancet. 2015; 385:117–71. [http://dx.doi.org/10.1016/S0140-6736\(14\)61682-2](http://dx.doi.org/10.1016/S0140-6736(14)61682-2).
15. Chelchowska, M; Laskowska-Klita, T (2002). “**Effect of maternal smoking on some markers of iron status in umbilical cord blood**”. RocznikiAkademiiMedycznej w Białymstoku (1995) 47: 235–40.
16. Takazono, P.S. and Golin, M.O. (2013) **Perinatal asphyxia: Repercussions neurological disorders and early detection.** Magazine. Neuroscience, 21, 108–117.
17. **Pathology of the human placenta By Kurt Benirschke, Peter Kaufmann.** page453. Publisher: Springer; 4th edition (March 23, 2000) Language: English ISBN 0-387- 98894-7 ISBN 978-0387988948.
18. Gleason C, Devaskar S, Avery M. **Avery’s diseases of the newborn.** Philadelphia, PA: Elsevier/Saunders; 2012.
19. Bang AT, Bang RA, Baitule SB, Reddy HM, Deshmukh MD. **Management of birth asphyxia in home deliveries in rural Gadchiroli: the effect of two types of birth attendants and of resuscitating with mouth-to-mouth, tube-mask or bag–mask.** Journal of Perinatology. 2005 Mar;25(1):S82-91. Doi:10.1038/sj.jp.7211275.
20. Rueda-Clausen CF, Morton JS, Davidge ST. **Effects of hypoxia-induced intrauterine growth restriction on cardiopulmonary structure and function during adulthood. Cardiovascular research.** 2009 Mar 1;81(4):713–22. Doi:10.1093/cvr/cvn341.
21. Sly PD, Drew JH. **Massive pulmonary haemorrhage: a cause of sudden unexpected deaths in severely growth retarded infants.** Journal of Paediatrics and Child Health. 1981 Mar;17(1):32–4.
22. Rogharu MT, Mohammad T. **Neonatal diseases profile in NWFP an analysis of four years admission.** Pakistan Pediatr. J. 1983;7:17.
23. Rennie JM. Neonatology. **Obstetrics by ten teachers.** 19<sup>th</sup> ed. India: Hodder Arnold; 2011; 281.
24. Arif MA., Nizami Q.S., **A study of 1056 new born babies.** Pak Pediatric. J. 1985; IC: 20.
25. Martínez BM, Madero R, González A, Quero J, García AA. **Perinatal morbidity and risk of hypoxic-ischemic encephalopathy associated with intrapartum sentinel events.** Am J Obstet Gynecol. 2012; 206:148.e1–7. <http://dx.doi.org/10.1016/j.ajog.2011.09.031>.
26. Muller AJ, Marks JD. **Hypoxic ischemic brain injury: Potential therapeutic interventions for the future.** Neoreviews. 2014; 15:e177–86. <http://dx.doi.org/10.1542/neo.15-5-e177>.
27. Aslam HM, Saleem S, Afzal R, Iqbal U, Saleem SM, Shaikh MW, et al. **Risk factors of birth asphyxia.** Ital J Pediatr. 2014; 40(1):94.
28. Colmorn LB, Langhoff-Roos J, Jakobsson M, et al. **National rates of uterine rupture are not associated with rates of previous caesarean delivery: Results from the Nordic Obstetric Surveillance Study.** Paediatr Perinat Epidemiol. 2017; 31(3):176–182.
29. Lundgren C, Brudin L, Wanby AS, Blomberg M. **Ante- and intrapartum riskfactors for neonatal hypoxic ischemic encephalopathy.** J Matern Fetal Neonatal Med. 2017:1–7.
30. Nelson DB, Lucke AM, McIntire DD, Sanchez PJ, Leveno KJ, Chalak LF. **Obstetric antecedents to body-cooling treatment of the newborn infant.** Am J Obstet Gynecol. 2014; 211(2):155 e151–156.
31. Martinez-Biarge M, Diez-Sebastian J, Wusthoff CJ, Mercuri E, Cowan FM. **Antepartum and intrapartum factors preceding neonatal hypoxic-ischemic encephalopathy.** Pediatrics. 2013; 132(4):e952–959.



**AUTHORSHIP AND CONTRIBUTION DECLARATION**

Sr. #	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	M. Faisal Mehar	Data collection, Data analysis, Literature review & Discussion.	
2	M. Azam Khan	Study design.	
3	Rabia Saleem	Data collection & Discussion.	
4	Fauzia Zafar	Research Methodology.	
5	Ali Bakht Naqqash	Data collection.	
6	Sidra Shahid	Data collection.	
7	Rushan Hassan	Data collection.	