

# Study of risk factors for preterm births in a teaching hospital: A prospective study

Mahajan A<sup>1</sup>, Magon S<sup>2</sup>

<sup>1</sup>Dr Amita Mahajan  
MBBS, MD

Associate professor

<sup>2</sup>Dr Shally Magon

MBBS, MD

Professor

drpushendra1969@gmail.com

<sup>1,2</sup>Department of Obstetrics and

Gynaecology

Punjab Institute of Medical Sciences

Jalandhar, Punjab, India

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Correspondence to:

Dr Amita Mahajan

9814516442

amitamahajanjlm@gmail.com

## ABSTRACT

**Background:** Preterm birth is a leading cause of perinatal mortality and long term morbidity as well as the long term health consequences and neurodevelopmental outcome.

**Objectives:** To study the relationship between sociodemographic factors, obstetric, fetal factors, chronic maternal diseases and preterm births and to study the percentage of late preterm, moderately preterm and very preterm births.

**Material and Methods:** 100 preterm births (cases) and 100 term births (control cases) which took place in Department of Obstetrics and Gynaecology of a teaching hospital were enrolled in the study. A detailed questionnaire was used to record sociodemographic factors, maternal and antenatal characteristics of current and previous pregnancies. Data was analyzed.

**Results:** Pre-eclampsia ( $p < 0.01$ ), preterm prelabour rupture of membranes ( $p < 0.01$ ), previous history of preterm births ( $p < 0.01$ ), IUD ( $p < 0.05$ ), genitourinary infections ( $p < 0.02$ ) and polyhydramnios or oligohydramnios ( $p < 0.05$ ) were determined as significant risk factors for preterm birth. 53.1% preterm babies were late preterm babies.

**Conclusions:** Early detection and treatment of diseases or disorders among pregnant women especially hypertension, genitourinary infections, oligohydramnios/ polyhydramnios as well as improving health care quality delivered to pregnant women may reduce the risk of preterm births according to our study.

**Key words:** PIH, preterm birth, oligohydramnios, polyhydramnios, preterm prelabour rupture of membranes

## Introduction

Preterm birth is defined as gestational age at birth of less than 37 completed weeks or 259 days. The lower limit varies in different countries: as per WHO the lower limit is 22 weeks and 500 grams. Preterm infant is further classified into three main categories: late preterm infant (infant born between 34-36 weeks), moderately preterm infant (infant born between 32-34 completed weeks) and very preterm infant (infant born before 32 completed weeks of gestation). Preterm birth is a major determinant of neonatal mortality, morbidity and childhood disability. Preterm birth remains one of the most serious obstetric problems. Preterm birth is recognized as a worldwide problem responsible for most of the neonatal deaths and a vast majority of neonatal morbidity in the surviving infants.<sup>[1,2]</sup> The incidence

of preterm birth is relatively constant for the past three decades and there are worrying trends that it is on the rise.<sup>[3,4]</sup> Factors possibly contributing to but not completely explaining this upward trend include increasing rates of multiple births, greater use of assisted reproductive techniques, increases in the proportion of births among women over 34 years of age and changes in clinical practices, such as greater use of elective caesarean sections. Rates of preterm birth have been reported to range from 5-7% of all live births in some developed countries and are estimated to be substantially higher in developing countries.<sup>[3]</sup> The children who are born prematurely have higher rates of cerebral palsy, sensory deficits, learning disabilities and respiratory diseases compared with children born at term. The morbidity associated with preterm birth often extends to later life resulting in

enormous physical, psychological and economic costs. [5] Events leading to preterm birth are still not completely clear; although the etiology is thought to be multifactorial. It is however unclear whether preterm birth results from the interaction of several pathways or the independent effect of each pathway. Causal factors linked to preterm birth include medical conditions of the mother or fetus, socio-economic factors, genetic influences, environmental exposure, infertility treatments and iatrogenic prematurity.

### Material and methods

100 preterm births (case group) and 100 term births (control group) which took place in Department of Obstetrics and Gynaecology of PIMS Jalandhar were enrolled in the study. Gestational age was estimated by using the first day of the LMP or the first trimester ultrasonography. A detailed questionnaire was used to record sociodemographic factors, maternal and antenatal characteristics of current and previous pregnancies. Sociodemographic factors included age, rural or urban background, economic and educational status. Maternal and antenatal characteristics examined for their association with preterm birth included preterm prelabour rupture of membranes (PPROM), hypertension, PIH, gestational diabetes, IUGR, multiple pregnancies, genitourinary infections, antepartum haemorrhage, anaemia, chronic diseases in pregnancy and presence or absence of hydramnios. Special note was made of all IUDs, congenital malformations of fetus and uterus. Previous pregnancy and reproductive characteristics included; gravidity, parity, history of abortions, stillbirths and preterm births. Preterm birth was defined as gestational age at birth of between 22 completed weeks and less than 37 completed weeks or 259 days. The categorical variables of data representing preterm births and term births was presented as count and percentage. The p value was also calculated and a p value of less than 0.05 was considered statistically significant.

### Results

In our study, majority of the preterm births were late preterm as shown in table 1. In both case and control groups, the maternal characteristics were similar. In our study among the variables considered as maternal sociodemographic and economic parameters, only maternal age > 34 years and low socioeconomic status were significantly associated with increased risk of preterm delivery as shown in table 2.

Table: 1 Distribution of preterm births

Category of preterm birth	Number of patients	Percentage
Late preterm	60	60%
Moderately preterm	18	18%
Very preterm	22	22%

59% of the babies delivered prematurely were male babies while 49 % of babies delivered at term were male babies. 58% mothers who delivered prematurely had a vaginal delivery as compared to 68% vaginal deliveries in the control group. The difference is however not statistically significant. In our study in the preterm birth group, 59% patients had no antenatal visit as compared to only 15 % patients in the control group. So the incidence of preterm births is significantly more in patients not having any antenatal care (p-value <0.01). In our study pre-eclampsia, preterm prelabour rupture of membranes, hydramnios or oligohydramnios, antepartum haemorrhage and genitourinary infections were significantly associated with increased risk of preterm births (p-value <0.01). Women with previous experience of abortion and women with history of previous preterm birth were more likely to deliver a preterm child (p value <0.01). Intrauterine death also significantly increased the risk of preterm birth (p value <0.05).

**Table: 2 Association of maternal socio-demographic characteristics and preterm births**

Maternal socio demographic parameter	Number of preterm births	Number of term births
<b>Age(Years)</b>		
Less than 20	4	1
20-24	15	20
25-29	40	44
30-34	32	34
>34*	9	1
<b>Educational Status</b>		
Below primary	26	20
Primary plus	74	80
<b>Rural or Urban background</b>		
Rural	54	57
Urban	46	43
<b>Socioeconomic Status*</b>		
Poor	58	39
Non-poor	42	61

\*p value &lt; 0.05

**Table: 3 Association of risk factors and preterm birth**

Risk factors	Number of preterm deliveries	Number of term deliveries
<b>PREGNANCY COMPLICATIONS</b>		
PIH/Pre-eclampsia*	20	8
Preterm Prelabour Rupture of Membranes*	19	2
Genitourinary infections*	10	2
Oligohydramnios/polyhydramnios*	14	4
Antepartum haemorrhage*	14	7
Multiple pregnancy	8	5
Gestational diabetes	2	1
Severe anaemia	7	5
<b>PAST OBSTETRICAL PERFORMANCE</b>		
Previous history of preterm births*	26	9
Previous history of abortions*	25	16
<b>FETAL FACTORS</b>		
IUGR/SGA baby	24	16
Fetal distress	22	14
Intra uterine deaths*	13	4
Congenital malformations of the fetus	4	2

\*p value &lt; 0.05

## Discussion

In our study there was a slight preponderance of male babies in the mothers who had a preterm delivery as compared to the mothers who delivered at term. These findings are consistent with other studies.<sup>[6-10]</sup> In our study 44 % patients underwent a caesarean section in the mothers who delivered prematurely; of these almost an equal number of patients had an emergency caesarean section and a planned caesarean section and fetal distress was the most common indication for emergency caesarean section. In the mothers who had a term delivery only 32% mothers were delivered by a caesarean section. These findings are consistent with other studies.<sup>[8,11,12]</sup> In our study; in the preterm birth group, 59% patients had no antenatal visit and only 14% patients had more than three antenatal visits while in the control group only 15% patients had no antenatal checkup and 70% patients had three or more antenatal visits. So the incidence of preterm births is more in patients not having any antenatal care. The difference is statistically significant (p-value <0.01). The results are consistent with the results of other studies.<sup>[8]</sup> Moderately preterm neonates coupled with late preterm neonates constituted nearly three-fourths of all neonates. These findings are similar to observations made in other studies.<sup>[6]</sup> In our study maximum mothers who delivered prematurely were in the age group 25-34 years. Similar observations have been made in other studies.<sup>[6,9,12]</sup> In the present study, elderly mothers (maternal age more than 34 years) were at a significantly higher risk of a preterm delivery (P-value<0.01) as was observed by other researchers.<sup>[8,9]</sup> In the present study, 58% of preterm babies were born to mothers from low socioeconomic strata as compared to 39% babies in term group. This difference was statistically significant (p-value<0.01). These results are similar to other studies.<sup>[13,14]</sup> In our study nearly one fourth of preterm babies were born to mothers with a previous history of preterm birth as compared to 9% mothers who delivered a term baby. This difference was highly significant

statistically (p value<0.01). These findings are consistent with the results of other studies.<sup>[12,15]</sup> In our study, PIH, IUGR, fetal distress and antepartum haemorrhage were the most frequent indications which prompted an intervention at preterm gestational age. These findings are consistent with the findings of other researchers.<sup>[16-18]</sup> Hypertension causes vasospasm in uterine vessels and reduces placental blood flow which in turn causes intrauterine growth restriction.<sup>[18]</sup> High rates of disorders like placental abruption, preeclampsia and intrauterine growth restriction among women with hypertension results in higher chances of preterm birth. In our study premature rupture of membranes was the commonest cause of spontaneous preterm labour. Premature rupture of membranes is the commonest cause of preterm labour accounting for 25.6% cases and is an important preventable risk factor for preterm birth.<sup>[19]</sup> In our study 14% patients were having oligohydramnios/polyhydramnios in the preterm group as compared to 9% in the babies delivered at term. This difference is statistically significant (p-value <0.05). Oligohydramnios/polyhydramnios is associated with significantly higher risk of preterm delivery.<sup>[20,21]</sup> In our study, majority of the preterm births were late preterm as has been observed in other studies.<sup>[6]</sup>

Preterm babies continue to die in perinatal period or have severe neonatal complications which predispose to a higher incidence of developmental complications and sensory deficits. Impressive advances in neonatal care have steadily improved neonatal mortality over last many years; however it is unlikely to reduce it further to a significant level. The onus is now on understanding the causes and mechanisms of parturition so that preterm labour can be prevented and preterm birth is allowed to happen electively for the benefit of the mother-fetus. PIH, preterm prelabour rupture of membranes, maternal genitourinary infections, antepartum haemorrhage, multiple pregnancy, previous history of preterm labour and IUD are major causes of preterm labour. A good and proper antenatal care can prevent PIH and

reduce maternal genitourinary infections to a large extent and thus reduce the burden of preterm births.

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