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Feto-Maternal Outcome in Preterm Deliveries

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Abstract
Background*: Preterm labour and preterm deliveries are very challenging obstetric complications encountered by obstetricians. Incidence of preterm is increasing worldwide. In addition to its contribution to mortality, preterm birth has lifelong effects on neurodevelopmental functioning of the newborns such as increased risk of cerebral palsy, impaired learning and visual disorders and an increased risk of chronic disease in adulthood. The economic cost of preterm birth is high in terms of neonatal intensive care and ongoing health care and educational needs. Hence it is a time felt need to ascertain the causes and outcome of preterm labour and delivery.*
Materials and methods:*It was a one year observational study conducted in the Department of obstetrics and gynecology, IGMC Shimla, Himachal Pradesh from 1st August 2017 to 31st July 2018. All mothers who delivered between 24 to 37 weeks were included in the study. The data was collected from the mothers and neonates case sheet.Fetal and maternal outcomes in the form of various morbidities and mortalities were recorded. . Parametric and non-parametric test of significance were used to find the association between different quantitative and qualitative variable.*
Observation:*The Incidence of preterm deliveries in our hospital was 11.4%.55.1% of the cases presented with spontaneous onset of preterm labour. 56.5% occurred at POG 34-36wk6d.4.9% were still born. Neonatal mortality was seen in 13.8% of the babies. Most common cause was RDS, seen in 26.5%. Maternal complications were seen in 7.6% of the cases with puerperal pyrexia being most common complication, seen in 3.3% of the cases.*
Keywords:*NICU admissions, neonatal morbidity, neonatal mortality*

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I. Introduction

The World Health Organization defines preterm birth as any birth before 37 completed weeks of gestation or fewer than 259 days since the first day of woman's last menstrual period[1]. Estimates of preterm birth rates range from 5-10% in developed countries to 25% in developing countries. In India, incidence of preterm labour is 23.3% and of preterm delivery is 10-69%.[2]

Preterm births can be divided on the basis of gestational age into:

- Late preterm births: between 34-36 weeks
- Early preterm birth: between 32-34 weeks.
- Very preterm birth: between 28-32 weeks.
- Extreme preterm birth: before 28 weeks.[3]

In low income countries, often less than 10% of those born at 28weeks survive and it is only those born at 34 weeks or later that have survival rates of more than 50%.[4]In addition to its contribution to mortality, preterm birth has lifelong effects on neurodevelopmental functioning of the newborns. The social cost is also high, with many families experiencing the suddenloss of a preterm baby or a stressful hospital stay, sometimes for months.[1]Therefore this study was conducted to see the fetomaternal outcomes so that appropriate preventive and curative measures can be taken.

II. Materials And Methods

Study design: Prospective observational study.
Study location: Study was done in Department of obstetrics and gynecology IGMC Shimla Himachal Pradesh.
Study duration: 1st August 2017 to 31st July 2018
Sample size: 630 preterm deliveries which occurred during study duration and fulfilled the inclusion criteria were included in the study.
Inclusion criteria: Women withGestation age >24 weeks to <37 weeks who had spontaneous onset preterm labour, hadpreterm premature rupture of membranes and medically indicated or elective preterm deliveries were included in the study.
Exclusion criteria: Pregnancy beyond 37 weeks, any congenital malformations such as anencephaly, hydrocephalus or multiple congenital anomalies and multiple pregnancies were excluded from the study.
Methodology
All mothers who delivered between 24 to 37 weeks and neonates of these mothers were followed up till the discharge from the hospital. Fetal outcomes observed were:

- Gestation age at delivery
- Weight of the baby
- APGAR at 1 min and 5 min of age
- NICU admission
- Neonatal morbidity
- Neonatal mortality

Neonatal stay in the nursery was observed till discharge or demise of the baby.
Various Maternal morbidities and mortality were also recorded.
STATISTICAL ANALYSIS
Data collected was transformed into MS excel sheet for further processing and analysis. Appropriate statistical software and tools were used for analysing the data. Parametric and non-parametric test of significance were used wherever applicable to find the association between different quantitative and qualitative variable of interest.

III. Results

There were 6533 deliveries in the hospital during study period of which 720 were preterm deliveries. Hence incidence of preterm deliveries in our institution was 11.4%.Out of 720 preterm deliveries 630 subjects fulfilled the inclusion criteria and were included in the study.
Cause of preterm deliveries: In this study 347 (55.1%) cases had preterm delivery due to spontaneous onset of preterm labour, 217 (34.4%) were due to PPROM and 66 (10.5%) cases had iatrogenic preterm deliveries for some maternal and fetal indications (Table 1).

Cause of preterm	No. of cases	Percentage
Spontaneous	347	55.1%
PPROM	217	34.4%
Iatrogenic	66	10.5%

Table 1. Cause of preterm

POG at delivery:356 (56.5%) out of total 630 cases delivered at POG 34-36wk6d, 152 (24.1%) at 32-33wk6d, 88 (14%) at 28-31wk6d and 34 (5.4%) cases delivered at 24-27wk6d. Maximum cases were of late preterm age group (Table 2).

POG at delivery	Number	Percentage
24-27wk6d	34	5.4%
28-31wk6d	88	14%
32-33wk6d	152	24.1%
34-36wk6d	356	56.5%

Table 2.POG at delivery

Mode of delivery: In this study, 489 (77.6%) cases underwent normal vaginal delivery, 101 (16%) cases had caesarean sections while only 40 (6.4%) cases had instrumental deliveries(Table 3).

Mode of delivery	Number	Percentage
NVD	489	77.6%
Instrumental	40	6.4%
Caesarean	101	16%

Table 3. Mode of delivery

Birth weight: 51 (8.1%) babies were <1 kg in weight, 128 (20.3%) babies had birth weight 1-1.5 kg, 210 (33.3%) babies had birth weight 1.6-2 kg, 206 (32.7%) babies had birth weight 2.1-2.5 kg and35 (6.6%) babies had birth weight >2.5 kg .Maximum babies had birth weight between 1.6 kg to 2.5 kg (Table 4).

Birth weight	24-27w6d	28-31w6d	32-33w6d	33-36w6d
<1kg n=51(8.1%)	32	15	4	0
1-1.5kg n=128 (20.3%)	2	67	46	13
1.6-2kg n=210 (33.3%)	0	5	92	113
2.1-2.5kg n=206 (32.7%)	0	1	10	195
>2.5kg n=35 (5.6%)	0	0	0	35

Table 4. Distribution according to birth weight

Perinatal outcome: Out of 630 cases, 31 (4.9%) were still births and 599 (95%) were live births. Stillbirths decreased with increasing gestation age(Table 5).

GA at birth	Total Number of deliveries	Stillbirth	Live birth	Percentage of still birth
24-27wk6d	34	9	25	26.4%
28-31wk6d	88	13	75	14.7%
32-33wk6d	152	8	144	5.3%
34-36wk6d	356	1	355	0.3%

Table 5. Perinatal outcome

APGAR Score: In our study out of total 599 live births, 97 (16.2%) babies had APGAR score <7 at 1 min of birth and 91(15.2%) babies had APGAR <9 at 5 min of birth(Table 6).

	At 1 min		At 5 min	
APGAR	<7	7	<9	9
Number	97	502	91	508
Percent	16.2%	83.8%	15.2%	84.8%

Table 6.APGAR Score

NICU admissions: Out of total 599 live births, 276 (46.1%) babies shifted to NICU. As the gestation age increased, rate of NICU admission decreased(Table 7).

Gestation age	Live births	NICU admissions	Percentage
24-27wk6d	25	25	100%
28-31wk6d	75	71	94.6%
32-33wk6d	144	109	76%
34-36wk6d	355	71	20%
Total	599	276	46.1%

Table 7. NICU admissions

Neonatal morbidity: 276 (46.1%) babies had neonatal morbidity in which most common complication was RDS, seen in 80 (13.3%) followed by neonatal jaundice in 74 (12.3%), sepsis in 36 (6.01%), birth asphyxia in 33 (5.5%), hypoglycaemia in 16 (2.6%), intraventricular haemorrhage in 16 (2.6%), pulmonary haemorrhage in 11 (1.8%), neonatal seizures in 6 (1%) and necrotising enterocolitis 4 (0.6%) cases(Table 8).

Complications	Number	Percentage
RDS	80	13.3%
Neonatal jaundice	74	12.3%
Sepsis	36	6.01%
Birth asphyxia	33	5.5%
Intraventricular haemorrhage	16	2.6%
Hypoglycemia	16	2.6%
Pulmonary haemorrhage	11	1.8%
Neonatal seizures	6	1%
Necrotising enterocolitis	4	0.6%

Table 8. Causes of Neonatal morbidity

Neonatal mortality:83 (13.8%) babies had neonatal mortality. It was 22 out of 25 in the age group of 24-27wk6d, 39 out of 75 in 28-31wk6d, 20 out of 144 in 32-33wk6d and 2 out of 355in 34-36wk6d.(Table 9a).

POG at birth	Number of live birth	Neonatal mortality	Percentage
24-27w6d	25	22	88%
28-31w6d	75	39	52%
32-33w6d	144	20	13.9%

34-36w6d	355	2	0.6%

Table 9a. Neonatal mortality according to Gestation age

Out of 28 live births of birth weight <1 kg, 26 (92.8%) babies died. Between birth weight 1-1.5kg, 48(39%) babies out of 123died. 7(3.4%) out of 207 with birth weight 1.6-2kg and 2(1%) out of 206 with birth weight 2.1-2.5kg died. No neonatal death was observed in the babies with birth weight >2.5kg (Table 9b).

Birth weight	Number of live births	Neonatal mortality	Percentage
< 1kg	28	26	92.8%
1-1.5kg	123	48	39%
1.6-2kg	207	7	3.4%
2.1-2.5kg	206	2	1%
>2.5kg	35	0	0.0%

Table 9b. Neonatal mortality according to birth weight

Cause of mortality: Out of total 83 cases who had neonatal mortality, most common cause was RDS which was seen in 22 (26.5%) cases followed by extreme prematurity in 18 (21.7%), sepsis in 17 (20.5%), Intraventricular haemorrhage in 11 (13.3%), pulmonary haemorrhage in 6 (7.2%), Necrotising enterocolitis in 4 (4.8%), neonatal seizures in 3 (3.6%) and birth asphyxia in 2 (2.4%) cases(Table 10).

Cause of mortality	Number	Percentage
RDS	22	26.5%
Extreme prematurity	18	21.7%
Sepsis	17	20.5%
Intraventricular haemorrhage	11	13.3%
Pulmonary heamorrhage	6	7.2%
Necrotising enterocolitis	4	4.8%
Neonatal seizures	3	3.6%
Birth asphyxia	2	2.4%

Table 10. Cause of mortality

Maternal complications: Maternal morbidity was seen in 48 (7.6%) cases out of total 630. Most common was puerperal pyrexia which was seen in 21 (3.3%) followed by PPH in 15 (2.3%), wound infection was seen in 10 (1.6%), chorioamnionitis in 4 (0.6%), postpartum psychosis in 2 (0.3%) and postpartum eclampsia was seen in 2 (0.3%) cases. No maternal mortality was seen in our study (Table 11).

Complications	Number	Percentage
Puerperal pyrexia	21	3.3%
PPH	15	2.3%
Wound infection	10	1.6%
Chorioamnionitis	4	0.6%
Postpartum psychosis	2	0.3%
Postpartum eclampsia	2	0.3%

Table 11.Maternal complications

IV. Discussion

Preterm labour is an obstetrics emergency and a threat to population health. 75% of the infant mortality is related to preterm birth. The vast majority (85%) of global preterm births occur in Asian and African continents, where health systems are weak and inadequate as per the standards of developed nations.[5]

Maximum preterm deliveries in our study were due spontaneous onset of labour which constituted 55.1% which is comparable to studies by McIntire DD et al[6]., Henderson JJ et al[7]. and Das A et al[8]. in which it was seen in 45%, 31.7%, 56.05% cases respectively. PPROM as a cause was seen in 34.4% of the cases. It was consistent with the other studies as 35% in study by McIntire DD et al[6]., 27.4% by Henderson JJ et al[7]. and 21.8% by Das A et al[8].

80.6% cases delivered at gestation age of 32-36wk6d. These results were similar to the studies by Fyala E et al[9]. in which 79.6% and Usynina AA et al[10]. in which 86.3% delivered at 32-36wk6d.

In the study by Usynina A et al[10]. still births were 3.2% and live births were 96.8%. Our study had results similar with still births being 4.9% and live births were 95.1%.

When cases were evaluated for NICU admissions, results in a study by NaikS et al[3]. showed that 46.6% of the babies were shifted to NICU. In our study also 46.1% of the babies were shifted to NICU, either for observation of prematurity or for the management of various complications.

Most common neonatal morbidity in our study was RDS which was seen in 13.5% of the babies. This was in accordance to the studies of Asalkar MR et al[11]. and Gupta N et al[12]. in which it was seen in 18% and 17.5% of the cases.

In our study, neonatal mortality was seen 13.8% comparable to 12.7% in the study by Singh U et al[13]. Most common cause of neonatal mortality was RDS, seen in 26.5% of the cases. 88% cases of neonatal

mortality was seen at gestation age <28 weeks which was comparable to study byKunle-Olowoet al[14]. in which it was 88.9%.

V. Conclusion

Preterm birth is challenging and yet unmet goal of health care professionals. It is the leading etiological factor for neonatal morbidity and mortality, especially in developing country like India. Preterm labour and preterm births require early and prolonged hospitalization posing great financial and psychological burden on the family. Hence reliable and accurate strategies must be established to overcome this problem.

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