Original Research Article

Fetomaternal outcome in preterm labour

Nungsangtemjen, Kaushik Mahajan*, M. Rameswar Singh, Yaruiyam Mahongnao, Dylan G. Momin, Taneesha Subba

Department of Obstetrics and Gynecology, Regional Institute of Medical Sciences, Imphal, Manipur, India

*Correspondence:
Dr. Kaushik Mahajan,
E-mail: Kaushik.rims@gmail.com

ABSTRACT

Background: Preterm birth is the leading cause of infant morbidity and mortality in the world. It affects not only the immediate neonatal period but also affects infancy, childhood and even adulthood. The aim of the study was to ascertain the causes and outcome of preterm labor and delivery and also the neonatal outcome.

Methods: A hospital based cross-sectional study was conducted among patients who entered the third trimester of pregnancy and diagnosed as a case of threatened preterm labor or preterm labor from September 2017 to August 2019 in the department of obstetrics & gynaecology in collaboration with department of paediatrics, Regional institute of Medical Sciences, Imphal. Detailed clinical history and socio-demographic profile were recorded in pre-designed proforma. General physical examination and systemic examination and obstetrical examination was carried out for the participants.

Results: Out of 918 preterm births 88.9% of neonates between the gestation period 28 weeks and <32 weeks were admitted to NICU. 48.8% of the neonates were having low birth weight. 23.8% of neonates required NICU admission and the most common neonatal complications were sepsis (5.2%), asphyxia (4%), jaundice (4%) and hyaline membrane disease (1.7%). Apgar score significantly improved as the period of gestation increased at 5 minute and 10 minutes (p=0.006 and p<0.001 respectively). The overall mortality among preterm births was 8.1% and only 3.7% neonatal deaths were seen in gestational age 34 weeks to <37 weeks, whereas 24.1% and 22.2% mortality were seen in 32 weeks to <34 weeks and 28 weeks to <32 weeks of gestation (p=<0.001).

Conclusions: Preterm infants are at high risk for overall morbidity and mortality compared with term infants. Proper antenatal care, clinical suspicion, early detection and correction of risk factors, institutional delivery and good neonatal care facilities can improve the outcome of preterm labour.

Keywords: Preterm labour, Apgar score, Cross sectional study, Fetomaternal outcome

INTRODUCTION

Preterm birth (PTB) is the leading cause of infant morbidity and mortality in the world.[1] It affects not only the immediate neonatal period but also affects infancy, childhood and even adulthood. It can affect physical health, cognitive and behavioural dimensions, making it one of the most significant challenges for modern public health.[2,3]The WHO 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

(LMP).[4] According to WHO, every year about 15 million babies are born prematurely around the world and that is more than 1 in 10 of all babies born globally. Almost 1 million children die each year due to complications of preterm birth (2013).

Across 184 countries, the rate of preterm birth ranges from 5% to 18% of babies born. In India, out of 27 million babies born every year (2010 data), 3.6 million babies born are premature, of which 303,600 do not survived due to complications.[4] Of all early neonatal deaths that are not

related to congenital malformations, 28% are due to preterm birth. Children who are born prematurely have higher rates of cerebral palsy, sensory deficits, learning disabilities and respiratory illnesses compared with children born at term.[5-7]

Due to continued innovation in neonatal intensive care facilities and obstetric interventions, fetal survival is now possible even at 20 weeks gestation in developed countries. However, in even the best set up in developing countries, survival is rare below 28 weeks of gestation. Incidence of preterm labor is 23.3% and of preterm delivery 10-69% in India. It is raising world over because of increased frequency of multiple births due to assisted reproductive techniques (ART), more working mothers, increasing psychological stress and medically induced prematurity.[8]

More than three-quarters of preterm/premature babies can be saved with often inexpensive care such as essential care during child birth, antenatal steroid injections (given to pregnant women at risk of preterm labor under set criteria to strengthen the babies lungs) and postnatal care like kangaroo mother care (the baby is carried by the mother with skin-to-skin contact and frequent breastfeeding), and basic care for infections and breathing difficulties. Identification of risk factors in women with improved care before, between and during pregnancies; better access to contraceptives and increased empowerment/ education can further decrease the preterm birth rate (the number of preterm births divided by the number of live births).[4]

In our part of the country many preterm births are taking place but the exact data are lacking. Hence this study is being planned to ascertain the causes and outcome of preterm labor and delivery and also the neonatal outcome.

METHODS

A hospital based cross-sectional study was conducted among patients who entered the third trimester of pregnancy and diagnosed as a case of threatened preterm labor or preterm labor from September 2017 to August 2019 in the department of obstetrics & gynaecology in collaboration with department of paediatrics, Regional institute of Medical Sciences, Imphal. Patients with pre-term newborns with any congenital malformation, term pregnancy, cases with malpresentation, antepartum haemorrhage and uterine anomaly, not giving consent or not willing to participate were excluded. The study was conducted after obtaining permission from the Research Ethics Board, RIMS, Imphal.

Sample size and sampling

Assuming the prevalence of of preterm birth in India as 13%, the sample size was estimated to be 172 at 95% confidence level and a precision of 5%, using the formula for diagnostic tests. All the Patients who entered the third trimester of pregnancy and are diagnosed as a case of

threatened preterm labor or preterm labor were included in this study until the sample size was reached.

Study procedure

After obtaining informed consent from the participants, the detailed clinical history including premature rupture of membranes, vaginal Infections, urinary infections, multiple gestation (twins, triplets), polyhydramnios, maternal disease, extremes of age, history of abortions, history of preterm deliveries, short stature, maternal weight and sociodemographic profile were then recorded. Following the socio- demographic and clinical characteristics, general physical examination (pallor, oedema, neck glands, thyroid) and systemic examination and obstetrical examination was carried out for the participants.

Fetal outcome is recorded in terms of: (a) Apgar score at birth; (b) fetal weight; (c) NICU admission; (d) perinatal outcome. Maternal outcome is recorded in terms of: (a) gestational age at the time of delivery, b) duration of labor; (c) mode of delivery: vaginal/assisted vaginal delivery/caesarean section; (d) complications if any. All the routine investigations including complete haemogram, urine routine examination, liver and kidney function tests, ABO grouping and Rh typing, blood sugar estimation, thyroid profile along with necessary investigations like ultrasonography (trans-abdominal) were also performed. Data was recorded in a pre-designed proforma.

Statistical analysis

Data were checked for completeness and consistency. Data was analysed using SPSS for windows version 21 (IBM. Corp 1995, 2012). Descriptive statistical tools like mean, percentage and proportion were used. Association between preterm labor and fetomaternal outcome were analysed using chi square test. P value<0.05 was considered as significant.

RESULTS

In this study, over a period of one and half years (September 2017-March 2019) there were 13,810 live births, out of which 918 were pre-term births. So, incidence of preterm birth is 6.6% in our study.

Table 1 shows almost half of the mothers (49.4%) were primipara and one fourth of the mothers (27.9%) had previous history of abortion. Majority of the mothers (77.9%) were late preterm cases (i.e gestation between 34 weeks and <37 weeks). Maximum mothers (95.3%) did not have any previous history of preterm births.

Table 2 shows most common risk factor was PPROM (47.7%), which almost half of the mothers had, followed by Hypertension (18.6%), UTI (7.6%) and twin pregnancy (7.6%), etc.

Table 1: Mothers characteristics (N=172).

Characteristics	N (%)
Parity	
Primi	85 (49.4)
Multi para	82 (47.7)
Grand multipara	5 (2.9)
History of abortion	
No	124 (72.1)
Yes	48 (27.9)
Period of gestation (in weeks)	
28 to <32	9 (5.2)
32 to <34	29 (16.9)
34 to <37	134 (77.9)
Mode of delivery	
Normal vaginal delivery	119 (69.2)
Elective caesarean	5 (2.9)
Emergency caesarean	48 (27.9)
Previous history of preterm	
Yes	8 (4.7)
No	164 (95.3)

Table 2: High risk factors for preterm labour (N=172).

Risk factors	N (%)
Preterm premature rupture of membrane (PPROM)	82 (47.7)
PIH	32 (18.6)
UTI	13 (7.6)
Twins	13 (7.6)
Idiopathic	7 (4.1)
Gestational diabetes mellitus	6 (3.5)
Anaemia	5 (2.9)
Polyhydramnios	4 (2.3)
Short stature	4 (2.3)
Thyroid disorders	3 (1.7)
Vaginal infections	3 (1.7)

Table 3: Complications of the neonate's baby (N=172).

Complications	N (%)
Low birth weight	84 (48.9)
Very low birth weight	16 (9.3)
Early onset sepsis	9 (5.2)
Hyperbilirubinaemia	4 (2.3)
LBW with asphyxia	4 (2.3)
Birth asphyxia with neonatal jaundice	3 (1.7)
Hyaline membrane disease	3 (1.7)

Table 3 shows majority (48.9%) of the neonates had low birth weight, 9.3% of the neonates had very low birth weight, 5.2% of the neonates were complicated with early onset sepsis. Other complications observed were hyperbilirubinaemia (2.3%), LBW with asphyxia (2.3%), etc.

Table 4 shows 88.9% of neonates of cases between the gestation period 28 weeks and <32 weeks were admitted to NICU, while the trend significantly decreased as the gestational age increased (p<0.001).

Table 4: Association between POG and NICU admission (N=172).

POG	NICU admission (N%)		P value*
	Yes	**No**	
28 to <32	8 (88.9)	1 (11.1)	<0.001
32 to <34	16 (55.2)	13 (44.8)	
34 to <37	17 (12.7)	117 (87.3)	

*Chi square test

Table 5 shows majority of the neonates were having low birth weight and this trend significantly decreased as the gestation age increased (p<0.001).

Table 6 shows 91% of the neonates of cases who were in the late preterm period had Apgar score 7 or more in the 1st minute and is found to be statistically significant.

Table 5: Association between POG and birth weight (N=172).

POG	Birth weight (BW) (N%)			P value*
	VLBW	**LBW**	**Normal**	
28 to <32	3 (33.3)	6 (66.7)	0 (0)	<0.001
32 to <34	8 (27.6)	18 (62.1)	3 (10.3)	
34 to <37	5 (3.7)	60 (44.8)	69 (51.5)	

*Chi square test

Table 6: Association between POG and Apgar at 1 min (N=172).

POG	Apgar at 1 min (N%)		P value*
	<7	**≥7**	
28 to <32	2 (22.2)	7 (77.8)	<0.001
32 to <34	11 (37.9)	18 (62.1)	
34 to <37	12 (9)	122 (91)	

*Fisher exact test

Table 7 shows Apgar score at 5 minutes significantly improved as the period of gestation increased.

Table 7: Association between POG and Apgar at 5 min (N=172).

POG	Apgar at 5 min (N%)		P value*
	<7	**≥7**	
28 to <32	2 (22.2)	7 (77.8)	<0.006
32 to <34	5 (17.2)	24 (82.8)	
34 to <37	5 (3.7)	129 (96.3)	

*Fisher exact test

Table 8 shows Apgar score at 10 minutes significantly improved as the period of gestation increased.

Table 9 shows birth weight is significantly associated with mortality as no deaths were reported in babies who weighed >2 kg (p≤0.01).

Table 8: Association between POG and Apgar at 10 min (N=172).

POG	Apgar at 10 min (N%)		P value*
	<7	≥7	
28 to <32	1 (11.1)	8 (88.9)	
32 to <34	4 (13.8)	20 (86.2)	<0.006
34 to <37	0 (0)	134 (100)	

*Fisher exact test

Table 9: Association between birth weight and morality (N=172).

BW (kg)	Mortality		P value*
	Yes	No	
<1.5	9 (56.3)	7 (43.8)	
1.5 to <2	5 (17.2)	24 (82.8)	<0.01
2 to <2.5	0 (0)	55 (100)	
>2.5	0 (0)	72 (100)	

*Fisher exact test

DISCUSSION

During the study period there were 13,810 live births. Out of these 918 (6.6%) were preterm births, which is comparable to an Iranian study done by Alijahan et al (5.1%). Singh et al and Satija et al has reported higher incidence rate, 20.9% and 20.4% respectively but they included deliveries at <28weeks of gestation.[8,10,12] Studies done by Garg et al and Naik et al observed higher incidence rate of preterm, 11.16% and 11.56%, as compared to our study.[13,14]

Maximum number of mothers (61.1%) were in the age group of 20-29 years in this study which is comparable to a study done by Fernandes et al (67.9%).[9] Extremes of age group (i.e <20 and>35 years of age), which play a large role in PTB, accounted for 25% of the cases which is slightly higher when compared to studies done by Fernandes et al and Shetty et al 15.8% and 14.2% respectively.[9,15] This could be because of higher absolute number of cases in our study who were>35years of age i.e 30/172(17.4%). Though other studies done by Samim et al reported higher extremes of age for 36.5% of cases.[17]

In our study, almost two third (71.5%) of the mothers belonged to low socio-economic status. Similar findings were reported in studies done in India.[11,16] 49.4% of the mothers were primigravidas in our study, while multigravidas accounted for 50.6%. The findings in the present study were consistent with the study Singh et al where 47% were primigravida and 53% were multiparous.[8] Grand multipara cases accounted only for

2.9% of the total cases. Similar findings were also observed in studies done by Fernandes et al.[9] On the contrary, Shlomo et al in Israel observed that preterm delivery rate was much higher (93% among gravid>5).[18] The comparative lower rate of grand-multiparas among the patients in our setting might be due to motivation to adopt family planning.

In this study, 20.9% of the mothers had previous history of one abortion, whereas 7% of the mothers had two or more abortion. These findings correlated with studies done in India and Epipage study.[15,19] The commonest obstetrical risk factor in our study was preterm premature rupture of membrane (PPROM) accounting for almost half of the cases (47.7%). Pool et al and Singh et al found approximately 30% and 25.9% respectively, of pre-term births associated with rupture of membrane.[8,20] The second most common risk factor in our study was pregnancy induced hypertension (PIH) which accounted for 18.6% of the cases. Similar findings (21.07%) were observed in studies done by Fernandes et al, Shrestha et al at 13.3% and Taskeen et al at 14%. The slightly higher incidence of hypertensive disorders in our study maybe due to the fact that almost half of the cases were either referred or were unbooked cases with no proper antenatal checkup.[9,21,22]

Genitourinary infections have been reported to be one of the commonest risk factors in literature. Wright et al identified urinary tract infections (UTI) in 7% of PTB, similar to our study where 7.6% of the cases had UTI.[24] Singh et al found genitourinary infection as the second commonest cause (20.7%), reporting UTI and vaginal infections in 8.4% and 12.25% cases respectively.[8]

Almost one fourth (23.8%) of neonates required neonatal intensive care unit (NICU) admission and the most common neonatal complications were sepsis (5.2%), asphyxia (4%), jaundice (4%) and hyaline membrane disease (1.7%). Garg et al observed 84% of neonates requiring NICU admission with complications of jaundice in (30%) of neonates followed by asphyxia (18%) and RDS (16%).[13] Chauhan et al also reported higher incidence of jaundice (32.3%), RDS (22.6%) and asphyxia (13.7%) in their study.[23]

14.5% of the neonates had Apgar score less than 7 at 1 minute in our study. On the contrary, Karegoudar et al observed that 55.28% of the babies had Apgar score less than seven.[11] At 5 minutes Apgar score was less than seven in 7% in our study while in their study it was 2.48%. Apgar score significantly improved as the period of gestation increased at 5 minutes and 10 minutes (p=0.006 and p<0.001 respectively).

The overall mortality among preterm births was 8.1% which is lower as compared to studies done by Singh et al at 12.7% and Singh et al at 21%.[8,25] Only 3.7% neonatal deaths were seen in gestational age 34 weeks to<37 weeks, whereas 24.1% and 22.2% mortality were seen in 32 weeks to<34 weeks and 28 weeks to<32 weeks of gestation

(p=<0.001). Similar findings were observed by Singh et al where neonatal mortality in babies>34 weeks was only 3.4%.[8] This translates to a great benefit of prolonging pregnancy beyond 34 weeks in cases of preterm labor. In this study, birth weight is significantly associated with mortality as no deaths were reported in babies who weighed>2 kg. Similar findings were also reported by Garg et al.[13]

Limitations

The major limitations of this study were the small sample size and study population belongs to a state referral hospital. So, the results of this study may not reflect the actual scenario in the general population. Hence, we should analyse the results of this study with caution. Beside the limitatations, this study has provided the basic information on fetomaternal outcome in preterm labour in our set up and also guides to conduct further studies be carried out in different settings to elucidate the causes of preterm births to help policy makers to plan preventive measures to combat this problem, thereby decreasing infant morbidity and mortality.

CONCLUSION

Preterm infants are at high risk for overall morbidity and mortality compared with term infants. Proper antenatal care, clinical suspicion, early detection and correction of risk factors like correction of anaemia, group B of blood preeclampsia, treatment of cervicovaginal infections and asymptomatic bacteriruria, use of tocolysis in over distended uterus, abstinence, cervical cerclage in proven cases of cervical incompetence, institutional delivery and good neonatal care facilities can improve the outcome of preterm labour. This study was conducted to assess and analyse the fetomaternal outcome and suggest preventive measures that can be developed through this study. Though incidence of preterm in our study is lower compared to others, it still contributes significantly to neonatal mortality and morbidity. Proper antenatal care will help in identification of high-risk cases and plays a major role in lowering preterm births and thereby preventing complications in the newborn, as evidenced by significant association between premature births and low Apgar score and low birth weight.

Considering the significant association of preterm births and infant mortality, it is important that further studies be carried out in different settings to elucidate the causes of preterm births to help policy makers to plan preventive measures to combat this problem, thereby decreasing infant morbidity and mortality.

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