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## Original Research Article

# Study of risk factors for preterm deliveries in a tertiary hospital

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### ABSTRACT

**Background:** Preterm labour and preterm deliveries are very challenging obstetric complications. Early identification of risk factors may help identify women at risk for preterm deliveries.

**Methods:** A one-year observational study was conducted in the department of obstetrics and gynecology, IGMC Shimla, Himachal Pradesh from 1<sup>st</sup> August 2017 to 31<sup>st</sup> July 2018. All mothers who delivered between 24 to 37 weeks were subjected to a detailed history with respect to age, parity, previous pregnancy outcomes and to identify the presence of any risk factors. A thorough obstetric and systemic examination was done. Parametric and non-parametric test of significance were used to find the association between different quantitative and qualitative variable.

**Results:** Incidence of preterm deliveries was 11.4%. Maximum cases were of age group 25-30 years. 71.7% belonged to lower socio-economic status. 54% cases were seen in multigravida. History of previous abortion was seen in 18.4% and 9.7% had history of preterm deliveries. 12% cases had history of 1<sup>st</sup> trimester bleeding. Spontaneous onset of preterm labour was seen in 55.1%. The significant risk factors associated were PIH and genitourinary infections.

**Conclusions:** The risk factors of preterm birth to a large extent can be identified in antenatal period. Adolescent health education including good nutrition, good hygiene, counselling for contraception to reduce unintended pregnancies and birth spacing can lower the preterm birth rate. Better prenatal care, early identification of risk factors and complicated cases, regular follow up and proper management can help us in reducing preterm births.

**Keywords:** Etiology, Preterm labour, Risk factors

### 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.<sup>1</sup>

Incidence of preterm delivery is 1 in 10 births (11%) in USA and even greater births in developing countries. Around 40-75% neonatal deaths are attributable to preterm deliveries. 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%.<sup>2</sup> Preterm birth is a worldwide problem and to draw attention to it, since

2011, November 17 is celebrated as World's prematurity day.<sup>3</sup>

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.<sup>4</sup>

#### *The precludes leading to preterm birth include*

- Spontaneous labour with intact membranes (40-55%)
- Preterm rupture of membranes (30%)

- Medically indicated or elective preterm birth (15-20%).<sup>5</sup>

American college of obstetrics and gynecology proposed the following criteria to diagnose preterm labour:

- Contraction of 4 in 20 minutes or 8 in 60 minutes plus progressive cervical change
- Cervical dilatation greater than 1 cm
- Cervical effacement of 80% or greater.<sup>2</sup>

Prelabour rupture of membranes (PROM) is defined as the spontaneous rupture of amniotic membrane with a release of amniotic fluid at least one hour before the onset of labour. If the membranes before 37 weeks of gestation, it is termed as the preterm prelabour rupture of membrane (PPROM). Latent period is the time interval between the rupture of membranes and the onset of uterine contractions. Prolonged PROM is the term used when more than 24 hours have elapsed before the labour ensues.<sup>6</sup> Incidence of PPRM ranges from 3%-10% of all the deliveries. It leads to one third of preterm births.<sup>7</sup>

## METHODS

This was a one-year observational study, conducted in the Department of obstetrics and gynecology IGMC Shimla Himachal Pradesh from 1<sup>st</sup> August 2017 to 31<sup>st</sup> July 2018.

### Inclusion criteria

- Women with gestation age >24 weeks to <37 weeks who had spontaneous onset preterm labour and preterm premature rupture of membranes were included in the study. Medically indicated or elective preterm deliveries were also included in the study.

### Exclusion criteria

- Pregnancy beyond 37 weeks
- Any congenital malformations such as anencephaly, hydrocephalus or multiple congenital anomalies
- Multiple pregnancies.

The data was collected from mother case sheet and included age, parity, booking status, socio-economic status, gestation age, previous obstetric history, medical/obstetric complications in present pregnancy, cause of preterm delivery, if any, treatment profile.

Those subjects where induction of labour was done due to any medical or obstetrical indication, indication for induction and mode of delivery was recorded.

## RESULTS

There were 6533 deliveries in the hospital during study period of which 720 were preterm deliveries, giving incidence of 11.4%. Out of 720 preterm deliveries 630

subjects fulfilled the inclusion criteria and were included in the study.

Maximum numbers of the subjects accounting for 45.1% were in age group of 25-30 years followed by 30.1% of age group 21-24 years, 16.2% of age group >30 years and 8.6% of age group <20 years (Table 1).

**Table 1: Distribution of cases according to age.**

| Age group   | No. of cases | Percentage (n=630) |
|-------------|--------------|--------------------|
| <20 years   | 54           | 8.6%               |
| 21-24 years | 190          | 30.1%              |
| 25-30 years | 284          | 45.1%              |
| >30 years   | 102          | 16.2%              |

A total 71.7% cases belonged to lower socio-economic status and middle socio-economic status group had 26.3% cases while upper socio-economic status group constituted only 2% of the cases (Table 2).

**Table 2: Distribution of cases according to socio-economic status.**

| Socio-economic status | No. of cases | Percentage (n=630) |
|-----------------------|--------------|--------------------|
| Lower class           | 452          | 71.7%              |
| Middle class          | 166          | 26.3%              |
| Upper class           | 12           | 2%                 |

**Table 3: Distribution according to obstetrics score.**

| Gravidity    | No. of cases | Percentage (n=630) |
|--------------|--------------|--------------------|
| Primigravida | 290          | 46%                |
| Multigravida | 340          | 54%                |

A total 54% cases were seen in multigravida and 46% were seen in primigravida (Table 3).

**Table 4: Distribution according to previous obstetrics outcomes.**

| Previous history | No. of cases | Percentage (n=630) |
|------------------|--------------|--------------------|
| Abortion         | 116          | 18.4%              |
| Preterm delivery | 61           | 9.7%               |

In 18.4% cases there was history of previous abortion while 9.7% cases had previous history of preterm delivery (Table 4).

A total 12% cases that had preterm deliveries were also having history of bleeding in 1<sup>st</sup> trimester (Table 5).

Among the various medical complications 20.3% cases were having hypertension, 18.7% had genitourinary infections, 7.6% cases had subclinical hypothyroidism 5.1% had severe anaemia, 2.8% cases were having GDM, 2.2% cases had ICP and 0.8% cases were having heart

disease. Most common complication was hypertension (Table 6).

**Table 5: Distribution according to history of 1<sup>st</sup> trimester bleeding.**

| H/o 1 <sup>st</sup> trimester bleeding | No. of cases | Percentage (n=630) |
|--|--------------|--------------------|
| Present                                | 75           | 12%                |
| Absent                                 | 555          | 88%                |

**Table 6: Associated medical complications in pregnancy.**

| Complications            | No. of cases | Percentage (n=630) |
|--------------------------|--------------|--------------------|
| Hypertension             | 128          | 20.3%              |
| Genitourinary infections | 118          | 18.7%              |
| S/C hypothyroidism       | 48           | 7.6%               |
| Severe anaemia           | 32           | 5.1%               |
| GDM                      | 18           | 2.8%               |
| ICP                      | 14           | 2.2%               |
| Heart disease            | 5            | 0.8%               |

Among the various obstetrics complications 5.1% cases were having IUGR, 4.8% cases were of malpresentation, 4% were having previous LSCS, 3.8% cases had abruptio placenta and 2.5% were of placenta praevia. Most common obstetric complication associated with preterm deliveries was IUGR (Table 7).

**Table 7: Associated obstetrics complications in pregnancy.**

| Complications     | No. of cases | Percentage (n=630) |
|-------------------|--------------|--------------------|
| IUGR              | 32           | 5.1%               |
| Malpresentation   | 30           | 4.8%               |
| Previous LSCS     | 25           | 4%                 |
| Abruptio placenta | 24           | 3.8%               |
| Placenta praevia  | 16           | 2.5%               |

**Table 8: Distribution according to cause of preterm.**

| Type        | No. of cases | Percentage (n=630) |
|-------------|--------------|--------------------|
| Spontaneous | 347          | 55.1%              |
| PPROM       | 217          | 34.4%              |
| Iatrogenic  | 66           | 10.5%              |

In this study 55.1% cases had preterm delivery due to spontaneous onset of preterm labour, 34.4% were due to PPRM and 10.5% cases had iatrogenic preterm deliveries for some maternal and fetal indications (Table 8).

In iatrogenic preterm deliveries most, common indication was PIH (37.9%) followed by APH (30.3%), severe IUGR (28.8%) and (3.0%).

## 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.<sup>8</sup>

Incidence of preterm birth in this study was 11.02%. This was in accordance with the study by Das A et al, and Prakash SA et al in which the incidence of preterm birth was 10.2% and 6.7% respectively.<sup>2,5</sup> It was 27.9% in study of Gupta N et al.<sup>9</sup>

### Age incidence

Most cases accounting for 45.1% in this study were in the age group of 25-30 years. In the studies by Radhanpuri F et al, Fernandes SF et al and Shetty MB et al, 42.6% 35.7% and 44% of cases were of age group 25-30 years respectively.<sup>10-12</sup> This age group being the most common period for marriage and childbearing accounted for higher incidence of preterm birth in this age.

### Socio-economic incidence

In this study maximum numbers of cases belonged to low socio-economic status which accounted for 71.7% in comparison to other studies conducted by Radhanpuri F et al, Mahajan A et al and Gupta N et al where 51%, 58% and 56.3% were from low socio-economics status respectively, which shows that preterm births are more common in low socio-economic status.<sup>9,10,13</sup>

### Gravidity incidence

A total 54% cases of preterm deliveries in this study were seen in multigravida. This was similar to studies by Singh U et al, Fernandes SF et al, and Shetty MB et al in which it was 53%, 54.4% and 57.4% respectively.<sup>11,12,14</sup>

### Previous obstetrics outcomes

Present study showed that previous history of abortion was present in 18.4% cases and history of previous preterm delivery was present in 9.7%. This is similar to study by Gupta N et al where these histories were present in 18.8% and 11.6% of the cases respectively.<sup>9</sup> In a study by Singh U et al similar histories were present in 14.4% of cases.<sup>14</sup> Similar observations were even seen in a study by Mahajan A et al, where 25% cases had previous H/O abortion and 26% had previous H/O preterm delivery.<sup>15</sup>

Association with abortion could be attributed to cervical trauma from mechanical dilatation and suction and evacuation, which do increase the risk of cervical incompetence and facilitates upper genital tract infection also.

### ***1<sup>st</sup> trimester bleeding***

In this study H/O 1st trimester bleeding was present in 12% of the cases which was similar to study by Rao CR et al, in which it was present in 9.1% of the cases.<sup>1</sup>

### ***Associated risk factors***

- Hypertension was present in 20.3% of the cases in this study which was in accordance to the studies by Fernandes SF et al, Prakash SA et al, and Mahajan A et al, in which it was present in 21.07%, 12.5% and 20% of the cases respectively.<sup>2,11,13</sup> Hypertension causes vasospasm and leads to IUGR. It also causes increased incidence of abruption leading to preterm deliveries, either spontaneous or iatrogenic.
- Genitourinary infections were present in 18.7% of the cases in this study which were correlating with the studies by Fernandes SF et al in which these were present in 13.6% and Prakash SA et al in which these were seen in 10.4% cases respectively.<sup>2,11</sup>
- A total 5.1% cases were of anaemia in present study and it was seen in 2.7% in study by Fernandes SF et al, 2.08% in Prakash SA et al.<sup>2,11</sup> 2.9% in Shetty MB et al and 7% in study by Mahajan A et al.<sup>12,13</sup>
- Hypothyroidism was seen in 7.6% of the cases in this study which was similar to the study by Shetty MB et al, in which it was seen in 9.9% of the cases.<sup>12</sup> It was 0.5% and 1.04% in the studies of Fernandes SF et al, and Prakash SA et al.<sup>2,11</sup> Incidence of hypothyroidism was more in this study because study is conducted in sub Himalayan region of country in which iodine deficiency is common.
- Association with the GDM was seen in 2.8% of the cases which was similar to the studies of Fernandes SF et al, Prakash SA et al, Shetty MB et al, and Mahajan A et al in which it was present in 3.4%, 4.1%, 3.8% and 2% respectively.<sup>2,11,12,13</sup>
- Heart disease was seen in 0.8% of the cases in this study. It was similar to the study by Fernandes SF et al and Shetty MB et al in which it was seen in 0.5% and 0.9% respectively.<sup>11,12</sup>
- Association with IUGR was 5.1% in this study and 2.08% in study by Prakash SA et al.<sup>2</sup> High incidence of IUGR in present study is due to a greater number of cases belonging to high altitude areas where incidence of IUGR is higher and also a greater number of cases from low socio-economic status in this study.
- APH was seen in 6.3% of the cases in present study which was in accordance with studies of Fernandes SF et al and Prakash SA et al where it was seen in 11% and 9.4% respectively.<sup>2,11</sup> In APH, the rate of iatrogenic preterm deliveries increases in view of maternal and fetal well-being.
- Association with malpresentation was seen in 4.7% of the cases in this study which is correlating with the study by Prakash MB et al and Shetty MB et al, in which it was present in 5.2% and 8.2% of the

cases respectively.<sup>2,12</sup> Malpresentation at preterm gestation is a known association in comparison to term gestation.

### ***Cause of preterm deliveries***

Maximum preterm deliveries in this study were due spontaneous onset of labour which constituted 55.1% of the total preterm deliveries. Similarly, in other studies also, spontaneous onset of preterm labour was the most common cause of preterm. It was 45% in study by McIntire DD et al, 31.7% in Henderson JJ et al and 56.05% in study by Das A et al.<sup>5,15,16</sup>

The second most common cause of preterm deliveries was PPROM which was seen in 34.4% of the cases. It was consistent with the other studies as 35% in study by McIntire DD et al, 27.4% by Henderson JJ et al and 21.8% by Das A et al.<sup>4,15,19</sup>

Iatrogenic preterm deliveries accounted for 10.5% of the cases in this study while it was seen in 20% of the cases in study by McIntire DD et al and 22.1% in studies by Henderson JJ et al and Das A et al.<sup>5,15,16</sup>

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### **REFERENCES**

1. Rao CR, de Ruiter LE, Bhat P, Kamath V, Kamath A, Bhat V. A case-control study on risk factors for preterm deliveries in a secondary care hospital, southern India. *Obstet Gynecol.* 2014;2014:935982.
2. Prakash SA, Rasquinha S, Rajaratnam A, Lavanya S. Analysis of risk factors and outcome of preterm labor. *Int J of Eng Sci.* 2016;6(8):2602-4.
3. Platt MJ. Outcomes in preterm infants. *Public Health.* 2014;128(5):399-403.
4. Naik S, Singh A. Preterm birth: its causes and perinatal outcome. *Int J Sci Res.* 2018;6(5):501-3.
5. Das A, Panda S, Ahanthem SS, Sourabh GD, Bhanu Partap SG. Preterm birth: analysis of risk factors and neonatal outcomes. *Gynecol Obstet Case Rep.* 2015;1:1-5.
6. Mohokar SA, Bava AK, Nandanwar YS. Analysis of maternal and perinatal outcome in cases of preterm premature rupture of membranes. *Bombay Hospital.* 2015;57(3):285-96.
7. Dars S, Malik S, Samreen I, Kazi RA. Maternal morbidity and perinatal outcome in preterm

- premature rupture of membranes before 37 weeks gestation. *Pak J Med Sci.* 2014;30(3):626-9.
8. Shah R, Mullany LC, Darmstadt GL, Mannan I, Rahman SM, Talukder RR, et al. Incidence and risk factors of preterm birth in a rural Bangladeshi cohort. *BMC Pediatr.* 2014;14:112-22.
  9. Gupta N, Divedi P, Dwivedi D. Preterm labour and its effect on perinatal morbidity and mortality. *Int J Reprod, Contracept Obstet Gynecol.* 2018;7(5):1993-6.
  10. Radhanpuri F, Desai DA, Sharma J, Kaur P. Preterm birth and its outcome. *Int J Reprod Contracept Obstet Gynecol.* 2014;3(1):153-7.
  11. Fernandes SF, Chandra S. A study of risk factors for preterm labour. *Int J Reprod Contracept Obstet Gynecol.* 2015;4(5):1306-12.
  12. Shetty MB, Krupa BM, Malyala M, Swarup A, Pathadan DS, Pocha S. Preterm birth: associated risk factors and outcome in tertiary care center. *Int J Reprod Contracept Obstet Gynecol.* 2017;6(8):3271-4.
  13. Mahajan A, Magon S. Study of risk factors for preterm births in a teaching hospital: a prospective study. *Int J Med and Dent Sci.* 2017;6(1):1407-12.
  14. Singh U, Singh N, Seth S. A prospective analysis of etiology and outcome of preterm labor. *J Obstet Gynecol India.* 2007;57(1):48-52.
  15. McIntire DD, Leveno KJ. Neonatal mortality and morbidity rates in late preterm births compared with births at term. *Obstet Gynecol.* 2008;111(1):35-41.
  16. Henderson JJ, McWilliam OA, Newnham JP, Pennell CE. Preterm birth etiology 2004-2008. Maternal factors associated with three phenotypes: spontaneous preterm labour, preterm pre-labour, rupture of membranes and medically indicated preterm birth. *J Matern Fetal Neonatal Med.* 2012;25(6):642-7.

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