

# RISK FACTORS FOR PRETERM BIRTHS IN A TERTIARY CARE HOSPITAL, LADY READING HOSPITAL, PESHAWAR

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## ABSTRACT

**Objective:** To determine the various maternal and neonatal risk factors of preterm birth.

**Methodology:** A descriptive case series was conducted from 1<sup>st</sup> January 2010 to 31<sup>st</sup> December 2010. In this study all cases, a live Pre term birth (PTB) (29 – <37 weeks) by vaginal delivery or caesarean section and their mothers were included.

**Results:** A total of 205 (04.04%) neonates were identified as premature neonates. Majority (29.3%) were in the age range of 2 days with mean age of  $1.5073 \pm 1.2627$  days. Out of 205, 51.7% were male and 48.3% were female. Maternal age of 21-35 years was recorded in majority 79.51% with mean age of  $28.10 \pm 5.8982$  years. Majority of mothers (96.1%) were illiterate, 76.6% belonged to rural areas, 76.1% belonged to poor class, 35.1% were multiparas. A history of Premature rupture of membrane (PROM) was found in 61% cases, history of burning micturition 4.9%, physical injuries 0.5%, polyhydramnios 14.14%, previous low birth weight baby 41.5%, threaten abortion 27.8%, antepartum hemorrhage 36.1%, previous perinatal loss 31.2%, previous premature birth 30.2%, maternal pyrexia 14.1%, previous twins 6.3% and placenta previa 4.4%.

**Conclusion:** Frequency of prematurity was 04.04%. Among the various risk factors maternal age, illiteracy, rural residence, poverty, joint family setup, history of PROM, previous low birth weight babies, history of antepartum hemorrhage, multiparity, previous perinatal loss, previous premature babies, threaten abortion, were the prominent risk factors found in majority of cases.

**Key Word:** Prematurity; preterm births; maternal and fetal problems.

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## INTRODUCTION

Pre-term birth (PTB) is a major determinant of neonatal mortality, morbidity and childhood disability and remains one of the most

serious problems in obstetrics. PTB is defined as gestational age at birth of less than 37 completed gestational weeks. It is further classified into three main categories: mild, very pre-term and extremely pre-term for births occurring at 32–36 weeks, 28–31 weeks and less than 28 weeks respectively, with average frequencies of 85%, 10% and 5%, respectively<sup>1-3</sup>. Over the past two decades despite major preventive efforts, the incidence of PTB has remained constant at about 5–10% of live births in most countries<sup>4-6</sup>. Approximately 12.7% of births are preterm and 2% are less than 32 weeks. It is estimated that 70 to 80% of PTBs occur spontaneously. The remaining 20 to 30% of PTBs are due to intervention for maternal or fetal problems<sup>7,8</sup>.

Worldwide data on the incidence of preterm birth are unreliable, but incidence ranges between 5% in developed countries and 25% in

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developing countries<sup>9</sup>. Wide scale national data is lacking in this respect to show the incidence in our country<sup>10</sup>.

The main causes of preterm delivery are spontaneous premature labor, premature rupture of membranes, and therapeutic induction of labor (indicated on the basis of fetal or maternal complications). Recent studies have also suggested genital tract infections, stress, anxiety, and depression as determinants of preterm birth. An association between the indiscriminate use of cesarean sections and increased preterm birth rate has also been observed in Ribeirão Preto, Brazil. However, in most cases the etiology of preterm birth is unknown<sup>11-13</sup>.

In 75% of PTB cases no obvious causes have been established, but several etiological risk factors have been identified. Non-obstetric risk factors include: poor socioeconomic status<sup>14,15</sup>, maternal malnutrition<sup>16,17</sup>, illiteracy<sup>17,18</sup>, maternal age of <20 and >35 years<sup>18,19</sup>, heavy manual work<sup>20</sup>, cigarette smoking<sup>21,22</sup>, long distance travel<sup>23</sup>, and trauma<sup>24</sup>. Obstetric risk factors associated with PTB include: uterine malformations, placenta previa, abruptio placentae, cervical incompetence, multiple gestations, short birth intervals, abortion, pre-labor premature rupture of membrane (PPROM) and previous PTB<sup>16,19,20,23,25-30</sup>.

A number of other medical conditions have also been associated with PTB including: heart disease, lung disease, hypertension, and anemia; a history of preterm delivery or low birth weight children, Diabetes mellitus, urinary and genital tract infections and psychological stress<sup>23,31,32</sup>. Fetal disorders such as fetal erythroblastosis, fetal distress, or intrauterine growth retardation (which might require preterm delivery); and inadvertently performed early delivery<sup>12</sup>.

The objective of this study was to determine the various risk factors for PTB that could be targeted to reduce the risk of PTB in this region.

## METHODOLOGY

The study was conducted in the Department of Pediatrics and Neonatology, Postgraduate Medical Institute, Lady Reading Hospital, Peshawar, during the one year period from 1<sup>st</sup> January 2010 to 31<sup>st</sup> December 2010. PTB cases were selected for the study admitted in the Department of Pediatrics and Neonatology, PGMI/LRH, Peshawar.

**Inclusion criteria:** In this study all cases, a live PTB (29 – <37 weeks) by vaginal delivery or caesarean section and their mothers were included.

Informed consent was obtained from all study subjects before enrollment in the study.

**Exclusion Criteria:** Elective cases of preterm labour and twin pregnancies were excluded.

**Methodology:** All mothers of included cases were interviewed face-to-face using a specially designed questionnaire. In addition to general background information, respondents were asked questions about suspected risk factors. Socioeconomic status included per month income of the head of family, house, locality etc. Information about suspected risk factors for the present pregnancy and past obstetric history were obtained from the patient and/or from the clinical case record as applicable. The patients were asked about the diagnosis and treatment of four conditions during pregnancy: diabetes, typhoid fever, urinary tract infections and genital tract infections.

All the qualitative variables like gender, maternal socioeconomic, demographic data, past obstetric history, present pregnancy, suspected risk factors were analyzed for percentages and frequencies. Mean  $\pm$  standard deviation was calculated for quantitative variables like age of premature neonates and maternal age. For gender male to female ratio of premature neonates was calculated. The results were presented through tables, and figures. All the data was analyzed by statistical program SPSS version 12 for windows.

## RESULTS

Out of 5062 children admitted in Pediatrics and Neonatology Department, PGMI/LRH, Peshawar during the period from January 01, 2010 to December 31<sup>st</sup>, 2010, only 205 neonates with the frequency of 04.04% were identified as premature neonates. So a total of 205 PTB cases were included in the study.

Majority of premature neonates 165 (80.49%) were in the age range of 0-2 days, followed by 40 (19.51%) were in the age range of 3-5 days. Overall age range was from 0 day to 5 days with mean age of  $1.5073 \pm 1.2627$  days.

Out of 205 neonates, majority 106 (51.7%) were male and 99 (48.3%) were female with male to female ratio of 1.07: 1 (Table 1).

Maternal demographic data i.e. maternal age, educational status, residential area, socioeconomic status and other details are mentioned in Table 2.

Various risk factors for prematurity e.g. multiparity, time interval between the two pregnancies, period of gestation (POG), antenatal care (check up), history of PROM, history of

burning maturation, polyhydramnios, previous low birth weight baby, threaten abortion, history of antepartum hemorrhage, previous perinatal loss, previous premature birth, maternal pyrexia, previous twins are mentioned in Table 3.

Among anomalies i.e. placenta previa, and

ovarian cyst, and their relative frequencies are mentioned in Table 3.

Associated medical disorders included PIH, eclampsia, anemia, fibroid, and diabetes mellitus are also given in details in Table 3.

**Table 1: Various Characteristics of Preterm Neonates (n=205)**

Neonatal Demographic Data		No. of Cases	Percentage
Frequency of pre term		205/5062	04.04%
Age:	0 - 2 days	165	80.41%
	3 - 5 days	40	19.51%
<b>Gender distribution:</b>			
	Male	106	51.7%
	Female	99	48.3%

**Table 2: Demographic data of mothers of preterm babies (n=205)**

Maternal Demographic Data		No. of Cases	Percentage
Age:	15 - 34 years	154	75.12%
	35 - 45 years	51	24.88%
<b>Educational status:</b>			
	Illiterate	197	96.10%
	Matric (secondary)	04	02.00%
	F.A. (Higher secondary)	02	01.00%
	Middle	02	01.00%
<b>Residential status:</b>			
	Rural	157	76.60%
	Urban	48	23.40%
<b>Socioeconomic status:</b>			
	Poor (monthly income up to 10000/-)	156	76.10%
	Middle (monthly income > 10000/- to 20000/-)	49	23.90%
<b>Type of family setup:</b>			
	Joint	147	71.70%
	Nuclear	58	28.30%

**Table 3: Risk Factors of Preterm (n=205)**

Risk Factors	No. of Cases	Percentage
History of PROM	125	61.00%
Previous low birth weight babies	85	41.50%
History of antepartum hemorrhage	74	36.10%
Multiparity	72	35.10%
Previous perinatal loss	64	31.20%
Previous premature babies	62	30.20%
Threaten abortion	57	27.80%
Polyhydramnios	29	14.14%
Maternal pyrexia	29	14.14%
Previous twins	13	06.30%
History of burning micturition	10	04.00%
<b>Time of interval between two pregnancies:</b>		
1 to 2 years	143	69.75%
2.1 to 2.5 years	04	02%
<b>Period of gestation (POG):</b>		
25 -30 weeks	31	15.12%
31 -36.5 weeks	174	84.88%
<b>Antenatal Care (checkup):</b>		
Done	20	09.75%
Not done	185	90.25%
<b>Anomalies:</b>		
Placenta previa	09	04.40%
Ovarian cyst	02	01.00%
<b>Associated medical disorders:</b>		
Pregnancy induced hypertension (PIH)	61	29.75%
Eclampsia	06	02.92%
Anemia	03	01.50%
Fibroid	02	01.00%
Diabetes mellitus	02	01.00%

## DISCUSSION

In a local study total numbers of deliveries during the study period (from January 2006 to December 2007) were 1815, so the frequency of preterm birth was 7.5%. They have eliminated twins pregnancies and elective preterm deliveries in their study, so the actual frequency of preterm birth will higher than this figure<sup>10</sup>. Anyway our reported frequency is 04.40% which is comparable to the reported worldwide figure<sup>33-35</sup>.

In an analysis a significant risk association was found between PTB and women who conceived at younger but not at older ages. Contradicting results have been observed in other studies between the age of the mother at conception and PTB<sup>18,36</sup>. In our study 11.70%

women were less than 20 years of age, while > 35 years (range 35-45) were 24.88% making an overall 36.58% risk for prematurity. These results are corresponding with the studies in which advance maternal age was a risk factor for prematurity<sup>29,30</sup>.

In this study multiparity was recorded in 35.10% cases. In some studies no significant association was observed between PTB and parity. Some cross-sectional analyses have reported an association with high parity, while others showed no effect of parity on the occurrence of PTB<sup>28,37</sup>.

In one local study<sup>10</sup> cause of preterm birth was multifactorial in a high proportion of the cases. Anemia was detected as the commonest

aetiological factor (45%) in the aforesaid local study<sup>10</sup>. This association is being documented in another studies too<sup>38,39</sup>. This reflects poverty leading to anemia due to nutritional deficiencies in rural areas. This is the fact that in rural communities poverty is proportionate to anemia which leads to preterm birth in a significant number of cases.

Poor socioeconomic background and illiteracy were also both found to be significantly associated with PTB. Similarly, significant associations were observed between PTB and heavy manual work and caring for domestic animals. All these conditions are interrelated and are proxies for low socioeconomic status. Other studies have also found that limiting the amount of work done by pregnant women and avoiding fatigue helps reduce the risk of PTB<sup>16,17,23,28</sup>. Our study's results are also in agreement with above mentioned studies showing that the majority of women were illiterate (96.1%), residents of rural areas (76.6%) and belonged to poor class of the society, which are commonest risk factors for prematurity. Due to lack of education in rural community, women are unaware of the consequences of preterm birth and which is also responsible for late arrival to health care facilities when no one can do any measure to save the pregnancy.

Preterm deliveries in previous pregnancies have been associated with high risk of preterm birth in the next pregnancy<sup>40</sup>. In a local study past history of preterm birth was positive in 25% of cases while 8.8% of the cases had more than one second trimester miscarriage in the past<sup>40</sup>. Similar association was observed in another study<sup>39</sup>. In our study previous low birth weight baby and previous premature birth were encountered in 41.5% and 30.2% cases respectively.

In our study 90.25% of the patients were lacking of any antenatal care, as seen in other studies too<sup>28,39</sup>. Maternity care is likely to be of importance in screening for risks of preterm birth like infections, inadequate nutrition, medical disorders and cervical incompetence. While one study found that cases had undergone a greater number of antenatal care visits than had the controls, mainly for pregnancy complications. The coverage of antenatal care was very low in about 33% in one study, and antenatal visits are mainly made for high-risk pregnancies in other parts of the world too<sup>41</sup>.

A study<sup>28</sup> also revealed significant risk associations between the presence of cervical incompetence, multiple pregnancies and previous PTB. This, too, is in accordance with other studies<sup>16,19,20,25</sup>. Our results are also comparable with

this finding. Multiparity was recorded in 35.1% cases and PTB in 30.2% cases.

A study investigated the possible association of PTB with histories of other medical diseases, like diabetes mellitus, maternal pyrexial illnesses with PTB<sup>1</sup>. Accidental hemorrhage has also been suspected as a risk factor<sup>27</sup>.

In this study we have found that associated medical disorders were encountered with varied frequencies e.g. pregnancy induced hypertension (PIH) in 29.75% cases, eclampsia in 2.92%, fibroid in 1%, diabetes mellitus in 1% cases respectively.

In one study<sup>39</sup> frequency of fetal anomalies was quiet high (10.3%) as compared to other studies. The commonest ones were neural tube defects. Folate deficiency is also responsible for more cases with abruptio placenta in the aforesaid study as compared to other study<sup>28</sup>. In our study among anomalies placenta previa was found in 4.4% cases, mass in uterus, ovarian cyst, obstructed cervix, cord around neck, fetal encephalocele, and polyp was recorded in 1% case respectively.

The differences in study results are mainly attributed to the types of study design, the variables measured and analyzed and other factors.

## CONCLUSIONS

From the results of this study it is concluded that prematurity is a frequent finding in our community. Among the various risk factors, maternal age; illiteracy, poverty; joint family setup; history of PROM and no antenatal checkup; and associated medical disorders like pregnancy induced hypertension were observed risk factors associated with PTB in this study. However, all these risk factors, which have been found to be associated with PTB, are modifiable.

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None Declared

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#### **CONTRIBUTORS**

MI conceived the idea and planned the study. AA, KFA, MH, RK, MH, NA & BK did the data collection and analyzed the study, SR supervised the study. All the authors contributed significantly in the manuscript.