



## OUTCOMES AND ANALYSIS OF FETOMATERNAL ELEMENTS AND DELIVERY STRATEGIES WITH NEONATAL RESPIRATORY DISTRESS

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### ABSTRACT

**BACKGROUND:** Perinatal asphyxia is one of the most important causes of morbidity and mortality in neonates. Perinatal asphyxia occurs in association with different maternal and fetal determinants. However, the relation of associated factors with perinatal asphyxia is not well studied. **AIM:** The aim of this study is to determine the association of maternofetal factors and mode of delivery with perinatal asphyxia in a tertiary care centre. **MATERIAL AND METHOD:** This is a retrospective comparative study conducted in department of OBG in tertiary care health centre. A total 200 newborns were selected for study out of which 100 newborns were with asphyxia at birth as study group and 100 non asphyxiated newborns were taken as control group. Maternal factor like age, gestational age and fetal factor like weight at birth and mode of delivery were studied to established association on perinatal asphyxia. **RESULT:** Maternal factor had no significant relationship with perinatal asphyxia. Maximum number of babies delivered in both control and the study group were in the range of 2.6 to 3kg. In this study birth weight did not have significant relationship with perinatal asphyxia. Proportions of LSCS was comparatively higher in the study group. Though the delivery mode did not have any statistically significant influence on the newborns affliction with birth asphyxia ( $P > 0.05$ ). **CONCLUSION:** Findings of this study highlight the need for the better obstetrical care and awareness of the possible presence of the risk factors of PNA (perinatal asphyxia) among mothers and fetus, so that the incidence and complications of PNA could be prevented or at least appropriately managed.

### KEYWORDS

Birth asphyxia; Delivery mode; Maternofetal factor

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#### INTRODUCTION:

Birth asphyxia continues to be the leading cause of perinatal mortality and developmental and neurological handicaps in both term and preterm infants. The occurrence of birth asphyxia is closely related to a number of maternal, fetal and obstetrical risk factors. The present study attempts to find out the importance of selected maternal factor and fetal factors and mode of delivery on the incidence of neonatal asphyxia. Birth asphyxia is responsible for 23% perinatal deaths in low-income countries. This finding signifies that perinatal asphyxia is still a global burden. [1, 2, 3].

#### MATERIAL AND METHODS:

This was a retrospective comparative study of association between maternofetal determinant and mode of delivery in asphyxiated and non asphyxiated baby in a tertiary level health care centre conducted between December 2013 to November 2015. Total 200 newborns were selected for study out of which 100 newborn were with asphyxia at birth as study group and 100 newborns were with non asphyxia as control group. Maternal factor and mode of delivery were studied to established association on perinatal asphyxia. Every delivery was attended by a neonatal resident who gave timely resuscitation to all the cases when required and recorded Apgar score at 1, 5 and 10 min. respectively. Apgar score of  $< 7$  at 1 min was defined as neonatal asphyxia. All neonates were weighed naked on a lever actuated weighing scale to the nearest 20 g. Gestation of each neonate was calculated from the last day of menstrual period and when not available then clinical and neurological criteria for assessment of gestational age was applied. Sample size was calculated using a single population proportion formula, a systematic sampling technique was used to get all study units in the delivery unit of the hospitals. In this study, all babies with their mother were eligible to inclusion while babies who are suffering from major congenital anomalies or syndromes and preterm babies  $< 35$  completed weeks were excluded. Ethical clearance of the study was taken. Informed consent was obtained for every patient. Statistical analysis was done using SPSS version 20 and chi square test.

#### RESULT

The study included 100 patient in study (asphyxiated baby) and 100 patients in control group (non asphyxiated) for this analysis. TABLE 1 shows age of mother in the study group ranged from 16 to 35 yrs and in the control group ranged from 16-30 yrs. Maximum number of patients were in 21-25 years age group both in case as well as control group. Mean age of mother in the study group - 22.42 yrs. Mean age of Pts. in

the control group - 21.98 yrs

**Table-1**

Interval	No. of pts. in study group	No. of Pts. in control group
16Yrs - 20 Yrs	29	32
21Yrs - 25 Yrs	55	57
26 Yrs - 30 Yrs	15	11
31 Yrs - 35 yrs	1	0
Mean value (average)	22.42 Yrs SD - 2.81	21.98 Yrs SD - 0.73

**P Value  $> 0.05$**

Table 2 shows Maximum no. of patients in the study group and the control group were having 38-39 wks of pregnancy. The Average gestational age of study group was  $38.67 \text{ wks} \pm 0.73$  (SD) The average gestational age of control groups was  $39.63 \text{ wks} \pm 5.96$  (SD). There is no significant relationship between perinatal asphyxia and gestational age.

**Table - 2 Gestational Age**

Gestational in wks	No. of pts in study group	No. of Pts in control group
36-37 wks	5	4
37-38 wks	33	23
38-39 wks	52	39
39-40 wks	10	34
Avg. gestational age	38.67 wks SD -0.73	39.63 wks SD - 5.96

**P  $> 0.05$**

Table 3 shows Maximum number of babies delivered in both the control and the study group were in the range of 2.6 to 3.0 kg. Average baby weight in the study group was  $2.69 \text{ kg} \pm 0.39$  (SD) Average baby weight in the control group was  $2.65 \text{ Kg} \pm 0.46$  (SD). There is no significant relationship between birth weight and perinatal asphyxia.

**Table - 3 weight At Birth**

Baby wt in intervals	No. of babies delivered by Pts. of study group	No. of babies delivered by Pts. in control group
1.5-2.0 Kg	5	11

2.1 - 2.5 Kg	26	20
2.6 Kg - 3.0 Kg	56	52
3.1 - 3.5 Kg	13	17
Average baby weight	2.69 Kg SD - 0.39	2.65 Kg SD - 0.46

**P>0.05**

**Table 4** shows Maximum number of deliveries in both the study group and the control group were by vaginal route. Proportion of LSCS was comparatively higher in the study group though not statistically significant

**Table - 4 Mode Of Delivery**

Mode of delivery	No. of Pts in study group	No. of Pts in Control group
Vaginal	64	68
LSCS	36	32

**P>0.05**

## DISCUSSION

The incidence of perinatal asphyxia is still high inspite of timely neonatal resuscitative measure. In the study by **B Ghosh, S. Mittal, S. Kumar V. Dadhwal**[4] of AIIMS in 1999-2001, the mean maternal age of the study group was 27.19 yrs  $\pm$  3.82 (SD) and of the control group was 26.73 yrs  $\pm$  4.40(SD) . Here also the difference was not statistically significant (P 0.66)**Saracoglu et al**[5] in 1999, studied NRBC count in fetal acidosis. In their study also , mean age difference between the study and the control was statistically not significant. **Danish Hasan Quaiser, Mohammad Perwaiz et al**[6] of Ziauddin university, Pakistan in 2006-2008 studied the influence of maternal factors on the hematological parameters and perinatal asphyxia. They found that NRBC count/100 WBC and other hematologic parameters in women of age group 15-27 yrs was not statistically different from that in the age group of 28-45 yrs. (P 0.07).In the study by **Hasan Boskabadi et al**[7] in 2006-2008, the difference in the mean age of Pts. having evidence of perinatal asphyxia and Pts. not having perinatal asphyxia was statistically not significant In our present study the case and the control group were comparable on the basis of age and thus any possible effect of maternal age on the perinatal asphyxia may be neglected With increasing parity, more fibroelastic tissue is deposited in the wall of the uterus. But this does not seem to hamper in any way the supply of nutrients via the placenta or the growth of the fetus. Prematurity also pre-disposes to neonatal asphyxia because of immature lungs, immature central nervous system and use of sedatives by the mother to stop premature labour.various studies done on effect of gestational age on perinatal asphyxia.most of studies observe significant relation ship. Clifford[8] concluded that increased perinatal mortality and its accompanying mental injuries are mainly due to birth asphyxia in premature infants. Macdonald et al [9] reported prematurity to be the most significant predictor of asphyxia.. Mean gestational age in the study group was 38.67 wks  $\pm$  0.73 (SD), and the mean gestational age in the control group was 39.63  $\pm$  5.96 (SD). P value was > 0.05, which means there was statistically no significant difference between the two groups.. Absolute NRBC count decreases with advancing gestation and increasing birth weight. It is reasonable to conclude from the previous studies that the mean NRBC/100 WBC in the first few hours of life in healthy term newborn is about 0-10 and values above 10-20 are considered elevated. Studies have consistently shown that NRBC decreases as the gestational age increases, except in the case of post term infants, who have higher count than the term infants. In preterm, the number of NRBC is higher and also persist longer compared with the term neonates. In the study by **Dasari Papa et al**[10] of JIPMER, India, the mean period of gestation in the study group was 272.69  $\pm$  34.27 and in the control group was 274.75  $\pm$  7.45 (P 0.150). The difference in the period of gestation between the study and the control group was statistically not significant. Thus, we decided that possible effect on the count of NRBC which further reflect perinatal asphyxia resulting from the difference in the gestational age in the two groups could be neglected. . Another causative factor for perinatal asphyxia was fetal birth weight. Neonates who are weighed less than 2.5 kg were prone to develop birth asphyxia which is consistent with studies from other corners of the world [11,12]. In contrary, a large size of a baby at birth (a proxy for birth weight) had been found an associated factor for birth asphyxia-related neonatal mortality [13]. **Batra et al**[14] report maximum incidence of asphyxia at 32 weeks of gestation and at birth weight of < 1500 g. An increasing incidence of asphyxia with decreasing birth weight and a significantly increased incidence in small for date babies also compares well with the previous findings. But some studies showed

insignificant relationship between birth weight and perinatal asphyxia. In the study by **Saracoglu et al** [5] acute and chronic fetal distress, the average birth weight was 3211 g  $\pm$  413 (SD) in the control group. Among the chronic fetal distress group, the average baby weight at birth was 2571g  $\pm$  608 (SD) and in the acute fetal distress group, the baby weight was 3259  $\pm$  452 (SD).Their result was comparable to a large extent with the present study's result .Minor variations may be due to the difference in the socioeconomic status or genetic or ethical difference between the populations studied. In the study by **Hasan Boskabadi et al**[7] on neonatal asphyxia in 2006-08, the average baby weight in the asphyxiated group was 2920 gm  $\pm$  405 (SD) and in the control group, it was 3070 gm  $\pm$  416 (SD) . P value was 0.397 which was statistically not significant..Thus we can see that in the various studies in the past and also in this study the effect of birth weight on perinatal asphyxia can be ruled out. This may be due to small sample size. So we can conclude that birth weight is in no way affecting the result of this study. Caesarean section was also strongly associated with birth asphyxia in comparison to vaginal delivery and various studies supported it with diferent study designs [15,16,17]. The high rate of asphyxia among newborns delivered by CS might be due to the fact that either most of the mothers came with complications or the late decision for CS might causes complications or due to factors associated with indications of caesarean section and an added stress of anesthesia.In vaginal delivery fetus chest might be squeezed during passes through the birth canal which might evacuate secretion which in turn reduces the chance of developing birth asphyxia, while in cs this physiological advantage is not seen . In the study by **B.Ghosh et al**[4] out of 26 patients in the study group 17 i.e. 65.38% delivered vaginally and 9 i.e. 34.61% delivered by LSCS. Out of 49 patients in the non asphyxiated group 34 patients delivered vaginally (i.e. 69.38%) and 15 patients i.e. 30.61% delivered by LSCS. In the present study done in PMCH, the case and the control group were comparable on the basis of mode of delivery (P > 0.05) So, we can assume that the mode of delivery does not have any significant effect on fetal asphyxia in this study.

## CONCLUSION:

Perinatal asphyxia remains one of the most significant cause of mortality and morbidity among new born due to hypoxic ischemic injury to the neonatal brain. Therefore, providing good quality medical care is of utmost importance to curtail the neonatal mortality and future complications of perinatal asphyxia. In this study, it was attempted to identify the determinants of birth asphyxia among newborns so that efforts should be made to improve the quality of intra-partum care service in order to prevent perinatal asphyxia and its long term complications. Although no significant relationship was established in the index study it is recommended that a study with a larger sample size may lead to more significant outcomes in futures studies.

## REFERENCES:

1. World Health Organization and Others, *Guidelines on Basic Newborn Resuscitation. World Heal Organ*, 2012.
2. O. Lincetto, *Birth Asphyxia - Summary of the Previous Meeting and Protocol Overview*, 2007, <http://curoservice.com/Accessedon12/2/2015>
3. WHO, *World Health Statistics*, WHO, Geneva, Switzerland, 2015
4. Ghosh B, Mittal S, Kumar S, Dadhwal V. Prediction of perinatal asphyxia with nucleated red blood cells in cord blood of newborns. *Int J Gynaecol Obstet*. 2003; **81**: 267-271
5. F. Saracoglu, I. Sahin, E. Eser, K. Gol and B. Turkkan, Nucleated red blood cells as a marker in acute and chronic fetal asphyxia. *Int J Gynecol Obstet* **71** (2000), pp. 113-118
6. Danish Hasan quaiser et al. *Pak J Physiol* 2009; 5(2)
7. Boskabadi H, Tavakoli Afshari J, Ghayour-Mobarhan M, Maamouri GH, Shakeri MT, Sahebkar A. Association between serum interleukin-6 levels and severity of perinatal asphyxia. *Asian Biomedicine*. 2010; **4**: 79-85
8. Clifford SH. High risk pregnancy I. Prevention of prematurity. The sin qua non for reduction in mental retardation and other neurological disorders. *New Eng J Med* 1964; **271** : 243-2,19.
9. Macdonald HM, Muligan JC, Allen AC, Taylor PM. Neonatal asphyxia I. Relationship of obstetric and neonatal complication to neonatal mortality in 38,405 consecutive deliveries *Y Pediatr* 1980; **96** : 898-902.
10. Papa D, Jyotsna P, Ashok BB. Cord blood nucleated red blood cell count-a marker of fetal asphyxia. *J Obstet Gynecol India*. 2008; **58**:45-4. <http://medind.nic.in/jaq/108/i1/jaq1081p45.pdf>
11. C. Pitsawong, "Risk Factors Associated with Birth Asphyxia in Phramongkutklao Hospital," *Thai J Obstet Gynaecol*, vol. 19, no. 4, pp. 165-171, 2011. View at: Google Scholar
12. M. Solayman, S. Hoque, T. Akber, M. I. Islam, and M. A. Islam, "Prevalence of Perinatal Asphyxia with Evaluation of Associated Risk Factors in a Rural Tertiary Level Hospital," *KYAMC Journal*, vol. 8, no. 1, pp. 43-48, 2017. View at: Publisher Site | Google Scholar
13. F. Tabassum, A. Rizvi, S. Ariff, S. Soofi, and Z. A. Bhutta, "Risk Factors Associated with Birth Asphyxia in Rural District Matiari, Pakistan: A Case Control Study," *International Journal of Clinical Medicine*, vol. 05, no. 21, pp. 1430-1441, 2014. View at: Publisher Site | Google Scholar
14. .Batra A, Sengupta A, Kumar A, Bhargava SK. A study of asphyxia neonatorum. *J Obstet Gynecol. India* 1988; **38** : 162-166
15. H. Uzel, S. Keleke "i, and C. Devocio" glu, "Neonatal asphyxia: A study of 210 cases," *Journal of Clinical and Experimental Investigations*, vol. 3, no. 2, pp. 194-198, 2012.
16. A. Chiabi, S. Nguefack, E. Mah et al., "Risk factors for birth asphyxia in an urban health facility in Cameroon," *Iranian Journal of Child Neurology*, vol. 7, no. 3, pp. 46-54, 2013.

17. S. K. Gupta, B. K. Sarmah, D. Tiwari, A. Shakya, and D. Khatriwada, "Clinical Profile of Neonates with Perinatal Asphyxia in a Tertiary Care Hospital of Central Nepal," Journal of the Nepal Medical Association, vol. 52, no. 12, pp.